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VOLUME 7

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DERUNOV, KONSTANTIN NIKOLAEVITCH

Konstantin Nikolaevitch Derunov (1866–1929) was an outstanding Russian library scientist and bibliographer. His main contribution was the monumental *Bibliography of Russian Reviews in 325 Russian Periodicals for 1850–1928* (about 300,000 entries in an unpublished catalog). Of great interest is his paper "The Vital Tasks of Bibliography—Results and Past Experience of Russian Bibliography in the Course of 200 Years" (Zhiznenniye zadachi bibliografii—itogi i uroki proshlogo russkoy bibliografii za 200 let), published in *Bibliograficheskiye Izvestiya*, **1913,** Nos. 1 and 2.

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<div align="right">OLGA AKHMANOVA</div>

DESCRIPTIVE BIBLIOGRAPHY

Descriptive bibliography is one of the two main end products of the processes of critical bibliography (q.v.). The other is textual bibliography (q.v.). Descriptive bibliography is connected with critical bibliography in the sense that it records the facts relating to a book which the critical method has uncovered. Because descriptive bibliography is applied to a wide and ever-increasing range of books, it becomes progressively more difficult to generalize as to the exact methods of descriptive work. It is not to be expected that the same criteria could apply to an incunabulum, an eighteenth-century plate-book, an Elizabethan pamphlet, and a nineteenth-century novel. The function of descriptive bibliography can be fully discussed and general methods can be evolved, but the path beyond these points is fraught with difficulty.

In any study which has an entirely practical outcome as its main result it is common to find instructional manuals of a basically factual nature. There is a group of these which provide an entry into this field and which give as much direct instruction as is possible by this means. McKerrow's *An Introduction to Bibliography for Literary Students* (*1*) still provides the best general approach to all the problems of bibliography, and *Esdaile's Manual of Bibliography* (2) leads gently in from general considerations of bibliography to some of the specific problems of collation and description. J. D. Cowley's *Bibliographical Description and Cataloguing* (3), although old, still has material of interest in that it introduces the tyro to specific and factual problems at an elementary level. The turning point, however, in the literature of the subject came in 1949 when Fredson Bower's *Principles of Bibliographical Descrip-*

tion (4) was first published. This is a massive and provocative survey of the field but it assumes both a lively interest in and considerable knowledge of critical bibliography at the outset. With varying degrees of complexity, these books provide the main instruction necessary at an early stage and, in certain instances, can apply stimulus to an awakened experience.

The most important sources of information, however, are the major descriptive bibliographies themselves. These put all the theory into practice and can be appreciated and judged against the evidence of the books themselves. The present intention, therefore, is to look at a few of the major bibliographical tools to see what were the bases of their compilation. In order to demonstrate the variety of approaches to the description of bibliographical items, the examples are taken from different categories of material.

The field of incunabula (books printed in the fifteenth century) raises many individual problems. The art of printing was young at this time. Type designs were in an evolutionary state, many of the printers worked anonymously, and the place and date of printing are frequently difficult to establish with certainty. Although these are matters which are primarily the concern of critical bibliography, the descriptive work is naturally affected. Because the process of printing a particular book may be a highly individual operation, it is necessary to be as specific as it is possible to be. The best working example of the bibliographical description of incunabula is the great catalog, still in progress, of the British Museum. The *Catalogue of Books Printed in the XVth Century now in the British Museum* (5) began publication, with Part I, in 1908, but is more widely known through its lithographic reprint of 1963. The introduction to the original part was written by A. W. Pollard to whom "the arduous work of cataloguing the collection has been entrusted" with "the assistance of two other members of the staff of the Department of Printed Books, Mr. A. J. K. Esdaile and Mr. J. V. Scholderer" [Note by G. K. Fortescue]. Pollard's introduction provides an admirable example of the kind of background information which is required in conjunction with the bibliographical entries themselves. It also provides users of tools such as this with an example of the impossibility of using such a work effectively until the introduction has been studied in detail. To the student of bibliographical description it provides, together with the introductions to the succeeding parts, the best survey of the problems in this area of work accompanied by a plenitude of examples.

Pollard surveyed the work of his predecessors in the bibliographical description of incunabula, with especial reference to Robert Proctor whose work had such a direct bearing upon this catalog. Pollard discussed the arrangement of the entries in the catalog, the decisions taken in a variety of instances, and the nature of the evidence upon which these decisions were founded. This catalog has proved its stature in the years since its publication and, at this remove of time, it is of special interest to re-read Pollard's discussion of some areas of evidence. It indicates very clearly the solid foundations on which the whole work was compiled and, in a number of cases (notably watermarks), it points to the advances made since the time of publication. Indeed, this is one additional service rendered by the modern reprint, which

was reproduced photographically from the British Museum's own copy of the cata-
log. This is kept up to date by manuscript amendments and it is salutary to observe
the high percentage of entries so revised. The rate of advance in bibliographical
studies can be judged by the nature of many of the changes and, additionally, it is
certain that the spur and the knowledge which the original catalog gave to the
study of incunabula was in itself largely responsible for that advance. One small
self-contained paragraph, on the question of pin-holes as evidence, provides an
example of this aspect of the introduction (pp. xiv-xv):

> One detail as to the methods of the early printers may be mentioned here because
> both its use and its disuse were obviously prompted by the desire that their books
> should present a good appearance. In order to get the type-page in the same
> position on each page, the paper was kept in position by means of pin-points. In
> the 42-line Bible there are said to have been as many as ten of these pin-points to
> each leaf, four at the top, four at the foot, and two on the outer margin. Each of
> these pins left its mark on the paper in a little hole, but many of these pinholes
> have been cut off and others closed up by the heavy pressure used by modern
> binders. Often, however, they are distinctly visible and sometimes very unpleasantly
> so. If the paper were worked fairly dry, and ordinary care used, the pinhole is
> literally a pinhole, but a combination of damp paper and a pull against the pin in
> taking it off the press greatly enlarged the puncture and sometimes resulted in a
> tear. Hence the object of a careful printer was to reduce his pinholes to as few as
> possible. At a very early date the ten pinholes mentioned above had been reduced
> to four, and in the case of several printers the further reduction from four to two,
> and the final abandonment of pinholes altogether, form very useful landmarks.
> Thus Schoeffer appears to have changed from four pinholes to two in the second
> half of 1474, and to have given them up at the beginning of 1477. Mentelin, on
> the other hand, made the first change as early as 1466, and the second probably
> some time in 1473. The career of each printer is thus at once divided into three
> periods, into one or other of which any book which is available for examination
> in an uncropped copy can at once be placed. Ulrich Zel seems to have made his
> changes very rapidly. In his small quartos he was using four pinholes in 1467, two
> in 1469, and none in 1472. Of his folios only one book in the Museum collection
> has four, a good many printed about 1473 have three. By 1474 they seem to have
> been reduced to two, and soon afterwards were dropped altogether. It is thus only
> for the first eight or nine years of Zel's long career that we get any help from this
> source, but for this period the pinholes are very useful.

The final worth of the catalog depends on two things; the quality of the collection
which the British Museum houses and the efficiency of the descriptions in recording
the salient details of the books. The former is beyond doubt; it is one of the great
collections of the world. The second can only be assessed by looking in some detail
at one of the entries. The example chosen (see Figure 1) is not of a book of any
outstanding importance, but it exemplifies the kind of information which can nor-
mally be expected in a compilation such as this.

The techniques of printing were fairly securely established by the end of the
fifteenth century. From that point onward, until the beginning of the nineteenth cen-
tury, one main interest resides in the ever-increasing range of the material printed
and the adaptation of printing methods to serve those ends. So far as English print-

JACOBUS DE VORAGINE. Legenda
aurea. [In a Dutch translation.]
*'10' May, 31 July, 1478.

PART I: 1ᵇ. Hier beghint ce[n] [n]uttelijc boec dat ‖ mē
hiet dat passionael dat welc in ‖ latijn is gheheten Aurea
legenda . . . Ibid., col. 2: Dit is die tafel vanden somer stic
‖ vanden passionael . . . 2ᵇ, col. 2, l. 25: Explicit tabula ‖‖
G L ‖‖ Die hystorie vander verrisenissen ‖ ons herē ihesu
xpī optē paeschdach (3ª) [C]Ristus verrees ‖ opten
derden ‖ dach. . . . 268ᵇ, COLOPHON: (red) Hier is voleyndet
bider gracien ‖ goods dat somer stuc vandē passi ‖onael. bi
mi gheraert leeu ter gou ‖de in hollant Int iaer ons herē
M. ‖ CCCC eñ lxxviij. op die pinxter ‖ auont den tienden
dach in meye ‖‖ DEVICE A (red). PART II: 2ª. [D]It is die
tafel vā desen teghē ‖woerdighen boec datmē hiet ‖ dat
winter stuc vanden passionael . . . 2ᵇ, col. 2, l. 24: Explicit
tabula ‖‖ G L ‖‖ (3ª) Hier beghint dat prologus vā dat ‖
passionael ende is ghehetē in latijn ‖ aurea legenda dat
beduut in duut‖sche die gulden legende ‖ [L]Anghe tijt
hebbe ic ghe ‖weest versocht. ende seer ghebeden om wt
te latijn ‖ in duutsche te maken een boec dat=‖men in latijn
hiet aurea legenda . . . 265ᵇ, COLOPHON: Bider gracien
goods is hier vol ‖eynt. dat winterstic vanden possio ‖nael.
bi mi gheraert leeu ter goude ‖ in hollant Anno domini
M. cccc. ‖ lxxviij. den lesten dach van Iulio ‖‖ DEVICE A.

Folio. Part I: A b–d¹⁰ e⁸ f–i¹⁰ k⁸ l–r z f s t v u–z⁸·¹⁰ ז ⁵ Aˣ Bⁱ.
268 leaves, 3–268 numbered I–CClxviij, with errors. Part II:
A¹⁰ a–h¹⁰·⁸ i k¹⁰ l–r ז¹⁰·⁸ f¹⁰ s⁶ t v¹⁰ u–z ז ⁵ aaⁱ. 266 leaves, the
first and last blank, 4–265 numbered I–CClxv, with errors. 2
columns. Part I, 3ª: 35 lines, 190 × 140 mm. Type: 108 G.
Capital spaces, some with guide-letters. Campbell *1755.

In 1478 'pinxter auont' fell on 9 May.

In both parts the signatures of the first quire begin on 3ª. In
Part I 4ª and 5ª are signed in lower case: a ij, a iij respectively.
In Part I the signatures are printed below the inner column, the
foliation below the outer column; in Part II vice versa.

The copy in Cambridge University Library (ULC 3385) has
the device at the end of the Pars hiemalis printed in red. The
red there has traces of black ink at the edges, suggesting that
copies in black had been printed previously.

276 × 203 mm. Without the blanks. Fully rubricated.
On 1ª of Part I is written: Dyt boch hoert tue maerken
wyllem bouuēs dochter wyllem jan reyersʒ vedue, and: . . .
Cornelis eñ Gertrut willems dochter Anno xxxvj. At the
beginning is inserted a leaf from a printed Missal, con-
taining on one side a full-page hand-coloured cut of the
Crucifixion. From the Enschedé collection. Bound in
half brown morocco at the British Museum bindery.

Bought in July, 1868. IB. 47306, 47307.

FIGURE 1. *An example from* Catalogue of Books Printed in the XVth Century now in the
British Museum *(Part IX, p. 31).*

ing was concerned, it reflected, at the end of the sixteenth century, the literary genius of the period. It is particularly apt that one of the outstanding descriptive bibliographies is devoted to the English drama of this time, and its importance is enhanced by the fact that it was compiled by one of the greatest of all bibliographers. Sir Walter Greg's *Bibliography of the English Printed Drama to the Restoration* (6) was published in four volumes between 1939 and 1959. It is a work which occupied Greg, amid a host of other fundamentally influential writing, throughout 60 years of his long life. It was a logical outgrowth of his two handlists issued in the early years of this century. In contrast to the British Museum's fifteenth century catalog, Greg's work is essentially a bibliography and not a catalog, but it maintains similarly impressive standards. One other distinguishing feature in Greg, as opposed to the catalog of incunabula, stresses an important aspect of bibliography to which Greg himself always gave due weight.

It offends very few people to suggest that incunabula as a whole are prized more for their worth as pieces of printing than as vital pieces of text. With the English Elizabethan and Jacobean drama, however, almost the exact opposite is true. Prime interest in them lies in their intrinsic worth or interest as pieces of dramatic text. Because of this, many bibliographical tools approach these plays from a literary viewpoint. The adjudged literary merit of a play tended to dictate the amount of attention it would receive from a bibliographical standpoint. Greg's constant theme was that bibliography had no connection with the subject matter or literary content of the book; the interest in this instance would lie simply in the physical nature of the book itself. Each title would be approached solely from that angle and bibliographical matters alone would be discussed in the entry. This is the project exactly as Greg carried it out. The "Introduction," which he wrote on the completion of his work and published in Volume 4, is a text as important to bibliographical description as the introductions to the fifteenth century catalog. A typical entry from Greg is given as Figure 2 in order to demonstrate the likenesses and dissimilarities between a bibliography of sixteenth century dramatic texts and a catalog of incunabula. In this instance, it is a part of the large entry devoted to Marlowe's *Doctor Faustus*, a play on which Greg did a considerable amount of work and of which he produced a separate study in 1950. It must be emphasized that this is not the complete entry for the play, but it goes as far as is necessary to demonstrate the main aspects of a bibliographical description of a work of this nature.

As was the case with the catalog of incunabula, the thing which distinguished Greg's bibliography was the incalculable amount of experience he brought to his work. This has to be stressed on every possible occasion, because this is the reason why "descriptive bibliography" can not be regarded as a study on its own. Once the bibliographical nature of the book is fully understood, and this is the role of "critical bibliography," then descriptive work is stripped of some of its chief terrors. For example, Greg was able to reduce a complicated make-up of a book to manageable proportions in a collation entry and to set it down with superb clarity. It was a clarity which resulted from the depth of his own understanding of the matter as demonstrated by the relevant section of his introduction (pp. lvi–lviii).

205 Doctor Faustus 1604

SR 1592 Dec. 18. *Ordered in full Court (as between A. Jeffes and T. Orwin) that, if the book of Doctor Faustus shall not be found entered to R. Oliff before Jeffes claimed it about May last, then the copy shall remain to Jeffes from the time of his first claim.*

Since the earliest known copy of the prose history was printed by Orwin in 1592, it is presumably to that and not to the play that the above entry refers. No entrance either to Orwin or Oliffe is known; the earliest recorded being that of 5 Apr. 1596 to Edward White, 'he havinge thinterest of abell Jeffes thereto'. The imprints of later editions of the history allow us to conclude that it is again the same work that appears in transfers of 27 June 1646 and 4 Apr. 1655, though in the latter there has evidently been some confusion with the play (see below). Transfers of 16 Oct. 1609, 2 Mar. 1618, and 23 Feb. 1626 refer to 'The Second Report' entered 16 Nov. 1593, of which two editions are extant dated 1594. A 'Dr. Faustus' assigned by E. White sen. to T. Pavier and J. Wright sen. on 1 Sept. 1609 (Court-Book C, 57ᵃ), was no doubt the 'History of Doctor Faustus' assigned by the widow of T. Pavier to Brewster and Birde on 4 Aug. 1626: it was presumably some narrative, but nothing seems known of it.

SR 1601 Jan. 7. *Ent. T. Busshell: lic. Barlowe: a booke called the plaie of Doctor Faustus.*

*** Three different versions of the play may be distinguished. The earliest appears in the first quarto (*a*), which was reprinted in (*b*), this being in turn reprinted in (*c*). The second version first appeared in (*d*). This differs from the first textually throughout and is considerably expanded, clearly resting on a different manuscript source, though it would seem either that (*d*) was actually set up from a corrected copy of (*b*) or (*c*), or that one of these was at least consulted in its preparation, since both corrections and errors are carried over into the new version. Editions (*e*) to (*i*) were each in turn printed from its immediate predecessor without material alteration. Lastly (*j*) was printed from a copy of (*i*) in which the text had been minutely revised to eliminate any suspicion of profanity and in which substantial omissions and additions had been made: this constitutes a third version. A statement by Collier (*Notes and Queries*, 28 Sept. 1861, 2nd Ser., xii. 242–3) that the edition of 1611 (*c*) contained variations and additions found neither in the first nor the second version was no doubt due to his having before him, not a copy of (*c*), but a copy of (*j*) in which the date had been tampered with (see below).

(*a*) THE | TRAGICALL | Hiftory of D. Fauftus. | *As it hath bene Acted by the*
1604 *Right | Honorable the Earle of Nottingham his feruants.* | Written by Ch. Marl. |
[device 142] | LONDON | Printed by V. S. for Thomas Bufhell. 1604.

HT] The tragicall Hiftorie | of Doctor Fauftus. | [ornament]

RT] The tragicall Hiftory of | Doctor Fauftus.

Colophon] [none : in its place device 313]

Collation: 4°, A–F⁴, 24 leaves unnumbered. B.L.
Title, A1 (verso blank). Prologue by 'Chorus' (28 ll. 'Not marching now in fields of Thracimene,') with HT, A2. Text (not distinguished) on A2ᵛ. Epilogue by 'Chorus' (8 ll. 'Cut is the branch that might haue growne ful straight,') subscribed 'Terminat hora diem, Terminat Author opus' and device on F3 (verso and ? F4 blank).
Catchwords : A–B, Wag. C–D, letter E–F, Come [subscription]
In verse and prose with verse prologue and epilogue by the chorus and one appearance of the same in the text but not otherwise divided.
Notes—1. The text, including choruses, is in black letter with roman and italic for incidental use.
2. The internal chorus is on D2ᵛ. A speech assigned to Wagner on D1 apparently represents another entry of the chorus, the error being perhaps due to a doubling of the parts.
3. The printer appears from his initials and the device on the title to have been Valentine Simmes. The device at the end is Bushel's.
Copy : Bodl. (–F4)

(*b*) [lace ornament] | THE | TRAGICALL | Hiftory of the horrible | *Life and death* |
1609 OF | DOCTOR FAVSTVS. | Written by Ch. Marl. | [pair of ornaments] |
Imprinted at London by *G. E.* for *Iohn | Wright* and are to be fold at |
Chrift-church gate | 1609. [gate (*no point*)]

HT] The tragical hiftory | of Doctor Fauftus. | [ornament]

RT] The Tragicall hiftory of | Doctor Fauftus. [tragicall *in* CE, Hiftory *on* A2ᵛ]

Colophon] [none : in its place device 320]

Collation &c. as before except catchword A–B, VVag [Wag] (F4 blank). B.L.
Notes—1. The text, including choruses, is in black letter with roman for incidental use.
2. The printer appears from his initials and the device to have been George Eld.
Copies: Hunt. (—F4) Staatsbibliothek, Hamburg (+ F4)

SR 1610 Sept. 13. *Tr. T. Busshell to J. Wrighte: the tragicall history of the horrible life and death of Doctor Faustus, by C. M.*

This would appear to be the formal record of an earlier private agreement, unless it is the compounding of a piracy.

FIGURE 2. *A typical entry from* Greg's Bibliography of the English Printed Drama to the Restoration *(Vol. 1, pp. 205–206).*

The next item in the collation proper is the collational formula, which I propose to call the "register." Originally, the *registrum* or register was a feature added at the end of a volume, consisting of a list of the signatures used in printing it and a specification of the number of leaves (or rather of double-leaves or folds) in each. It is common in Italian books down to the end of the sixteenth century, but rare in English books and mostly confined to the fifteenth century. McKerrow (*Introduction*, p. 87) cites an Oxford example of 1483, which enumerates the signatures from A to Z and from Aa to Cc and adds the note "omnes isti sunt terni Dd vero est quaternus," meaning that all quires are sixes except the last which is an eight. The term "register" has sometimes been mistakenly used to mean the signatures themselves, an unsigned volume being said to be without register, but I think the proper meaning is now recognized (see O.E.D., s.v., 7c). It served the same purpose as the modern collational formula, which may therefore be conveniently known by the same name. Its object of course is to indicate in as brief and precise a manner as possible the make-up of the volume. No one who consults the present work is likely to be ignorant of at least the general principles on which a collational formula is constructed; but since I have been forced into certain elaborations which are less generally recognized, it is incumbent on me to give some fairly full account of the matter. This will be found in Excursus IV. It will, however, be convenient to deal here with certain explanatory notes that I sometimes append in brackets to the register. They treat of various peculiarities in the manner in which signatures are used in the originals, and with misprints in the same. It is unusual for every leaf of a quire to be signed. Of course some leaves in a volume are hardly ever signed. It is extremely rare to find a signature on a half-title, a title-page, or even a special title (in a collection); it is almost equally rare to find one below the finis at the end of a book; and it is quite common for the signature to be absent from a page on which an epistle, a prologue, or even an act ends, or indeed from any page that is not full. Any general statement about signatures must be understood to be subject to this qualification: for instance what is said in the text refers to the signing or not signing of leaves that are no wise typographically peculiar. A signature is always on the recto of the leaf. As a rule the printer put a signature on each leaf in the first half of a quire—that sufficed to ensure correct folding or gathering—and if he was careful he put one on the first leaf of the second half as well, to show that nothing was missing in the middle. This applies to formats from octavo upwards. There are peculiarities in the case of duodecimos, in which sometimes only leaves 1 to 3 and 5 are signed. This is because, in one method of folding this format, one third of the sheet, containing leaves 5 to 8, was cut off, folded separately, and placed within the other portion, containing leaves 1 to 4 and 9 to 12. But the format is not very common in plays. Thus in a quarto in fours we usually find either two or three leaves signed at the beginning of each quire. I think that in earlier books three is the usual number, but that after the middle of the seventeenth century two is the more common. Be this as it may, either number was perfectly normal and calls for no comment. But the signing of only one leaf or of all four leaves is exceptional and is worth recording. If a quire is signed on every leaf I call it "fully signed" and add a note to that effect. Meaning of course that *normally* each leaf is signed: cf. note † on p. lvi. The note "fully signed" by itself refers to the whole book: if, as often happens, it is only certain quires that are fully signed, these are specified. If only the first leaf of each quire is signed I note "$1 only signed." For the symbol $, meaning any or every signature, see note * on p. li. Another curious custom, a custom said to be distinctive of Robert Waldegrave though it was not peculiar to him, is that of placing the signature letter on the first leaf of the quire only, and only numerals on those that follow. I describe this by the note "signature-letter not repeated" [139, 140(a), 196(a)]. Like peculiarities

may of course occur in other formats, and if they do are similarly noted. They are, however, less frequent: I need only mention that most folios in twos are fully signed. Much more frequent and troublesome are the misprints that occur in signatures; for while they are less common than in foliation or pagination they are by no means rare, and since signatures are taken as the basis of reference they cause much more inconvenience. The way in which I record misprints (and with which I am not altogether satisfied) is to add a note running, for instance, "misprinting B3 as B5, C1 and D1, . . .". I should remark that I do not necessarily give the misprint in the actual form in which it occurs: thus in the example just quoted B5 and D1 only mean that the signatures are such as I should normally render as B5 and D1 (see p. cli). Actually B5 might very likely appear as "B.v.," and D1 would normally appear as "D." If it is desirable to give the signature exactly as it appears in the original it is given in quotation-marks: for instance the note might read "misprinting D1 as 'Ɑ'." Supposing a figure had been omitted from the signature D2, the note would run "misprinting D2 as 'D' " not "as D1," which in such a case would be misleading. But even so, being within quotation marks, such a signature follows the rules of quotation (not transcription) and the distinction between roman, italic, and black letter is not preserved: it can in fact never be relevant to the misprint. I record the omission of signatures by a formula such as "leaving B3 and C2 unsigned"; but such a note only appears if the leaf is one which should be signed according to the printer's normal practice and which there was no special reason for not signing. Sometimes in imposing the forme a signature was placed on the wrong page: the commonest error of this sort is the placing of $2 at the foot of $4 in a quarto, through the forme lying the wrong way round on the imposing stone, and this often of course leads to wrong perfecting. This could be recorded by the note "leaving $2 unsigned and misprinting $4 as $2"; but to do so would be misleading, since normally there would be no signature on $4 to misprint. The note therefore reads "misplacing sig. $2 on $4." It often happened that a misprinted or misplaced signature was noticed and corrected in the course of printing, so that the signature appears correct in some copies and incorrect in others. When such a case has come to my notice I have enclosed the record of the reprint in parentheses. Thus if a note runs "misprinting A2 as A3, (B1 and D1), . . ." it means that the first misprint is found in all copies examined, but that the second is found in some only, others showing the signature in its correct form. I have felt obliged to make this distinction, but it has in fact no great significance, for any signature may be misprinted and any misprint may be corrected in some copy I have not seen.

A superbly organized bibliographical record of another, and very different, category of books is found in the *Catalogue of Botanical Books in the Collection of Rachel McMasters Miller Hunt* (7). It is an outstanding collection of books and the catalog, especially the latter part edited by Allan Stevenson, is a model of its kind. A collection of botanical books must, of necessity, contain much which is important from the viewpoint of illustration. Some of the masterpieces of pictorial work, especially in the nineteenth and twentieth centuries, are botanical books, many of them among the great plate-books of the period. These plate-books add new and different problems to face the bibliographer and only in a very few instances have they been dealt with in anything other than a purely artistic manner. Allan Stevenson made his great contribution to modern bibliographical studies through his work on paper and it is this background knowledge of his which made the Hunt Catalogue significantly different from the general run of catalogs. The introduction which he

wrote for Volume II, Part I of the catalog entitled "A Bibliographical Method for the Description of Botanical Books" has to be added to the very short list of permanently important accounts of the problems encountered in the compilation of such a work. The clarity of Stevenson's expositions and the facility which he came to enjoy in handling his complex apparatus are equally visible in the introduction and in the entries themselves. One example of the latter will demonstrate this (see Figure 3).

The final area in which description can clearly be seen to be shaped by the nature of the books themselves is with nineteenth century books. This is shown most easily with British and American books because these have been the most efficiently covered by bibliographical tools.

Most dates chosen to delineate historical periods are somewhat arbitrary and do not always appear to be based on verifiable historical data. "Nineteenth century books" as a term does have a significance wider than that which can usually be attributed to the books printed in a particular period. A real watershed date in the development of printing is 1800. Up to that date, a book bore a remarkable physical similarity to a fifteenth century book. It was produced by a virtually unchanged machine using virtually identical materials. After 1800, however, change began to affect the industry and continued with ever increasing momentum. Paper manufacture, power printing, methods of casing books, paper-making materials, photographic methods of illustration, mechanical typesetting; all these wrought deep and important changes during the course of the century. These revolutions, in their turn, affected the economics of the trade as a whole. Until the middle of the eighteenth century the printer had been the key figure in the production of books but gradually the emphasis began to shift toward the emerging figure of the publisher. During the nineteenth century he was firmly installed as the central figure in the process and his constantly changing relationships with his authors became matters of considerable moment.

These are aspects of the book which are of bibliographical importance and which, therefore, need to be reflected in the description. This emphasis will produce a description markedly distinct from those already noted and the quality of the difference is important to observe. The bibliographical study of nineteenth century books, and the novel in particular, began seriously in the 1920s. It was a comparatively slow process to establish it in a position of bibliographical respectability and no one was more instrumental in so doing than Michael Sadleir. Sadleir was by nature a book collector rather than a bibliographer, if judged by the rather pedantic limitations surrounding the use of the latter term today. His first major piece of descriptive work covering certain of his personal favorites can be found in his *Excursions in Victorian Bibliography* (8) published in 1922. The development, not only of Sadleir's own expertise, but also of the general advance of interest and knowledge of the subject, can be judged by comparing an entry in this work with one related to a book of similar importance in Sadleir's later bibliographical compilation. The crowning point of his career was undoubtedly the publication in 1951 of his *XIX Century Fiction, a Bibliographical Record Based on His Own Collection* (9). The descriptions here are of great importance. He was careful to avoid any

1748

533 LINNAEUS, Carl (1707-1778), Swedish naturalist.

Hortus Upsaliensis. Amsterdam 1748. *Median* 8°.

CAROLI LINNÆI | *Archiatri Regii; Med. & Bot. Prof. Reg. Ups.* | *Hort. Acad. Præfect.* | HORTUS | UPSALIENSIS, | *Exhibens* | *PLANTAS EX- OTICAS,* | Horto | Upsaliensis Academiæ | a sese illatas, | *Ab anno 1742, in annum 1748,* | *Additis.* | Differentiis, Synonymis, | Habitationi- bus, Hospitiis, | Rariorumque Descriptionibus, | *In Gratiam Studiofæ juventutis* | [fleuron orn.] | *Proflat AMSTELÆDAMI,* | Apud J. WET- STENIUM, | 1748.

COLLATION: 8°: π1 (horiz. chains))(⁴ A-X⁴ Y⁴ Z1 (D5 as 'A5'); [x] 1-306 [40] (180 as '380'). π1: title, v□.)(1: dedication to Prince Adolf Fredrik, signed 'C. Linnæus.')(2: preface.)(4ᵛ: 'AUCTORES.' A1: text, beginning with '*CLASSIS I.* | MONANDRIA | *MONOGYNIA.*' U2: indexes. X3ᵛ: 'MACEL- LUM SVECICUM.' and other lists. Z1: index to plates; addenda. Z1ᵛ: errata. R1's vary.

PLATES: '*Tab.*' I-III, foldout engravings, of *Mimulus* [*ringens*], *Celsia* [*orientalis*], *Tussilago* [= *Gerbera Anandria*]; pl. 2 signed '*Bergquift Sc.*'; pl. 1 12.7 x 7.4; keyed to pp. 176, 179, 259, and indexed at Z1.

PAPER: *Median*, mainly Swedish(?), unmarked. Leaf 7.7 x 4.8ᵛ.

TYPE: *Median* (*cicero*) roman 41ᵛ. Dedication: *augustijn* (*mittel*) italic leaded 55. Preface: *augustijn* (*mittel*) roman 47.

BINDING: Calf with blind fillets; gilt floriated spine with red label; 'LINNÆI | FLORA | SUECICA'; marbled endpapers; red edges. Heraldic bookplate show- ing crowned shield with three circles in chief, supported by eagles, with ribbon

motto: 'VIRTUTE NON AURO', signed '*Dijon Fontanelli 1809.*' Bound with and after Linnaeus' *Flora Suecica* (1745).

REFERENCES (S = Stockholm; A = Amsterdam): Pritzel 5423, Haller, Hulth, Soulsby 425, Brunet, Grässe; BM(NH) (S), BN (S), DA (S), MH-A (S), MBHo (S), Kew (S), Lind. (S), Linn. (S, A); Sandberg 82 (S). *Copies* (NUC +): CtMW (S), CtY, CU, DLC (S), ICJ (S), MiU, NIC (A), NN, NNBG (S), OO, PPAmP, PPAN, PPiCM (S).

NOTES: This volume does honor to the exotic plants grown in the University city. Lin- naeus lists 110 plants which he had introduced into the Botanical Garden at Uppsala. Noteworthy are the indexes, including one of plants used as food in Sweden. For a his- tory of the Botanical Garden see the Linnaean thesis *Hortus Upsaliensis, quem ... subjicit Samuel Nauclér* [1745] 4° (Soulsby 1424); M. B. Swederus, *Botaniska Trädgarden: Upsala* (1877); H. O. Juel, *Hortus Linnaeanus* (1919); also the modern account by Robert E. Fries, in *A Short History of Botany in Sweden* (Uppsala 1950).

Soulsby calls this Amsterdam issue a 'pirated edition', Hulth a 'fausse édition'. As the volume is apparently the same as the one published in Stockholm by Laurentius Sal- vius, except for a substitute title, it is not a different edition but a special issue. And the fact that numerous copies exist with the Amsterdam imprint suggests the possibility of an arrangement with the Swedish publisher. In any case, Wetsten of Amsterdam may have taken so large a number of copies for sale in Holland that he considered it worth the trouble and expense of canceling the Stockholm title in favor of one saying the book was on sale in Amsterdam at his shop. The horizontal chains in the Amsterdam cancel-title call immediate attention to the fact of reissue. The Stockholm title has verti- cal chains (DLC copy). Though this title designates the volume as Vol. I, no Vol. II was issued.

Prince Adolf Fridrik, the dedicatee (1710-1771), became King of Sweden in 1751, whereupon Linnaeus dedicated to him and his queen the great *Species plantarum* (1753) 8°: see Hunt 548.

FIGURE 3. *An example of an entry from* Catalogue of Botanical Books in the Collection of Rachel McMasters Miller Hunt *(Vol. II, Part II, pp. 216-217).*

suggestion that the work was a bibliography. The whole strength of this publication depends upon its being regarded as a record of his own collection, viewed from the standpoint of his particular interests. The authors collected were those whose works Sadleir enjoyed reading. Aside from his book collecting interests, Sadleir also approached the books with a mind concerned with and knowledgeable about publishing history and conditions. All of this can be seen both in the preface which he wrote to Volume 1, entitled "Passages from the Autobiography of a Bibliomaniac," and in the entries themselves. This comes out very clearly in the entry, for example, of Captain Marryat's *Japhet in Search of a Father* (see Figure 4).

The close definition of the casing is also a matter of concern in nineteenth century books and Sadleir, both here and in other writings, was one of the group of bibliographers who began to tackle this problem. In a photographic supplement to Volume 1, Sadleir reproduced photographic representations of various cloth finishes with proposed nomenclature, such as "course diaper," "sand-grain," "bubble-grain," and "hexagon-grain." The reality of the domination of the publisher is also indicated by the entries in Volume 2 listing some of the publishers' series which were represented in his collection.

Following closely in the wake of Sadleir's work is another bibliography with which it can be justifiably compared. *Bibliography of American Literature (10)*, edited by Jacob Blanck, began publication in 1955 and is still in progress. Although it is neither limited to the nineteenth century nor restricted to the novel, it is, naturally, particularly strong in both those respects. Whereas Sadleir's is a highly individual record of a very personal collection, Blanck's is a more purely bibliographical approach. His entries are full and informative, but they lack the more enlightening idiosyncratic touches which made Sadleir's book such compulsive reading for a nineteenth-century enthusiast. The important point is that neither method is any better than the other; they are merely different approaches. Although, as was indicated earlier, certain ground rules of approach can be laid down for bibliographical description, the practice remains an art with all the possibilities for individuality which that allows. Although there are many entries in each book which show considerable similarity of approach in their descriptive methods, it remains true that the general tenor is different. This can be seen by comparing a fairly typical entry from Blanck with that already given from Sadleir (see Figure 5).

Another aspect of Blanck's *Bibliography of American Literature* indicates the variety which exists within the general framework of bibliographical description. In the extract from the "Introduction" to the *Bibliography of the English Printed Drama to the Restoration* already quoted, Greg wrote about the collational formula. In broad and general terms the same kind of problem existed in nineteenth-century books, but there were differences and new problems. Blanck wrote on a similar aspect in the preface to the first volume of his bibliography (pp. xxv–xxviii) and it can be compared and contrasted with Greg's related argument.

This section is devoted to the most revealing single element of the collation: the folding of the sheets. No attempt has been made to determine the imposition of the

JAPHET IN SEARCH OF A FATHER (by [1579]
the author of 'Peter Simple', 'Jacob Faithful', *Pl. 18*
etc.)

Copy 1: First English Edition. 3 vols. Saunders
& Otley 1836. Boards, labels.

Half-title in Vol. I

Vol. I viii + 304
    II viii + (300)
    III viii + (324) P, P adverts.

Bookseller's stamp: 'Williams, Cheltenham', inside
front cover of Vol. I. Very fine.

Copy II: First American Edition. Part Issue. [1579a]
Four post 8vo Parts. New York: Wallis & Newell,
9 John Street, 1835 [Parts 1 and 2], 1836
[Parts 3 and 4]. Light blue wrappers printed
in black—on front: double (thick-thin) frame;
PART I (2 etc.) PRICE 12½ CTS [Part 1], 6½ CTS
[Parts 2–4], / JAPHET / IN SEARCH OF A
FATHER, / BY THE AUTHOR OF / 'Peter Simple',
'Jacob Faithful', 'Naval Officer', &c. / rule /
[FRANKLIN LIBRARY EDITION.] / NEW-
YORK / WALLIS & NEWELL, PUBLISHERS, /
etc. etc. The sub-imprint alters with Part 3,
  on which is printed a long list of booksellers in
  various cities who sell the work instead of
  merely: 'Sold by the Principal Booksellers etc.'.
  Spine unlettered. Back printed with advert. of
  the Franklin Library which offers useful informa-
  tion (see below). Inside wrappers plain.

Part 1 pp. (92) [paged (5)–96]
    2 pp. 97–144
    3 pp. 145–192
    4 pp. 193–(224)

The first leaf of Part I is title, verso blank; the first
page of text is paged (7).

[1579b] Copy III: Second American Edition. Vol. I
only. Philadelphia and Baltimore: Carey &
Hart 1835. Half-cloth boards, label.

Blank leaf precedes title and is conjugate with it.
pp. (188) [paged (1)–(4) + 13–196] Publishers'
cat., 24 pp. dated January 1835, at end.

Pencil inscription: 'Anna L. Whites. Presented
by George Clark', on fly-leaf.

Note. This portion of the American edition pre-
ceded English book issue (but see 'General Note'
below). Neither title nor label suggest a further
volume to come, but on last page of text is stated
'End of Volume One'.

General Note on American Editions of 'Japhet'

I have no authority for this sequence of American
editions but it can be defended on grounds of internal
evidence. Of the Wallis & Newell Part Issue (recently
discovered by Mr I. R. Brussel and hitherto quite un-
known) Parts 1 and 2, both dated 1835, contain up to
p. 282 of Vol. II of the English edition (the second page
of Chap. xxix), whereas Vol. I of the Carey & Hart
edition (the second vol. is dated 1836) only goes to
p. 166 of the English Vol. II—i.e. to the middle of
Chap. xvii. Therefore under date 1835 a considerably
longer section of the novel appeared in U.S.A. (and
preceded English issue) in the Wallis & Newell, than
in the Carey & Hart edition.

There is further evidence in favour of Wallis & Newell
in their 'Advertisement' on the back wrappers of their
Part Issue. This Advertisement is unusually careful
and specific for American pirated editions at this period.
On the back of Part 1, over date April 22, 1835, we read:
'This day is published Part 1 of JAPHET IN SEARCH
OF A FATHER, [etc. etc.]. In consequence of the
numerous applications for the above Work, the Pub-
lishers of the FRANKLIN LIBRARY have been induced
to issue Part 1, which contains all that has yet been
received of this interesting tale. They also beg leave
to inform the numerous Patrons of the Franklin Library
that they receive the very earliest copy that can be
procured, and will issue it complete immediately upon
the receipt of the remainder from England.'

This announcement is repeated verbatim on the back
cover of Part II.

Japhet appeared serially in the *Metropolitan Magazine*
from November 1834 to January 1836. The material
contained in Part I was that printed in the *Metropolitan*
up to March 1835, so it took about seven weeks for
Wallis & Newell to receive a text and publish it in
America. The material contained in Part II appeared
in the *Metropolitan* for April, May and June, so we
may conclude that Part II appeared toward the end
of July.

On the back of Part III the Advertisement is dated
January 20, 1836, and on Part IV February 1836.
Part III covers *Metropolitan* publication up to October
1835 and one would have expected this to be issued
in America by the end of November; but the front
wrapper and Advertisement are specifically dated 1836,
and this date must be accepted at face value. A possible
reason for delay is that, whereas Parts I and II were
Nos. 21 and (probably) 22 of the Franklin Library,
Parts III and IV were Nos. 47 and 49, twenty-eight
additional titles having appeared in the interval. The
wish to issue these may have caused the publishers
deliberately to hold up a continuation of *Japhet*.

The Franklin Library was published weekly, either
in full Parts at 12½ cents or half Parts at 6½ cents. The
list of works issued up to Part IV of *Japhet* comprises
such important English novels as *The Last Days of
Pompeii* (Bulwer); *Tylney Hall* (Hood); *Brambletye
House* (Horace Smith); *Lodore* (Mary Shelley); *The
Cruise of the Midge* and *Tom Cringle's Log* (Scott); and
the following Marryat novels in addition to *Japhet*:
Jacob Faithful, Peter Simple, Naval Officer and *Pacha of
Many Tales*. There seems reason to suppose that the
Part Issues of some of these at any rate will, if sets can
be located, prove to be hitherto undetected priorities
over the English issue and therefore of bibliographical
importance.

Copy IV: Second Edition in 'Ship Binding'.
3 vols. Saunders & Otley 1836. Dark blue
diagonal-fine-ribbed cloth, blocked in blind and
gold as *Jacob Faithful* Copy III (q.v.). Collation
as Copy I. First Edition sheets with title over-
printed.

FIGURE 4. *An entry from Sadleir's* XIX Century Fiction, a Bibliographical Record Based on
His Own Collection *(Vol. 1, pp. 233–234).*

pages, a virtual impossibility with most of the mass-produced books issued in the
United States during the 19th and 20th centuries.

While most books manufactured prior to the introduction of stereotyping and
the general use of machine-made paper may be correctly described as folio, quarto,
octavo, etc. (on the basis of watermarks and chain lines), the same classifications
cannot be accurately applied to the mass-produced books issued in the later period.
While one may establish beyond doubt that an 18th century book was printed in

3895. THE DEERSLAYER; OR, THE FIRST
WAR-PATH. A TALE. BY THE AUTHOR
OF "THE LAST OF THE MOHICANS,"

. . .

PHILADELPHIA: LEA & BLANCHARD. 1841.

2 Vols.

1: ⟨5⟩-7, viii-⟨xii⟩, 13-267. 7⅛" x 4⅝".
2: ⟨1⟩-282.

1: ⟨1⟩⁴, 2-22⁶, 23².
2: ⟨1⟩-23⁶, 24², 24*¹.

Purple muslin. Printed paper label on spine.
Flyleaves.

Note: Spiller & Blackburn, p. 113, states:
". . . also, two volumes in one." *Not seen.* The
same authority also states: "One copy has also
been seen printed by T. V. and P. G. Collins,
wanting the number in parenthesis on the copy-
right page, but dated 1841." *Not seen.* A copy-
right deposit copy has the Fagan-Ashmead im-
prints on the copyright page of both volumes;
title-leaf verso paged, respectively, 6, 4.

Note: Unsold sheets were reissued in printed
terra-cotta paper wrapper. A copy of Vol. 1 (at
LC) so bound is imprinted 1841; wrapper im-
print dated 1843; notice on outer back wrapper
dated *December, 1842.*

Spiller & Blackburn (p. 113) states that the Phila-
delphia edition was published Aug. 27, 1841; the
London edition published Sept. 7, 1841. How-
ever, there is a possibility that the London edi-
tion was issued prior to the Philadelphia edition.
The Lea & Blanchard edition "will be pub-
lished the end of the present month"—USDR Aug.
1841; noted as *ready* USDR Sept. 1841; listed Arc
Oct. 1841; deposited Oct. 5, 1841. *The London
(Bentley)* edition was advertised for *Monday
next* (i.e., Sept. 6⟩ in LC Sept. 4, 1841; listed and
reviewed LG Sept. 11, 1841. In his advertisement
(LG Aug. 21, 1841) Bentley announced the book
for Sept. 4 publication and stated ". . . ⟨The
Deerslayer⟩ will be first published in England,
the Author having sent the *ms.* for that purpose
to Mr. Bentley. It will not be published in the
United States until the 15th September." Issued
in Paris by Galignani, 1841; precise date of
publication not determined. For a revised edi-
tion see under 1850.

NYPL

FIGURE 5. *A typical entry from Blanck's* Bibliography of American Literature *(Vol. 2, p. 292).*

4 to. even though bound in 8's, later manufacturing methods prevent application of
the rules that permit such identification. Indeed, it is currently possible to produce
a book of several hundred pages on a single sheet of paper which, when cut and
folded, will produce a book of (say) twelve gatherings in 16.

Common printing methods of the post-18th century period permitted the print-
ing of sheets with small relation to folding. For example, sheets were often printed
in 12 (i.e., 12 pages in the inner forme, 12 pages in the outer), cut apart, and bound

in 8; or, printed in 8 and bound in 12. In the latter case the inner inserted fold may have been signed with the mark of the signature into which it was to be inserted, the mark having a distinguishing asterisk, or other symbol. Marks identifying inner inserted folds are disregarded.

During the 19th century letters or arabic numerals were most frequently used for signing. Prior to the early years of the century American printers used letters for signing; the use of numbers in signing appears to be a 19th century innovation although numbers were frequently used before that time by Continental printers. Examination indicates that many American printers were not wholly aware of the proper use of the signature mark.

With relatively few exceptions British book manufacturers of the 19th century, in using signature marks (their usual practice), employed the antique twenty-three letter alphabet, ignoring the letters J, U and W. In the United States printers were more apt to use the modern twenty-six letter alphabet. Hence, while the statement A-Z, as applied to most British books, means 23 gatherings, the same statement applied to an American book may refer to twenty-six gatherings or fewer. The locksmith, Stephen Daye, or whoever it was who printed our first book, was the very real ancestor of the American printer: Daye ignored, or was ignorant of, the traditional method and used the letter W in signing the Bay Psalm Book.

In the matter of signing there seems to be a certain self-consciousness on the part of American printers. In some books (more than a few) the gathering falling between signed I and K, or signed H and J, is unsigned. This matter of erratic signing has obliged us to adopt a system which indicates the presence, or the absence, of the letters J, U and W. The exception is so much the rule that this treatment is required. The confusion is neatly demonstrated in Thomas MacKellar's *The American Printer: A Manual of Typography*, which, as late as the 15th edition, revised, Philadelphia, 1885, p. 135, continues to state:

> "It was formerly the custom to omit the letters J, V <sic> and W in the list of signatures. But the greater convenience attending the use of twenty-five letters has recently induced several of our largest establishments to omit the letter J only."

This ignorance of the use of the twenty-three letter alphabet or of its proper application causes the signature marks in 19th century American books to occur in strange forms. The very fact that the producers of the books with which we are here concerned disregarded tradition and appear to have made their own rules forces us to ignore the twenty-three-letter alphabet and to set down precisely what we see.

With the exception of those signature marks which identify inserted cut sheets (such as A*, 2*, etc.) all signature marks are accounted for in the transcription. Hence the statement <1>-10 means that all signature marks are present with the exception of signature mark 1. The statement <1>-5, <6>-10 means that all signature marks save 1 and 6 are present. The statement A-Z means that there are present twenty-six signature marks. The statement A-I, K-T, V, X-Z means that signature marks J, U and W are not present, and that the book contains no unsigned gatherings to which these signatures might be assigned. The statement <A>-H, <1>, J-P means that all letters, A through P, are present except signature marks A and I, which are implied.

The use of visible signature marks started to disappear in American book manufacture during the latter part of the 19th century. Relatively few books currently produced in the United States carry visible signature marks; modern methods

employ a type of mark which is concealed in binding. British manufacturers, however, appear not to have abandoned so generally the older method.

If the printed signature marks present correctly indicate the folding of the sheets, such marks are expressed as they appear in the book. Hence, the statement 1-10ˣ, or A-Jˣ, indicates that the book is made up of ten gatherings, each of eight leaves. If the gatherings are unsigned the description is expressed: <1-10>ˣ.

The word *plus* in a signature collation (thus: 1-10ˣ, plus <11>ˣ) indicates that gathering <11>, while printed on book stock, is not part of the text but something extraneous such as a publisher's catalog. For further comment regarding this see under *Pagination*.

Not infrequently 19th century American books bore not one but two or more sets of signature marks; occasionally none applies to the folding. Such signings are recorded. The examples given below indicate that no general rule for the expression of signature marks may be applied to American books. Variations are so frequent that each book may be considered a new problem, little related to another.

A superior figure (thus: ˑ) indicates the number of leaves in a gathering. Hence, the statement 1-10ˢ means that a book so described consists of ten gatherings, each gathering having eight leaves. An inferior figure (thus: ₋) refers to a leaf. Hence, the statement 1₇ refers to the seventh leaf of the gathering signed 1. The not generally used inferior figure is required in order to avoid confusion. While the statement A7 sufficiently identifies the seventh leaf of gathering A, the statement 17 would be hopelessly confusing in identifying the seventh leaf of a signature signed with the numeral 1. The statement 1₇ᵣ or 1₇ᵥ refers to, respectively, the recto of leaf seven, gathering 1 and the verso of leaf seven, gathering 1.

Pampinea and Other Poems. By Thomas Bailey
Aldrich. New York, 1861. Collation:
<1-6>⁶. *Signed:* <1>-<4>ˣ, 5³.

The Story of a Bad Boy. By Thomas Bailey
Aldrich. Boston, 1870. Collation:
<1>-11¹², plus <12>¹². *Also signed:*
<A>-H, <I>, J-P⁸, Q⁴, plus <R>¹².

Notes on the Western States. By James
Hall. Philadelphia, 1838. Collation:
<1>-2⁶, B-I, K-Xˣ, Z², Aaˣ, Bb².

*A Modern Mephistopheles and a Whisper in
the Dark.* By Louisa May Alcott. Boston,
1889. Collation <A>-M, <N>, O-S, 20-22ˣ.
Also signed: <1>-13, <14>¹², <15>ˣ.

The Three Fates. By F. Marion Crawford.
London and New York, 1892. Collation:
<1ˣ, 2-26ˣ, plus 27⁸>. Leaf <1>₂ inserted. *Signed:* <A>ˣ, B-H, J-V, Y-Z,
2A-2Cˣ, 2Cˣ, <2D>ˣ.

The Coronal. By Lydia Maria Child.
Boston, 1832. Collation: <->⁴, <1>-15⁹.
17ˣ. Leaves <1>-15₆ inserted; that is,
the fifth leaf of each gathering, <1>
through 15 inclusive, is an insert.

> *Poems.* By Thomas Bailey Aldrich. New York,
> 1863. Collation: $<1\text{-}27>^{6,2,1}$; that is,
> the gatherings run in a consistent pattern
> as follows: six leaves, two leaves, one
> leaf, six leaves, two leaves, one leaf,
> etc., etc. *Signed:* $<1>\text{-}13^6$, 14^3.

Certain of the books described in these lists have not been located in original binding and, being rebound, cannot be fully collated. If such books are signed, the signature marks are recorded but with a cautionary statement: *Signed;* or, *So Signed.* Signature collations so distinguished are tentative only. It cannot be assumed that the signature marks are an accurate statement of actual folding; the examples cited above are indication of that. If, in spite of rebinding, it has been possible to determine the folding such information is given without the cautionary statement.

Presented with two obvious printings, distinguishable by regular *versus* irregular gatherings, one may be almost certain that the earlier of the two contains the irregularity. These irregularities are usually, perhaps always, caused by the uncertainties normal in the production of the first printing of a book. But this must not be accepted as a rule. Errors of imposition can and do occur in reprinting. See, for example, the two printings of George Washington Cable's *Bylow Hill* (1902), which occur: $<1\text{-}14>^8$; and $<1\text{-}14^8, 15^1>$, leaf $<6>_8$ excised. In spite of the irregularity it is almost certain that the earlier of the two printings is $<1\text{-}14>^8$: and that in reprinting the book there was a misimposition in gathering $<6>$.

These specific examples of descriptive bibliography have been chosen and illustrated to demonstrate the basic fact about the procedure as a whole. There can be no "rules" for bibliographical description in general in the sense of specific instructions which can be drawn up to meet all circumstances. The kinds of books described, the anticipated use of the resultant listing, and the especial interests and attitudes of the compiler will rightly affect the final result.

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DESCRIPTIVE CATALOGING

Unlike subject cataloging, which locates information in the resources of the library or information center, descriptive cataloging is used to identify a particular information source. Hence the underlying assumption of all descriptive cataloging is that someone already knows some identifying feature of the work. A further assumption is needed when all these identifications are combined in a single file. We assume that the most significant identifying features are reasonable points of access to the particular work sought. Only very recently has the work of descriptive cataloging led to another use which is purely statistical in nature. A computerized catalog is needed to answer such questions as, "How many books by a given publisher were obtained for a given year of publication?" Here the question is a part of a type to which studies of resources generally are closely allied. If it is understood that the file of descriptive cataloging information must provide points of access which enable research in several directions, then it is possible to discuss the topic not only from the standpoint of history and tradition, but as the evolution of a theory. Language data processing, having reached a stage of development where speculation can be tested experimentally, requires that modern descriptive cataloging be viewed not as the culmination of a long historical development but as the current solution to problems of identification utilizing the technology available.

Even as late as 1904, when the 4th edition of Cutter's *Rules for a Dictionary Catalog* were published posthumously, the concept of technology was largely limited to handwritten or possibly typewritten information, reproducible, if at all, only in a printed book catalog. Though printed cards available from the Library of Congress after 1901 produced the unit-card method of descriptive cataloging, the significantly different postulates, which account for points of access in a printed book catalog and in a unit-card catalog, have only very recently come to light. Until reprography reached a point where locally produced cards could be fitted into a unit-card system, there was no need to distinguish between unit entry and main entry. Research now in progress tends to support the hypothesis that in a unit-card system title entry is most readily and efficiently utilized at all the steps in the system from order file to shelf list. In a computerized catalog, title entry is the searchable element required to

identify a work from the point of first entry until complete entry is recorded. Indeedd, in a main entry system, title entry can serve quite as well as author entry for thhhe complete bibliographic description of a work (*1*).

The Bodleian Catalog of 1624, the rules produced by Panizzi for the Britissish Museum Catalogue, and Cutter's rules all assume that author entry is the mooost efficient point of access to a file of bibliographic descriptions. This is true if thhhe search is most usually made on the basis of author, if the work has a clearly defineeted author, and if the file of authors does not include any significant amount of ambigwuu-ity. In a manual file, sequentiality of information is important as well. That is, thhhe names of authors must be arranged in some systematic fashion so that randommm access into the system is both immediate and precise. The Roman, Greek, ammnd Cyrillic alphabets are ideal for this purpose; special rules are required for thhhe Spanish, Swedish, and German alphabets; there are considerable problems with thhhe Arabic and Hebrew alphabets; and the sequentiality is practically lost for syllabarieses, such as Japanese and Amharic. The sequentiality is artificial and a great problemmm with Chinese. But in the intellectual climate of the eighteenth century, Latin ammnd Greek were considered the linguistic height of man's endeavor, and these languageics were accepted as the standard against which other languages were judged and itcto which they were made to conform. In any case, there were only books, broadsideses, and manuscripts to consider and of these, only books were of such importance thaaat bibliographic description was needed. Later in the century, with the developmemnt of serial publications, new problems arose, but the rules for main entry systemms were not changed then, nor much later, because the printed book catalog needs onlllly one place for full bibliographic description, and this can be identified in such a wraay that other points of access need not cite any more than is necessary to lead thhhe searcher to the full description. Often the main entries were numbered, and title, aidd-ditional authorship, and other points of access could refer back to this single entryy. It was rather natural to think of author as main entry because scholarship relied oon the principle of authority as the source of substantiation for any doctrine. Aristottlde could settle almost any argument in favor of the contender who found the moosst oracular passage in an appropriate segment of the philosopher's opera.

As knowledge changed, the needs of researchers changed. By the early twentietlth century it was not so much a matter of who said it as what was said. Learning comn-sisted of an ability to cite the places where information could be found, and thhhe author tended to represent a subject as well as explicate it. Hence the names whicckh are utilized as words: Kantian, Hegelian, Darwinism, Marxism, and so forth. For tlhhe learned man, a knowledge of the principal authors in his field was amplified to iinn-clude those who wrote at the periphery of a corpus of information. However, iinn-formation could be stored in many different forms, and of these the book that haaad served as a standard source came to represent the ideal around which bibliographilic description was organized as the terminology of cataloging shows.

Early in this century, the Library of Congress adopted a rule that each frame off a motion picture film had to be printed on paper before the work could be copyrightedd. When film was subject to fairly rapid deterioration, this rule was probably very wisee. At the present, though, no such rule exists. The description of such photographilic

collections need differ in no great way from the description of random photographs copied and bound together as a book. However, motion picture films meant to be run through a projector require fuller and different description. There is no concept of authorship to guide the cataloger, so that the problem of entry is resolved only by adopting the title as the main entry. The length of the film, the running time at standard speed, and whether it is in color and has sound are all vital parts of the description.

Similarly the development of phonorecordings from cylinders, to discs, to wire, to magnetic tape, and in the future possibly to electronically activated crystals, has produced a need for description that includes not only the form of the recording but also an indication of what was recorded and by whom. An example is the recording of Debussy playing his own compositions for the piano in a process that allowed transfer from one form of phonorecording to another. *Clair de Lune* by Debussy is ambiguous in this context until we include who has performed the work. The technique of recording is an essential part of the description if a collection is meant to be used fully. The performer is sometimes more the identifying feature of a work than the original composer, as is the case with jazz musicians, many of whom are quite incapable of playing the same work twice in precisely the same way. All improvisation is unique and requires the performer as the principal point of identification and possibly the date as a further point of identification.

These methods of communication as information sources in the twentieth century were devolped concomitantly with rapid means of duplication, through photo-offset and other processes, so that, in effect, everybody could be his own publisher. The characteristic of the nineteenth century scholar, a lifetime devoted to a single work, gave way to the characteristic of twentieth century scholarship, a subject to which several different researchers devote their effort for a relatively short period of time. The change was from the subject equated with the author to the subject-shared or multiple authorship.

Cutter's most significant contribution to descriptive cataloging was the development of corporate entry as a point of access, to replace the nondescript entry "anonymous." This entry has the effect of grouping together all works where title is the most important point of description. Corporate bodies represent shared authorship in one fashion, and the Anglo-American Code has various rules which attempt to discern responsibility for the intellectual content of a work. This is, at best, a metaphysical problem adding nothing whatever to the bibliographic description.

Certain entries, such as uniform title and form headings for laws, constitutions, and other legal acts, are refinements of a title entry and do not really represent authorship in any degree. Anonymous classics, such as *The Arabian Nights,* only partly account for the problems of title entry where several different editions of the same work are published under different titles. A similarity may readily be seen between titles and subject headings especially as titles have become subject headings, not as uniform titles but, *faute de mieux,* topical headings for a new subject.

The development of the Anglo-American Code has generally followed rather than prescribed actual practice. The attempt to render into something like statute law all

the possible bibliographic variations was shown to be the principal fault of the 1941 l Preliminary Second Edition of the American Library Association Cataloging Rules s of 1908. Osborn (2) established what can well bear his name as a principle of if descriptive cataloging: No code of rules can predict all possible variation and pre-- scribe methods of treating each as it may occur (3). We must rely on the judgment it of the descriptive cataloger in order to produce a code of rules that will facilitate the c work of the catalog department.

At the present, depending on what we wish to include, about 85% of descriptive e cataloging in a general library is the work of technical assistants trained to follow v specific rules and to call for help when the rules do not seem to apply. If we accept it training as the characteristic background of technical assistants and education neces-- sary for rendering judgment based on previous experience, personal and vicarious, , as the characteristic of professional personnel, then much of the work of descriptive e cataloging can be reduced to a fairly simple technique of transcribing what is found d on the title page, recto and verso, and discovered elsewhere in the work at hand iif f needed. Training for such work is neither lengthy nor difficult. The failure of the e original "Cataloging-in-Source-Project" (4) resulted from confusion over what must t be included in a word to produce uniformity of cataloging and what may be omitted d from a printed statement because the book at hand and a code of rules will produce e uniform results. One of the chief complaints was that the card reproduced on the e verso of the title page had the wrong collation. But the pagination was readily y available within the book itself and the complaint is more a case of querulousness s than reasoned criticism. As can be seen from the summary above, we can discuss s descriptive cataloging at present under three headings: (1) What represents ade-- quate description of an information source under which we can subsume such 1 topics as brief-listing and cooperative cataloging; (2) what constitutes points of f access and how they may be determined; and (3) what constitutes an effective e method of organizing descriptive cataloging in a library or information center.

A librarian who manages a picture collection has no need for descriptive catalog-- ing. It is sufficient to provide subject access to the collection and let the equivalent t of author be treated as if it were a subject. This comparison is vital to an under-- standing of what descriptive cataloging achieves. It is well known that many other r collections do not require an item-by-item description, whether an archival collec-- tion of letters and memoranda or a collection of technical reports, the authorship) of which is quite inconsequential. The first decision to be made is whether descrip-- tive cataloging is needed at all. Information retrieval systems have sometimes s omitted and sometimes included bibliographic description, but a decision to omit t any attempt at description is valid if no individual item will ever be needed. The e decision need not be final nor need it cover all parts of a collection so long as access s by subject is possible. It is always possible in a computerized catalog to add to the e points of access and to make some identifying feature, such as a random number, , serve in lieu of identification derived from the work itself.

From zero description we need proceed by degrees to the fullest possible descrip-- tion. As we extend the description of an item in the collection, we are guided by'

the type of information source and the need to identify it for a researcher. The fullest possible description is needed for an incunable or other rare work which may be as much an artifact as it is a book.

In the case of sixteenth, seventeenth, and some eighteenth century books, where hand-set printing resulted in a different copy for each title, the description that omits these marks of rarity is inadequate. Similarly for nineteenth and twentieth century books, each copy of which is identical (or so nearly so as to make no difference) with all the other copies produced in a given edition, there is no need to describe the book beyond that description that fits any copy of the edition. If the edition is not important and will never be important, as is the case with books in a public library system devoted to popular reading, then little more is needed than a description of the title as it might be found in any edition.

Each of the elements of the book that contribute to adequate description can be identified utilizing the standard terminology of catalogers through the ages.

(1) Title is the most important identifying feature of the book and may not be left out. This is especially true in the computerized catalog where title is the principal identifying feature.

(2) Subtitle, i.e., a portion of the entire name of the book which is considered by the author or publisher to be secondary to the principal name of the book, is primarily useful in identifying editions beginning with the first. At the time a book is cataloged, it is safest to assume that sometime in the future another edition will be published.

(3) Alternate title, i.e., another name for the book shown by the publisher to be equally as good as the name first listed, has a different significance altogether from subtitle. An alternate title may become better known than the original title. Since this is a possibility of the future, and the descriptive cataloger cannot predict that this will be impossible, an alternate title is as important as title in identifying the book regardless of edition. That an alternate title may be left out, expanded, or altered in another fashion in later editions is insignificant if change of edition is not important in the work. An alternate title can be identified with, and limited to, those titles included after a semicolon and the word "or" in the complete title of the book.

(4) Of equal importance with the title and alternate title is the author statement. This should be included in full if one or two authors are listed, but it may be shortened by any of the methods recommended in various cataloging codes if three or possibly four or more authors are included. Author statement is meant to include both editor and compiler as if they were authors, if the work has no author.

(5) Edition may be identified either as a number or some identifying feature of a particular work. Such identifying features include illustrator, translator, and editor, if the book has another type of authorship as well. Obviously if the work exists only because of an editor's work, then the editor is equivalent to the author. However, an editor of a particular edition deserves notice if the edition will be important in the system using the descriptive cataloging. Both illustrator and translator must be listed with the first edition of the book if a different edition will ever be important. In distinguishing between editions, marks of identification where numbers have been omitted are of capital importance.

(6) Imprint is a feature of identification necessary to distinguish editions, but most likely unnecessary to distinguish between different works. In the system that does not require identification of editions, publisher may be added on the basis of conflict; i.e., supposing a library already has a title identical with a different book, then imprint would be cited. This is a case that will rarely arise for modern books, considering the copyright laws now in effect in the United States and elsewhere in the world. Imprint is a vital part of edition and cannot be omitted in those systems where the edition of a work will ever be important. However, there is considerable question whether place as a part of imprint needs to be included. It should be understood that place is added on the basis that conflict may arise. However, there is no law which prevents two publishers of virtually the same name from maintaining offices in the same city, as occurred with Franklin Books Program and Burt Franklin, both of which are located in New York City and from time to time get each other's mail. It may be assumed that adding place in all cases is questionable even for the most complete bibliographic description, where place of publisher or date of publication may be discovered, if needed, more readily and more exactly in various guides to the publishing industry in a given country. Where place becomes important, as may happen with books from underdeveloped areas of the world, then it may be included after the name of the publisher, even though present rules insist that the only proper order of imprint is place, publisher, and date.

(7) Date of publication is not more significant than date of copyright. Some libraries utilizing fullest description have omitted publication date altogether, and quite successfully rely only on the copyright date. The Anglo-American Cataloging Rules and earlier rules of bibliographic description contain rubrics for citing dates and editions, including copyright, where it differed from date of publication. The date of a particular edition is far more significant than the date of a certain printing. If confusion exists over the distinction between printing and edition, the copyright date becomes a satisfactory method of determining whether a given title is an additional printing or is another edition. For a library which has no need of description beyond the identifying features of title and author, there remains a usefulness of including the copyright date of the edition at hand for scientific and technical works where the user may be mislead and seek a book that in the end will be too out of date for his purposes. Date then comes to be something more than bibliographic description and relates to the subject content of the work. Hence the necessity for including at least the copyright date in even the shortest method of cataloging.

(8) Collation has heretofore included either the number of pages or the number of volumes or both in the case of a work continuously numbered through more than one volume. This represents the pagination of the work or the volume count, either of which is quite important to a person utilizing a catalog even with the briefest description. Here again something like subject content is being indicated, although in an offhand manner, by the expanse of the work. Obviously a four-volume biography of George Washington will not suit the casual reader for whom brevity is important. Even less will lack of pagination serve students assigned a certain topic who will want to know how to get the burden of the matter in the fewest pages possible.

(9) Another part of collation is the statement regarding the presence of illustrative material, including maps, portraits, diagrams, facsimiles, and colored plates. The Library of Congress has ordinarily included music scores as if they were illustrative material. Maps folded out and some other description have been included as necessary for efficient function of the library because of the possibility of re-

binding or as notice to the circulation librarian that the book has been damaged by a borrower. When the cataloging is being kept to the minimum to identify a given title it is generally efficient to include only the word illustrated for anything beyond one type of illustration and to include the name of that type of illustrative material if it is unique in the book. For instance, it would seem enough to make note of maps, if only maps are included, but not to use both illustrated and maps, if both are included.

(10) The final part of the collation proper is the size of the book, and many libraries, even those where the cataloging by edition is of summary importance, will omit the size of the book unless there is something unusual for the reader to notice, such as an oversized book or an undersized book that is easily lost on the shelf. Standards for omission of size are very readily established so that only those books that do not fit the standard size may be noted on the catalog card.

(11) Series not included as a part of the collation represents another element crucial to the identification of a particular edition, but of much less importance when only the title will be sought as a point of identification. Books included in series, especially reprints, will satisfy few scholars in a research library, and yet be perfectly acceptable to casual readers in another kind of library. However, series statement has another importance in the cataloging process, especially to those librarians whose duty it is to determine whether the library already has a copy of the title or not. Often series is the uniquely identifying feature of the same book that has been published under two different titles. Different editions of a book may have different titles and, if so, all the editions should be brought together under a uniform title as if a series, even though the series itself has changed for the different editions. In view of this it can be stated that where cataloging by edition is important, then including a series statement is necessary, although the series may not be a point of access. It is equally important that series be omitted unless it is identified in some fashion with edition.

(12) Notes on catalog cards under present theory are best left to the few that constitute acceptable further description for the library; i.e., descriptive notes should be made only if essential. The general rule of the Library of Congress and hence the Anglo-American Cataloging Rules is to make notes on rather a generous basis when time is available for this purpose. However, it is surely wasteful to make notes for one set of books and not for another even though the validity of the notes has not changed. Contents notes, unlike descriptive notes, should be made whenever the book may be analyzed, but ought to be omitted if no analysis is done. At present contents notes frequently serve the purpose of including on a card what is being postponed or forfeited altogether, i.e., the preparation of adequate analytic entries. Contents notes are especially important if search will be made for each item within a book, and especially if the library has a portion of the book in another copy which represents an identical title separately bound. It seems unfortunate to rule on the basis of analytics by any means other than the usefulness of these entries in a catalog for the purpose of identifying the particular works in a library.

These elements represent adequate description based on a preliminary rule either to catalog each new edition of a work or to make entries only for different titles of a work. The latter process has been variously termed, but the idea is best understood under the rubric "brief-listing," a means of cataloging entirely suitable provided all members of the system are in complete agreement that no more is needed. Brief-

listing represents an ideal form of cataloging which can effectively save money byy providing adequate access to the titles in a system, but it seems far better to omitit unnecessary forms of description rather than analytics where they will represent a a considerable saving of time whether brief-listing or full-cataloging is done. Manyy library systems have chosen to include either place of publication or size and omitit analytics on the basis that too much time is required for the latter.

Cooperative cataloging then can be seen as an agreement on standardized rules's of adequate description depending entirely on whether the book is to be identifiedd by edition or only by title. Forms of cooperation that cannot settle this point usuallyy end in dissatisfaction and frustration. Even in a brief-listing system, all knowledgee of different editions is not lost. The increasing coverage provided by the Library of'f Congress of its holdings in the printed reproduction of catalog cards gives adequatee description of different editions for most works, and in any case, research into thee nature of different editions should be conducted in a research library where sufficientit bibliographic description abounds. Cooperative cataloging in the past, as seen in thee Cataloging-in-Source project and in the shared cataloging projects, has often resultedd in general frustration not only because of a confusion over adequate description butit also because of confusion over the point at which technology may replace the de--cision of a cataloger. In general, rules have been made that no one will objectt to too much, and the fail-safe method of cooperation is to provide description be--yond the state of adequacy into the conditions of abundance. The catalog of aa library that might very well do with much less description of the works on its shelvess is a kind of embarrassment of riches. Several different authors, beginning withh Susan Grey Akers, have sought to discover what students require of a catalog, andd in every case they have been rather dismayed that so much of the bibliographicc description is of little meaning or importance to otherwise intelligent students. Thee results of the findings generally cast doubt on either the intelligence or previouss instruction of students who do not make use of such parts of the description as aree judged crucial by the surveyor.

Having gone this far in a description of books, we can develop rules for thee description of other materials based on the concept of what is needed for identifica--tion and how this can be recorded. Obviously, if the information source lacks ann element of description no effort should be made to include it. For instance, it is un--wise to set up author equivalence for information sources where authorship is of no) significance whatever. There is no justification except tradition for regarding all in--formation sources as being like books. Rather, we should conclude that bookss represent a kind of bench mark of bibliographic description from which other in--formation sources will vary.

Further, the benefit of subject analysis should not be lost by attempting to make) bibliographic description serve that purpose. A case in point is the cataloging off music scores and phonorecordings. A title entry for a music score which is in effect a i subject heading. such as string quartet. or symphony. or sonata, should not be made: to serve also as the title of the work. An example may be seen in Beethoven's-quartets, where a conventional title has been given to some of the works, such as the·

Rasoumovsky quartets. If title unit entry is employed for either music scores or phonorecordings, then the title as found on the music score must serve whether it says String Quartet no. 1 or String Quartet nos. 1 through 6, or The Rasoumovsky String Quartets, or String Quartet (Rasoumovsky One) no. 7. The purpose of title unit entry is to serve as the model of what will be included under each different entry. In this concept, the various entries, rather than the bibliographic description of a given score, serve as the points of access and the organizational features of the catalog. This method will permit the inclusion of entries for phonorecordings as well as music scores.

Music scores when they were made from engraved plates usually included a plate mark which was of great importance in identifying the particular form of the particular revision or arrangement of a given piece of music. Such plate marks are no longer included with music produced by photo-reproduction. Here again the cataloger must decide how the music scores will be used and what the purpose of keeping them is. There is no need to make the music scores conform to the cataloging of books even though a collection of music scores may be similar to a collection of poetry, from single sheets to anthologies.

There is even less reason for making phonorecordings conform to the standards of books from which they must necessarily vary. The problem of phonorecordings is readily solved if a collection of single works by composers of serious music is the only thing to be cataloged. Whenever phonorecordings of jazz, or recordings of interesting or important performances, are included in the collection, then adequate description must include the performer even though this is never a question when books are being cataloged. The problem of analysis is equally important with phonorecordings because of the size of the disc which may include several different compositions by various composers and at times by various performers. Obviously each element of bibliographic description adds a dimension to the catalog. Phonorecordings of jazz performances must take into account not only the date of the recording and the method of transcription, but also the date of a performance.

The advantage of including nonbook, nonprint material as a part of the rules in the Anglo-American Cataloging Rules has practically been lost because of the dogma that such information sources must be made to conform to the rules established for books. The single unifying feature not only of books but also of serial publications, pamphlets, and off-prints, is the title. This is true also of nonprint materials such as phonorecordings, motion picture films, filmstrips, and films, or slides, and phonorecording combinations. In each of these cases authorship cannot readily be determined; for motion picture films the equivalence of authorship must be organized, more or less on an unsatisfactory basis, for adequate description to be possible. It is much better to devise separate rules of bibliographic description utilizing unit title entry as the method and providing for certain characteristics of motion picture films which apply to no other information source. A collection of motion picture film as photoplays, i.e., works of the imagination in motion picture form, must include not only the title of the film but also the director, the producer, and the main characters as well as the author of the photoplay and the author of the original

work from which the photoplay was taken. Even video-tape or electronic record-l-ings on magnetic tape can follow the same rules of description. A collection ofof documentary films will necessarily omit some elements of the description includedd as performers. If an equivalent to the author of books is sought in photoplays, itit must be the director, who is principally responsible for the final product. Modernn interest in motion picture films tends to center around the director's work, so thattit books of criticism and appreciation are being written about directors of motiomn pictures as if they were, in fact, authors, not the agent by whose effort an author"s's work comes to be exhibited.

In any case, the organization of points of access to a large motion picture collec->-tion must take into account the different reasons for which the motion picture filmn is sought. In a collection made up solely of documentary films, where the subjectt content is the only meaningful element, then the title of the film, the producer, theec date of production, and the running time, with a conventional note for either color orr black and white, and for sound as a part of the motion picture or in a separatee recording, are sufficient to satisfy the needs of users of the collection. But it would-dd be hoped that a collection for a research library would include photoplays of allll periods, and these must be analyzed in the manner described above if their useful--ness is not to be severely limited.

Libraries are frequently faced with the responsibility for organizing a collectiomn of clippings, i.e., pieces taken from printed sources, and for other quite ephemeralll material. In an era where reproduction in more permanent form is not only instantlyy available but relatively inexpensive, then the durability of the original informatiomn source is a secondary consideration if it is to be kept in mind at all. Clippings likee slides may be organized solely by subject. It is conceivable that a series of clippingss from a newspaper might illustrate the work of a given author, and if so then thee clipping has the same significance as a group of poems by a given author or a groupp of paintings by a given artist. What is advocated here is methods of description thatt are adequate, not only for the present, but for any foreseeable future. This adequacyy must be based on the nature of the collection, its permanence, and the permanencee of each item in it, and the reason for which the collection was assembled in the firstt place.

Archival material, especially that of the modern era, is frequently filled withh highly repetitive pieces, such as form letters sent out by businesses, if not by in--dividual authors. The value of an archival collection is not so much in its uniquenesss as in the fact that no more basic source of documentation can be utilized as amn information source. Included in the general area of archival material are manu--scripts dating from the period after the development of the modern publishing in--dustry. The handling of these collections is most efficient when adequate description1 of the materials is included in a book catalog. This method is especially useful when1 the collection is of considerable permanence to which additions, when made, are feww in number and at infrequent intervals. The book catalog may be prepared as a1 guide to a special collection of archival materials that provides a user not only with1 description but also information on the hours for use of the collection and any/

special regulations of which he should be aware. Such a guide may be cataloged as a book in the general collection with full subject analysis adding to its usefulness.

Adequate description may be defined as that description which provides all points of access needed to a given work. In the sense that bibliographic description includes all the likely clues to identification the user may have, then it is reasonable to make each clue a point of access. In practice, however, some points of access can be reached only with other works. This is especially true where a compilation of separate bibliographic entities is contained within a single volume. In this case analytics or some form of bibliographic analysis is necessary. In other cases, access is so rarely sought or if sought would result in so great a search that a portion of the bibliographic description may be omitted as a point of access. This is true for those works in which the number of the edition has no meaning except as it relates to the title and author of the work. This is equally true for publisher and for the collation. Hence adequate description is only in part governed by the necessity of points of access. Valid points of access include not only the title and the author statement but also the alternate title and editor, translator or illustrator if these names are significant in identifying the edition of the work. A further important point of access is the series statement for all but publisher's series used as a promotional device.

What might be termed secondary points of access would be numbered edition and date along with publisher and, if included, place of publication. Collation is a secondary point of access but only insofar as pagination is concerned. If edition is identified by the illustrator, then that portion of the collation which includes illustrations will not be necessary as a point of access, perhaps not even as a secondary point of access. Descriptive notes are secondary points of access while contents notes are primary points of access. Contents notes should not be included in the bibliographic description if no analytics are to be made. The best subject description of a work may be found either in the table of contents or in the index or both, and the reader should be directed to the book itself for the purpose of assisting him to determine finally whether this is the work he wishes to consult. Points of access in a computerized system may include permuted titles and permuted authorship statements. Permuted titles with a program that suppresses words of purely syntactical importance, such as prepositions and conjunctions, can assist in solving problems when the user has only a sketchy notion of the title. Equally joint authorship may be established on the basis of rule which will make authors included in the computerized entry equally searchable under any name. This applies equally to bibliographic analytics made for those works that are in effect a one-volume container for many bibliographic entities. In the past the number of points of access has been severely limited because of the essential linearity of the printed bibliographic description in a book catalog or on a catalog card. When this linearity is no longer a constraint, methods can be found for making portions of the title as searchable as the main entry. Main entry systems of cataloging, especially those that exclude all other entries as in the National Union Catalog, will ordinarily provide only 50% retrieval for titles that are likely to be entered under a corporate author, as a conference, or under a personal name entry as editor. This fact has made these catalogs

much less useful than they would be if the entire catalog were established in comp-puterized form. The experimentation done for the various MARC projects of the Library of Congress has sufficiently established that searchable elements should be identified by some code while secondary points of access should be identified by a subsystem code which relates the secondary point of access to the searchable element.

These points of access in a computerized system are also useful in statistical studies which may be devised with a relatively simple programming relying on the code of searchability to establish the data sought. Analytics in cataloging serials are such that each issue of a periodical may be included in a computerized catalog as if this periodical were a separate, i.e., each volume cataloged as a monograph. How-ever, in most cases it will be found that serials should be given brief listing, i.e., omitting the concept of edition altogether. Most of the union lists of serials produced with automated equipment have in effect followed established rules of bibliographic description for brief listing as opposed to the rules for bibliographic description of monographs in the system requiring identification of each edition. Points of access also determine the primary question with certain forms of material including maps, pictures, and other visual or graphic print materials.

If no part of the bibliographic description will ever be sought as an identifying feature, then no bibliographic description is necessary for a given information source. In the case of maps, which are to be used only for the subject content of the graphic displays, it is quite futile to include as points of access such incon-sequential matters as cartographer and engraver. Rare maps, however, that are not to be used as actual guides to a territory may be cataloged as if they were manuscripts. Maps used solely for subject content, like all other graphic material the collection of which is meant for informational content not dependent upon the producer of the material, need no bibliographic description. Scale, projection, area covered, and other elements of description are more nearly subject analysis than identifying features of a given map.

The points of access when arranged in random fashion represent the easiest means of utilizing a clue in the user's mind to obtain the material he wants without elaborate investigation, but this can only be achieved by an on-line real-time com-puterized catalog. Various substitutions and economies are possible so that the real-time use of the catalog is reduced. Most important of these measures is the prepara-tion of bibliographies based on a common need and answered by an arrangement of descriptions according to the most useful point of access sought. In a research library, for instance, all of the works in a collection of rare materials may be printed in a book catalog and this be made the primary point of access, even though it is at one time removed from the material itself. University and college libraries, similarly, now brief-list books on reserve for student's use as required or suggested by professors of various courses. Swank was probably 20 years ahead of his time in recommending that far more use be made of bibliographies for students than was common at his time. Even at the present time, when automated systems of catalog-ing are at least technologically and theoretically possible. very little attention has

been given to the possibilities such methods would bring to light. Foremost among these is a reordering of priorities not only in the acceptability of materials, but also in the preparation of materials for cataloging.

As indicated above, some 85% of all book material cataloged by a library can be handled by technical assistants who are trained in the use of a relatively simple set of rules. Only the choice of main entry is a professional judgment. All the rest is derived from the work at hand following certain standard rules of description. It is possible, then, to arrange the processing of library materials in a kind of assembly line. The first stage in preparing the final entry in a computerized system is the ordering phase. The request for the material is first searched in the library's catalog, or in the Union Catalog of the system, and if it is established that the work is not on hand, then an order is placed for the work. At this point all bibliographic information found in the searching process can be included as a temporary entry meant to be revised when the actual copy is received.

For gift books and exchange books which are in effect obtained without prior searching, the entry begins with the receipt of the book. As soon as the book is received, in either case, bibliographic description can be made in the form shown in Figure 1. Usually the line of procedure would go from the assistant who receives the books and distributes them to various other less experienced assistants who will make the initial bibliographic description and pass the work on to a reviser. The reviser may or may not be a professional whose purpose is to see that all the rules of description have been followed correctly. From this point the bibliographic description goes to an input clerk who translates the material on the bibliographic sheet into machine readable language for the computer. Subject analysis, not an issue under this heading, may best be accomplished after the bibliographic description is complete. If this is done, the need for a professional reviser is obviated. One of the professional tasks can be final review of the description as it appears in the catalog. The subject analysis once accomplished can be added to the entry whenever advisable. Until that time the work may be available for circulation by utilizing a random code or other device in lieu of a call number. The final preparation of the book may occur sometime after its value has been proven with circulation. The book prepared for the shelf represents the last stage of processing.

This concept removes the necessity for extensive cooperative cataloging, except for the remaining 15% of those works received by a general or research library that requires more sophisticated or special descriptive cataloging. The idea that it is unnecessary to catalog a book more than once still holds true, but as a practical measure it appears to be more economical to input information from the moment a request for a book is received until the actual book is at hand. Significant time waste in the cataloging process can be traced to the acquisitions department and the cataloging department each having unique functions and acquiring information which is never shared. Equally, time waste occurs because of matching problems where descriptive cataloging information is received independently of the book itself. The Cataloging-in-Source experiment came to grief because no clear distinction was made between those portions of the entry that required professional

Bibliographic Description

(1) Identifying number _____

Body of the Entry

(2) Title

    Subtitle _____

(3) Alternate

(4) Author Statement

_____

(5) Edition number

(6) Edition Statement

(7) Editor

(8) Illustrator, Translator

_____

Imprint (9) Place

(10) Publisher

(11) Date, Copyright date

_____

Collation, 12 Pages; Volumes

(13) Illustration

(14) Size

(15) Series Statement

_____

Notes (16) Descriptive notes

(17) Contents notes

_____

TRACING

FIGURE 1.

judgment and what was simply to be copied from the book at hand. Obviously if all the exogenous description, i.e., main entry and subject analysis, were included in the work from some central authority, as is now done in the Soviet Union and elsewhere, then descriptive cataloging becomes purely and clearly a sub- or nonprofessional task.

An extensive trial of this method resulted from the author's experience at the University of Mandalay from 1959 to 1962. The university had a library for all its students, departmental libraries for some of the students, and separate libraries for the Faculty of Medicine and the Faculty of Agriculture. The project established and funded by the Ford Foundation was to bring all the libraries into one unified system with a catalog for all the holdings in all the different libraries. In developing a method for the cataloging of the 30,000 titles in the main collection and the 10,000 additional titles in the other collections, the director of the library, U Htun Aung, and the author had to remember that none of the clerical or technical workers had ever been in a library or seen one in operation, let alone having any library experience. The solution was to break down each operation to its simplest component and train the clerks to do that task only. Later, as the clerk became more experienced, he was taught other components of the cataloging operation. A kind of assembly line was created so that the descriptive cataloging decisions were made by technicians (actually those graduates of the university who would go abroad for a professional degree) and their decisions were converted into card format by the typists. Each card had to be typed because of the lack of any equipment for creating unit cards, and the main entry system devised was such that any technician with some training could select a main entry with a reasonable expectation of arriving at the same decision that the Anglo-American Cataloging Rules dictated.

Despite the considerable distress which these methods caused the advisory committee of American Library Association, which acted as a backstopping agency and furnished professional advice, the experiment at least showed that other methods of descriptive analysis were as effective and much more economical than those which tradition dictated. As the computerized cataloging system becomes widespread, the opportunity to rethink previously developed rules is too good to be missed. Certainly there is little excuse for making the computer confirm what experience ought to have taught so far. The traditions of descriptive analysis have grown almost by accident from the bibliographer's solutions to problems of scholarship in previous times. The freedom from purely sequential information arranged with linear rigidity will help solve the problems of scholarship in an age of expanding information.

JAY E. DAILY

DESCRIPTORS

The method of descriptors is an intellectual technique for the subject specification of information and for retrieval. The method was introduced by the author of this article during the period 1947–1949. It was practiced in a select number of installations with considerable success during the following decade. As an intellectual technique for use by the library profession, the descriptor method was a

failure. It was a failure for the simple reason that documentalists were found to be incapable of understanding or practicing the method.

The descriptor method is of interest in the history of the development of information science for a number of reasons: (1) As an intellectual technique, it is the logical continuation and extension of the pioneering thoughts on classification for retrieval of Dewey, Bliss, and Ranganathan. The extensions are in the directions made possible by the capabilities of mechanical selection (since 1946) and computer methods (since 1955). (2) As a method of retrieval for different subject matter, both in the exact sciences and the social sciences, the descriptor method demonstrated its power and workability at a number of installations, some of which were quite large and wide-ranging in subject matter. (3) From the standpoint of the theoretical development and understanding of information retrieval, the descriptor method provided the inspiration or starting point for a number of important studies and theories. (4) In the inevitable area of "fads and fashions" in information science activity, the descriptor method (seemingly because of its prestige) had a profound effect upon various projects and methods in the period beginning in 1950. It stimulated the emergence of a number of quasi-imitations which were more closely related in claim than in substance to the actual descriptor technique. (5) As a sociological phenomenon, the method of descriptors inadvertently became a touchstone that cast serious doubt on the long-held claims of librarians to their pre-eminent ability to organize collections of documents *by their intellectual content.*

The word "descriptor" was coined in 1950 by the author in order to provide a new and distinctive terminology for denoting the new retrieval methodology which was then being developed (*1*). The term "descriptor" has since been widely applied in the most diverse situations in computer science, librarianship, and many other fields—usually with no awareness whatever of the original meaning of the term, or of its source—or even of the fact that the term is not an accepted (dictionary) word in the general language.

The descriptor method for information retrieval is based on a total systems view of the use of information (*2,3*). According to this view, any specific collection of information is used by some more or less well-defined group or "population" of users. Such a group tends to have a rather well-defined purpose for using their collection of information. In other words, the actual interest of the members of the group in the information is not unlimited in variety or range. Their interest is instead found to be intense and meticulous in some certain topic areas, and indifferent in others. Accordingly, in the systems view of descriptors, the retrieval capabilities to be imposed on such a collection of information should reflect the concern of the group which is to be served—rather than reflecting some broad hypothetical or unlimited range of interest in the topics.

A related aspect of the descriptor systems view is that the intellectual structure of a retrieval system should be focused upon the "retrieval aspects" of the information, rather than—as is usually the case—upon some attempt to convey the "messages" of the text in the documents (*2*). In the work with descriptors, it is

found that there is a very substantial difference between a set of retrieval-defining clues (which should be used in retrieval indexing) and the set of message-conveying terms (which are appropriate for use in the transfer of messages). This distinction between retrieval and message carrying is an important distinction because many times workers with information systems seem to equate excellence of indexing with conveyance of "the message" by the index terms.

The descriptor systems view is further supported by the discovery that the typical user communities (for many kinds of highly valuable scientific, technological, and social information) had a very characteristic manner in which they wanted to perform retrieval. They were particularly interested in performing retrieval upon the "idea content" of the documents—and not upon the happenstance of which particular words or terminology occurred in the text for the expression of the idea. This concern for the "ideas" was particularly acute because in many fields the terminology used is highly variable and unstable, while the set of underlying ideas (which the user community is almost solely interested in) has a remarkable stability and endurance.

It was on these foundations that the descriptor retrieval systems were constructed: (1) The clear definition of the user community and its actual scope of interest; (2) the recognition of the substantial difference between the desired kind of retrieval clues based on ideas in comparison to narrative message terminology; and (3) the focus upon retrieval by invariant idea-elements rather than upon the literal verbal expression found in the documents. These new idea-element retrieval clues or index terms were called "descriptors" in order adequately to distinguish the new viewpoint on which they were based.

These foundations led to the following consequences: For a given homogeneous user population, it was found empirically that a relatively small repertory of descriptors could be used together in unlimited combinations to provide the kind of retrieval discriminations needed for selection on actual collections of documents. A typical adequate repertory of descriptors was found to number between 200 and 400 descriptors. Such a small number of descriptors was found—surprisingly enough—to be able to exhaust almost all of the retrieval discriminations that a specified target user population wanted to make. On a pragmatic basis, it was found that adding a greater number of descriptors—allegedly to "improve the discrimination"—would actually decrease the utility for retrieval. This was so because meanings began to overlap and the infrequently used descriptors tended to be overlooked both in indexing and in retrieval. Both of these had drastic detrimental effects.

An utterly essential feature of the descriptors individually was that they were "idea elements," and thus were in general found to be independent of particular verbal usage or terminology in the text of the documents. This posed two salient problems: (1) How to represent these idea elements, and (2) how to define them. The first problem was met by the doctrine of using an arbitrary symbol to represent each descriptor. While such a symbol might be a meaningless number—such as 3A5 or 512.10—it was our experience that it was much more helpful to the users

to employ a strategically chosen word (or sometimes an abbreviation or acronym) to stand for the individual descriptor. In this way, the symbol chosen is able to jog the user's memory (to be a mnemonic) to the full scope of meaning chosen or assigned for the idea element of the descriptor. Thus, the descriptor symbols which have been used look like "vortices," "metabolism," "RNA," permafrost" (as taken from a variety of fields). To the end user of the information, each of these mnemonic terms is highly expressive—and has a wide-ranging scope of allusions.

This leads to the second problem, that of assigning or defining the scope of application of each of the descriptors. In ordinary library work, the scope of application of a term (in practice) is left almost wholly to the personal background or whim of the cataloger at the moment of cataloging, as guided by a standard dictionary definition. In the descriptor methodology, the application of a term was not left to such hazard. The meaning to be associated with each descriptor is carefully drawn or assigned in such a fashion as to best serve the purposes of the user population—even if this privately-assigned meaning may change or distort the usual meanings publicly attached to the term. In this sense, a descriptor "is not a word in the ordinary language." It is a private term for retrieval purposes only. It is an arbitrary word-symbol for a particularly chosen scope of meaning or application for use by a particular group of people with a particular collection. This explicit and overt manipulation of meaning is perhaps the most important (and the most startling) thing about descriptors.

At an early stage in the construction of a retrieval system based on descriptors, and prior to the actual general cataloging of the collection, each descriptor is given a carefully-drawn definition or "scope note" specifying its meaning and range of utilization in the retrieval system. An important feature of this scope note is that the intellectual scope, as given in the scope note, is allowed to be broader, narrower, or substantially different at times from the scope that is popularly used for the term. In fact, the scope for the descriptor is consciously tailored to fit the range of interests and allusions that are of greatest use for the specific group of users. Thus, the specified scope of range of interest attached to RNA usually would be very different for a group of geneticists as compared to a group of biochemists— even though the core idea for both began with the same chemical substance. The scope notes are typically verbal statements, from five to fifty words long. Sometimes, but not always, other related terminology would be included with the scope note. Figure 1 is an example of a scope note.

This pragmatic freedom to tailor the scope of meaning for descriptors, together with the arbitrary employment of words, is the source of the great power of the

STALL-AND-BUFFET (descriptor)
    Stall pertains to the condition of partially or wholly separated flow on an airfoil at high angles of attack. Buffet is the disturbance due to periodic boundary layer separation on a surface, or the motion of a surface in a fluctuating wake. (See also the descriptor STABILITY.)

FIGURE 1. *Example of a descriptor and a scope note for the descriptor.*

descriptors for retrieval in the hands of the consumers of, and the workers with, the information. Unfortunately, this most important property of descriptors—the use of a tailored meaning—was found to be beyond the ability or understanding of most of the documentalists or librarians who would ordinarily be given the service role in running such a system.

Descriptor systems are created at each installation according to a methodology embodying the utmost empiricism (2–4). A representative group of three to six high-level workers from the user population are called upon to comprise the working panel. A representative small pile of actual documents from the collection to be serviced is brought forth. In a short sequence of day-long sessions, documents are examined one by one, with the question: "Why would this group like to recover this document again? What ideas, what aspects does it contain?" The answers, in the way of suggested ideas and aspects, are recorded as they are mentioned. By the time that about 100 documents have been examined, the major part of the system has made itself evident in the lists of topics and aspects. There are typically about 250 ideas and aspects—and at the end, very few new ones appear as successive documents are examined.

At this stage, the mnemonic word-symbol for each descriptor is assigned. The ideas are usually grouped into handy groups of fifteen to twenty-five descriptors each, for ease of location. The entire repertory of descriptors is put on a large sheet or chart called a "schedule of descriptors." However, the descriptors are *not* put into a master alphabetical list for ordinary use. In many installations, each group of descriptors is headed by a "leading question," such as "Does the document deal with some *type of fluid flow?"* (see Figure 2). If the answer is "Yes," then presumably there is a descriptor in the group to point to the idea concerned, such as "supersonic."

Also, while the original set of documents is being examined, notes are kept to indicate the range of meanings that were found. At the end, these notes are edited into narrative "scope notes" for each of the descriptors as in Figure 1. Exhaustive lists of terms (in the manner of a thesaurus) are not constructed. For the users, the descriptors grouped in the display chart and the ideas exposed in the narrative scope notes are the more valuable.

Recurrent experience abundantly proved that "arm-chair descriptors"—i.e., descriptors which were not generated by being required by some actual document—are worthless to the system. The rule is: "If you cannot show a document where the descriptor is required, it will not go into the system." Another curious class of terms seems plausible, but has proved to be without content for retrieval: terms such as "the effect of" or "improvement."

It is found that something less than 100 hours of working time, divided among the members of the working group, suffices to develop a descriptor system for even complex fields of science or technology. This brief setup time is in startling contrast to the many thousands of hours which have been absorbed in the development of the various thesaurus-based systems for retrieval. It is usually claimed that these thesauruses are based on descriptor methods, but they are not. Rather than having

What is the type of fluid flow?

fluid flow
fluid flow
internal flow
subsonic
transonic
supersonic
hypersonic
laminar
turbulence
slip flow
compressibility
viscosity
vortices
shock waves
finite span = aspect ratio

Or is there another aerodynamic problem?

boundary layer
boundary layer
aeroelasticity
flutter
downwash
stall and buffet
interference
hydraulics
trajectory
modifying technique
performance
diffusion

Is it a stability and control problem?

stability
stability
control
static
dynamic = trans. resp.
longitudinal
lateral
derivatives
damping
weight & balance
e.g., center of gravity,
moments of inertia, etc.

Are there specific aerodynamic loads?

lift
lift
drag
moment
gust
pressure
center of application
e.g., aerodynamic center,
center of pressure, etc.

Is a specific component or body studied?

airplanes
airplanes
missiles
wings
tails
control surfaces
propeller
landing gear
parachutes
plates & shells
beams
helicopter
fuselage
non-aircraft structures
joints

Is the geometry or a shape important?

airfoil
airfoil
body of revolution
wedge
sweepback
angle of attack
finite span = aspect ratio
cascade
cross-section
thickness

FIGURE 2. *A portion of an actual schedule of descriptions in an aeronautical retrieval system. The descriptors are placed in groups with "leading questions" so they will be easy to find. About 250 descriptors in fifteen to twenty groups are placed on one large display sheet.*

a focus upon ideas, they are best characterized as being alphabetized, cross-referenced lists of mere words and terms as found in documents.

After a descriptor system has been set up, the documents of the collection are analyzed and descriptors are assigned for each document. This is done by the "filtering technique" (2). The person doing the work first familiarizes himself with the general content of the document. He then turns to his "schedule of descriptors," which has the descriptors conveniently arranged into related groups. He runs down the questions at the head of each of the twenty or so groups, and if any group is relevant, he assigns one or more descriptors from that group to the document. Typically, documents are found to take between three and a dozen descriptors. This is not surprising, since the descriptors are originally tailored (in regard to breadth and precision) so that between three and twelve descriptors will suffice for retrieval purposes. It should be noted that the filtering technique of descriptor assignment mimics the retrieval situation—It first asks a question, and then answers it by applying a descriptor to the document. It is at this stage of system development that the difference between "message-carrying" and "retrieval" index terms becomes the most apparent.

In this article on descriptors, the actual physical apparatus for storing the descriptors and for performing selection according to their association with the various documents will not be described. Any of a number of physical devices can be used. In the work of the author of this article, the "Zatocoding System," making use of mechanically sorted cards with a random code system (Zatocoding), was used (1,2,5). With current technology, various computer techniques are preferred.

The real purpose of a retrievel system is to provide service—to perform recovery of documents for the population of users. The users, with a problem in mind, consult the schedule of descriptors, initially paying special attention to the descriptor groups and to the suggestive questions at the headings. This quickly guides the user into a "retrieval prescription" consisting of a small number (two to five) descriptors chosen from the schedule. These descriptors are now used in various combinations, two or three at a time, to select upon the collection. A document is selected if it has associated with it each of the descriptors in a particular selective combination. Although this simple rule for selection sounds primitive, very sophisticated results are easily obtained in actuality. Characteristically, when a small number of descriptors are used in a selective combination, the number of documents that comes forth is larger than when more descriptors are used in the combination. To some extent, the number of documents that are retrieved can be predicted from the number of descriptors in the combination, since the descriptors tend to be tailored so that they have an incidence of from 0.1–10% on the total collection. (In a 10,000-document collection, a 1% incidence means that the descriptor is assigned to approximately 100 documents, i.e., to 1% of the documents.) Selection by a three-descriptor combination where each descriptor had a 10% incidence would thus tend to produce roughly ten documents in a

collection of 10,000 documents. In actuality, correlations between the ideas im the documents modify such simplistic statistics.

The main conclusion to be drawn from this discussion about retrieval is thait the descriptor repertory should be quite small (a few hundred), the individuail descriptors should be quite broad (both intellectually and in statistical incidence), and that the selection which is then performed is remarkably flexible and precise.

The preceding description terminates our discussion of "what descriptors are:, and how they are used." Additional details may be found in References *1–4*. Wee now turn our attention to the five provocative points mentioned at the beginning of this article.

Point (1). Descriptors are an intellectual continuation from the ideas of Dewey', Bliss, and Ranganathan.

The important feature of the Dewey classification was a structured listing oif abstract intellectual topics—topics which existed irrespective of any particulair words that might have been used in the documents so classified. An indicatiom of the intent to be independent of the particular words of a document was Dewey':s choice of numerical symbols for his idea classes. These classes were subdividedl, to several levels of division, but in all cases the subdivision was in accordance witlh "ideas" and not in accordance with the happenstance of words and terminology'. Possibly Dewey fell into an undue fascination with the "decimal" succession oif subdivisions, but I would not fault him for this.

Bliss, in some of his most stimulating speculations and discussions of what a classification should do, broke out of this decimal constraint. In one of his book:s he diagrammed a speculative and suggestive classification based on multiple geo-metric axes, e.g., with terms for type of work on one axis, for the field of learning on another axis, and for the country of origin on another. Bliss pointed out thait the topics of each axis acted independently and had no inherent order of sub-servience, one to another. He put forth this freedom as an ideal of a classification system. Unfortunately, it is logically impossible to devise a method of shelving books so as to preserve this freedom. Furthermore, no decimal or other linear notation is adequate to secure this desired end. Thus Bliss, despite his brilliant and exciting analysis of what should be done in classification, was forced to give up his principles of independence and to compromise in his notation upon logical subservience of topics.

Ranganathan took matters one step further. Where Bliss diagrammed independent coordinates, Ranganathan actually put independent coordinates into his notation, using the "facets" separated by the characteristic colon punctuation. However, the necessity for having filing rules for his notation (corresponding to shelf position) again forced some facets to be subservient to others, and the independence so bravely displayed in the notation was lost.

The viewpoints sketched here were the basis of the development of descriptors— with one additional contribution. This was that the technology of machine selection eliminated the requirement that certain categories of classification symbols had to be subservient to (indented behind) others. All topics could be on equal footing. This "revolutionary" idea was greeted with incredulity in library circles in 1947 (*5*).

Taking this viewpoint, we might say that descriptors are class symbols for ideas of the sort envisioned by Dewey, Bliss, and Ranganathan, but that in the descriptor system, any symbol can be a dominant or leading symbol for selection purposes, and descriptor symbols can be used in any combination or sequence to prescribe a selection. If there is a "heirarchy" of descriptors, it is only for grouping or display purposes, and not to impose a constraint upon their manner of use in selecting information.

One final observation: Circumstances beyond their control forced these pioneers, Dewey, Bliss, and Ranganathan, into use of a hierarchial structure. We should note that a hierarchical structure is in fact advantageous if the task is limited to "putting information away in an orderly fashion." It is, however, very debilitating when we desire to retrieve information, since then the ideas cannot be guaranteed to be presented in the rigid sequence required by the classification. Thus, one needs the full independence of topics to recall information with the greatest flexibility.

Point (2). Descriptors demonstrated their ability in installations in various fields and with wide-ranging subject matter *(3,4,6)*.

Descriptors were used in collections ranging in size to over 100,000 documents. The collections were most varied, from those in narrow fields of biochemistry to socio-politics of a world power and its allies. In some cases the user population was divided into a number of categories, and this situation was handled by providing tailored sets of descriptors for each specialty. Each such category took approximately 250 descriptors. Thus if there were three such groups (allowing for overlaps), the total system would have perhaps 500 descriptors. It was often alleged "that descriptors were not good for large systems." Such statements were made by those who had little knowledge of descriptor systems.

In contrast to the large systems, many small systems paid off well in results although they had only a few thousand documents used by a relatively small group. Such a favorable payoff was possible because of the high ratio between the useful output to the setup time which was invested.

Point (3). The descriptor method provided the inspiration or starting point for work in a number of directions.

In my work, the descriptor method led to the introduction of a number of useful ideas to the field of documentation. These included the ideas of Boole in logical symbolism, the ideas of Whitehead and Russell in propositional calculus, the use of statistical techniques and reasoning (7), and the application of metrical geometry (8) and lattice theory (9). In developing these ideas, the author was joined at a very early date by Fairthorne (10). Somewhat later, Hillman (11) explored certain of these foundations, and went on to the synthesis of a very useful retrieval system. Soergel has more recently provided an over-all synthesis of many of these in a mathematical setting (12,13).

Perhaps the greatest practical impact of descriptors was to force the library profession into the realization that classification for retrieval did not necessitate a hierarchial system of ideas.

Point (4). The descriptor methodology stimulated a number of short-lived, derivative "fads and fashions" in information science methodology.

The first of these fads occurred in 1950 and was called "Uniterms" (*14,15*). It was a debasement of the descriptor idea. It rather blindly seized upon the demonstration that the retrieval symbols could be used independently in retrieval—and that the constraints of a hierarchy were not needed. However, it focused upon words—and not upon ideas. The proprietary Uniterm method was presented by Mortimer Taube and associates of Documentation, Inc. It employed words and terms as they occurred in, and were selected from, the documents. It made use of a clever manual method of ledger cards, with one ledger card for each term. Document numbers were posted to the ledger card for each verbal term recognized in a document. As might be anticipated in any system, there were soon thousands of such ledger cards, one for each new word, even for comparatively small collections. In the Uniterm system, documents were selected by the concurrence of a group of words as found in the documents.

The tremendous fad of Uniterms was eventually succeeded by another fad which stumbled into being at the Armed Services Technical Information Agency (ASTIA) in Washington, D.C. There it was discovered that the large numbers of Uniterms which came into use (since the Uniterms were merely instances of verbal occurrence) badly required cross-referencing. There thus came into being the "thesaurus system" in which related words were collected, alphabetized, and cross-referenced, one against the other, for the production of a "thesaurus" to be used for retrieval (*16*). Although these systems usually claim to make use of "scope notes," their scope notes are in reality (for the most part) mere lists of "see" and "see also" references to other terms, rather than a real delineation of intellectual scope or a narrative statement of an idea or topic.

Point (5). The sociological phenomena that librarians were generally unable to understand or to cope with descriptors.

This last point was the most puzzling and frightening side of the entire descriptor study. Descriptors had their origin in, or were derived from, an evolutionary development of the ideas in library classification. They were an enhancement of the ideas of Dewey, Bliss, and Ranganathan in a new direction. Descriptors demonstrated that the constraints of hierarchy (as it applies to selection) were unnecessary. Descriptors were a further refinement in the sense that they abundantly demonstrated that a "tailor-made classification" could be generated quickly and efficiently, and that such descriptor systems were very effective in retrieval for both small and large collections.

However, the surprising—and totally unexpected—outcome was that the author discovered that the greater part of the library profession was unable to understand what descriptors were all about! (Reference *17* is a vivid instance of such a lack of understanding.)

The impasse seemed to be the very specific emphasis upon the use of "idea units," and of idea units which were tailor-made to fit the needs of a particular population of retrieval users. Persons from the library and documentation background were, for the most part, incapable of understanding (or crediting the notion) that ideas have a being apart from the (English) words which are used

to represent them! Neither could they understand or cope with the method of tailoring ideas to size, and then assigning arbitrary mnemonic word-symbols to the idea or topic unit so created. Recurrently, in any situation, the author was asked, "Just tell me what words I am to look for," when he tried to explain the use of a particular descriptor. The author's response was that none of the words of a list might occur, even though the descriptor was needed to give a clue to a topic or idea. At this point, there was usually a clear and total lack of comprehension of what the descriptor method was (*17*).

This total incomprehension by the librarians and documentalists was in sharp contrast to the immediate understanding and great enthusiasm for the descriptor method that was shown by the users generally, particularly those who were scientists and engineers (compare References *17* and *3* or *4*). These people immediately understood the various parts of the method: the focus upon idea units, the ability to tailor the intellectual scope of descriptors at will, the total lack of hierarchy, the use of arbitrary mnemonic words for the descriptors, and the formation of selective specifications by combinations of descriptors. They not only understood, but they soon began making clever suggestions for extensions and refinements of the descriptor method for use with their own particular materials.

Time after time, scientists and professional workers expressed to the author: "Why haven't the librarians provided something like this before?" or "This is the way we want to deal with our information." These questions were difficult to answer. At that time the author had not yet caught on to the fact that here was a method most librarians were apparently incapable of understanding!

Slowly, this shocking truth dawned on the author. (It took some 10 years before the author was convinced that there was no other alternative explanation. It took 10 years more—until now—before the author dared enunciate this hypothesis in public!)

> The plain truth is that a large part of our population is incapable—beyond a rudimentary level—of dealing with ideas apart from the words they are clothed in.

This hitherto undiscovered phenomenon is sufficiently central to the problems of scientific and engineering documentation so that it deserves a careful restatement here. The following discussion is the result of some 20 years of encounter with the phenomenon by the author, and a great deal of careful and sympathetic reflection. The phenomenon is perhaps made more understandable by the following analogy.

It is well known that a percentage of the population is color blind, in that such people are unable to perceive or to work with certain color discriminations— however hard they try. Also, they are often unaware of their inability, and they find it out only when their visual ability is brought into comparison with the visual ability of another part of the population. The same thing seems to be true in regard to descriptors. There seems to be a distribution among the population of the ability and inability to perceive what descriptors are, and how they are to be used.

As with color blindness, it is the author's hypothesis that a substantial portion of the population (it seems to run about 80% among documentalists) displays a charac-

teristic that can be called being "word bound" or "idea blind." Persons who are word bound cannot perceive or work with ideas apart from the actual words which such persons equate to ideas. For them, words are the ultimate reality in their mental operations and they cannot see beyond words—and by this is meant words in their conventional, well-established meanings in the language. For such a person, if a word is not found in a document, the corresponding "idea" (the word) is absent from the document. In the building of an index system, if a word cannot be found to suit the situation, such a person concludes there can be no such idea (no such word). If you carefully question such a person, you will find him expressing the view that "ideas are words"—and when further pressed he may say, "there can't be ideas without words." Clearly, for him, this is an accurate statement of fact. At first the author argued with this viewpoint. Now the author accepts it as being true—for such persons.

The analogy with color blindness should be taken very cautiously. It is only an analogy, and being word bound may not be an absolute genetic impairment as is color blindness. The physiological and genetic basis of color blindness is now well understood, while the word-bound phenomenon in this context has received no study. Whether it is acquired, genetic, or from some other cause, is unknown to the author.

Let it be clear, such word-bound persons are not deficient in intellect, training, motivation, or desire to serve. Moreover, being word bound is not necessarily a disadvantage in many kinds of documentation. For instance, in work in the humanities, literature, in much of law, and many parts of medicine, the high facility with words of the word-bound person may give him a definite advantage over the person not so inclined or capable. However, being word bound is likely to be a great disadvantage in working in many of the sciences, in engineering, and in some other fields.

The customers of a documentation service in these other fields habitually use an entirely different kind of mental operation in doing their work. They are not "word bound" in the sense described. Moreover, they prefer to have their mental techniques and habits reflected in their information systems. They perceive and deal with information and ideas without using close ties to established words and meanings of the language. In fact, they "do not think with words." They deal with ideas in various other ways—diagrammatically, symbolically, numerically, spatially —all of which are mostly or entirely nonverbal. They don't use words. Yet they freely work with, analyze, reshape, combine, and synthesize wordless ideas. Only at the end of their task do they face the necessity of clothing their ideas in writing by the use of conventional words.

It was this latter group, which is not word bound, which found descriptors so attractive. Descriptors evidently mirrored the manner of their internal mental operation. They found it easy and congenial to reshape ideas to the scope of interest of their documentation systems. They found it easy to use a descriptor term as a word-symbol standing for an assigned scope of meaning and to associate it with ideas and meanings found in documents irrespective of any occurrence of

particular words in the documents. Yet these operations, which they found so easy and congenial, proved to be completely beyond the perception and understanding of the word-bound persons—who were usually the persons associated with the library facility at the place where descriptors were being put to use.

In contrast to such modes of thinking, it appears that word-based persons (such as librarians, documentalists, as well as historians and literary persons) think almost totally verbally—and with accepted verbal terminology. They must think using standard words and sentences, and in place of "ideas" they apparently form complex patterns of co-occurrence of some words and phrases with other words and phrases. Their observable world of objects and social transactions must accordingly be abstracted mainly into static verbal symbols which (for them) are invariant objects of thought. If this is so, it would explain why the descriptor method is so incomprehensible and upsetting to them.

The operational success of the descriptor method (in the hands of others) is for them a tangible denial that established word symbols are the sole means or invariant objects of thought transactions. For them, this seems to be a very disturbing conclusion. Apparently even more incomprehensible and disturbing to them is the emphasis in the descriptor method on a free manipulation of the "shape or size" of a chosen idea or topic, which is then followed by an arbitrary assignment of a convenient mnemonic symbol or "handle" to represent the chosen scope of the topic. The assigned scope of meaning plus the arbitrary mnemonic term is "the descriptor."

It was found that extended attempts to convey this notion of what descriptors were, and how they were to be used, was distressing to such people. For example, on some occasions there might be two or three scientifically oriented persons in the discussion along with two or three librarians. This is what happened: The persons in the first group would quickly come to a joint understanding about descriptors, while the librarians were still quite puzzled as to what the rest were talking about (e.g., "But don't you look for words?"). Then, as the discussion continued, the librarians began to react and to imply by their remarks that they felt they were being made the butt of some kind of cruel prearranged joke or conspiracy by the first group. They would allege some kind of agreement among the others to engage in "double talk," yet to act as if the discussion had meaning. They would imply that it was some trick to exasperate and humiliate the librarians.

The implications of this discovery to documentation are evident. Namely, a word-bound person is likely to have difficulty—or even an inability—to provide the desired kind of documentation service to certain classes of users of information. It is the author's belief that this phenomenon, now that it has been discovered, should be carefully studied because of the practical importance of these implications. Unfortunately, such a study is in the department of the psychologists. But psychologists are well known for being very verbally oriented. Are they therefore likely to be word bound or idea blind? Could a psychologist study a phenomenon which he himself could not perceive?

These rather upsetting observations are summarized by the following hypothesis or law,* the author hopes can be further examined:

MOOERS' SECOND LAW OF DOCUMENTATION

In the same manner that color samples provide a test for the detection of color blindness in a person, the descriptor technique provides a means for the detection of the "word-bound" or "idea-blind" person. Such detection is important because a word-bound person may not be able to provide idea-based (word-independent) retrieval service of the kind which is most congenial and most desired by the non-word-bound part of the population.

The author does not know of any remedy for this unfortunate and (to him) unexpected situation. He believes that people simply differ. Persons prone (or restricted) to this kind of word-based thinking tend to choose librarianship as one of their professional choices. Many of these people come to librarianship from an earlier specialization or deep interest in literature, history, languages, sociology, and even law and medicine. The author does not believe that it is a matter of formal education. It may be a matter of skills acquired very early in life or, perhaps, of heredity.

The reader may find this conclusion and explanation objectionable. (The author finds it distressing!) Yet, it has been abundantly observed that highly intelligent, educated, and eager people have been unable to understand descriptors. This is a clear empirical fact. It needs an explanation. Therefore, if the reader objects to this explanation of the phenomenon, it is suggested that he should try to find a better explanation.

In epilog, the descriptor method is largely a failure because it proved to be beyond the capabilities of the persons who chose to enter the service profession of librarianship in which descriptors were to be used.

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CALVIN N. MOOERS

DESIGN OF BOOKS

Book design is a rather special barometer of Western civilization, at least of the last 1,500 years. It has recorded not only changing tastes and styles, but, to some extent, it has reflected nuances of religious, philosophical, political, economic, and technological changes as well.

The religious fervor of the Middle Ages, the exploding energy of the Renaissance, the sobering effects of the Reformation, the Age of Enlightenment—right up to today's industrial and scientific preoccupation—all are there to be noted in the design of books contemporary to these periods.

Books are one of the mainstays of tradition and, as a consequence, what changes they undergo are largely superficial. These superficial changes are what constitute

book design. While it is true that a beautiful book may add something to a reader's pleasure, that pleasure is on a different level from the experience he gains in reading the text. Consider the pleasure we all get from just holding a book, from admiring it as an abstract thing. But it is not an abstract thing, and that is where tradition imposes its restrictions. The book is to be read—easily and without distraction. Tradition favors certain forms and they are disregarded only at the designer's peril. So it is in the handling of the superficialities that the genius, or lack of it, becomes apparent in the designer.

There are four principal areas of concern for the book designer, all inseparably related yet capable of individual analysis. These are: (1) Design of text pages; (2) Type styles; (3) Decorative accessories; and (4) Special pages. He also has to be concerned in varying degrees with other factors that impinge on the effectiveness of his efforts: such things as paper, reproduction processes; press sizes which have a direct bearing on the imposition of pages; and on the bindery operations of folding, gathering, and collating. These are peripheral factors, some of which can, on occasion, be critical to the achievement of the desired end. They are only listed here to suggest the scope of the designer's concern.

Design of Text Pages

The spread of Christianity in the third and fourth centuries focused attention on the need for teaching and learning tools less cumbersome and more practical than the scrolls that had been in use for many centuries. The need was met by the invention of the codex, about the fourth century A.D. This consisted of a single sheet of papyrus or vellum folded in half. The resultant four surfaces were inscribed with a quill pen and sewed through the fold to a strip of cloth or vellum. As more pages were inscribed, they were sewed to the same strip, so that when the work was finished, a portable, easily handled package resulted. With the subsequent discovery that boards affixed to the sides of this package, hinged to that back strip, rendered the whole work more permanent and more easily stored, the book as we know it today had evolved. In 1,500 years this form has changed only in refinement.

The monasteries from which the codex emerged were, with the disintegration of Rome, the only remaining centers of intellectual and spiritual life. Not only were they outposts against the barbarians and pagans of Northern Europe, they were spearheads of the new religion. Individually, the monks were dedicated to the service of God through whatever skills they possessed. Those who were literate and able to master the intricacies of writing became scribes. To some of them, legibility was not enough. Beauty and the search for more intricate forms of expression elevated the inscribing of a sacred text to an act of worship (see Figure 1).

In the eighth century, Charlemagne established centers of learning, to one of which, at Tours, he brought the Northumbrian monk, Alcuin. Under his direction one of the most important and significant developments was the establishment of a well-organized scriptorium. This was probably one of the first efforts at mass production, and it is significant in that its product was books.
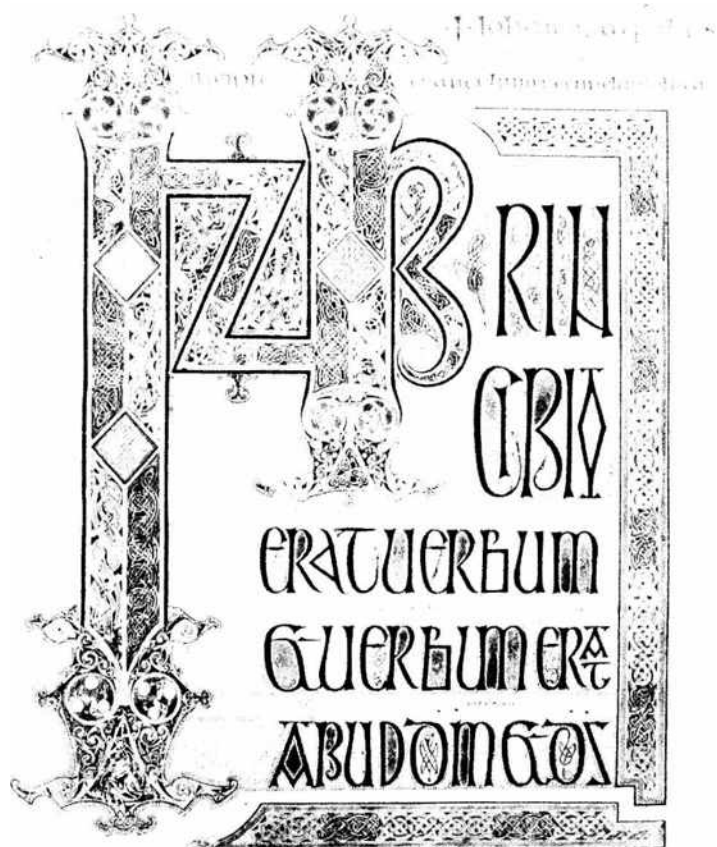
FIGURE 1. *This page of the* Lindisfarne Gospels, *a codex dating from the early eighth century, gives some suggestion of the intricate richness of the Celtic manuscripts.*

One basic tool was devised to implement a more rapid output and, at the same time, to assure a uniform standard appearance of the work of many hands. This tool was what we today call a grid, which determined not only the size of each letter but the space between lines, the margins, and certain standard indentions. Close examination of some medieval manuscripts will reveal the presence of tiny pin pricks from which, very faintly, guide lines were inscribed (see Figure 2). These inconspicuous pin holes were a necessary step toward printing from moveable type. They established clear space between lines of texts and kept them separate. It took 700 years for the realization of the idea that individual letters could also be separated.

There is a feeling of rightness about the traditional style of margins with the smallest being that next to the gutter, growing progressively larger at the top, outside, and bottom. Expediency must have determined this form back in the scriptorium. The irregularity of the edges of a sheet of vellum would have necessitated keeping written matter well back from the outer edges. The handling of sheets, both by the scribe who worked on it and the reader of the finished book, would make wide

FIGURE 2. *A ninth century manuscript page showing the establishment of a grid.*

margins desirable. The same considerations apply to the later use of handmade paper with its irregularities.

With the invention of printing, the basic reasons for the success of the grid system were not changed and they have not changed today (see Figure 3). After the first 25 years of printing, the close imitation of manuscripts had run its course, but the problems inherent in putting text on both sides of the sheet remained. In manuscripts on vellum a slight transparency of the sheet made perfect back-up desirable. The pin holes through the page guaranteed that. Handmade paper was inevitably irregular, although progress was steady in refining its manufacture and acquiring predictable and uniform sheets. Slightly dampening the sheets to be printed made them softer. In printing, the type was pressed into the paper and the impression was more likely to be uniform. It also showed up on the reverse side, but by printing the back-up over those same lines the problem was resolved. One of the standards of quality of today's printing is the perfect backing up of each page.

These basic elements of a grid system have as a module the size of the type

FIGURE 3. *A diagram from a recent book on graphic design that demonstrates a grid to resolve certain specific problems. The first step in developing a grid is an analysis of all of the various elements that will be encountered in the book.*

desired. As printing became more than just a means of imitating manuscripts, it became apparent that what was being done instinctively was the organization of two-dimensional space, and that the success of this effort hinged on how adroitly that space could be organized so that its two-dimensionality was somehow its greatest asset. While architecture was always concerned with three-dimensional space and painting was groping for means of expressing it, the printed page had, by 1500, established an integrity of its own based on the organization of space in two dimensions.

It may seem arbitrary to fix the year 1500 as the end of the period of incunabula, but it was about that date that the break was made away from what had basically been the codex. The single sheet folded once is, in printing terms, a folio. In 1501 the Venetian printer Aldus Manutius printed an edition of Virgil in octavo size (¼ the size of the folio) in a type face that came to be called "italic." The smaller book size was immediately popular, of course, and it soon dominated the field. The change in page size did not affect format to any great degree. Type sizes were smaller and required subtle adjustments in line spacing, but the same progressive margins remained and the over-all texture of the page was still of paramount concern.

FIGURE 4. *A contemporary book in which the traditional relationship of top to bottom margins is reversed. The page number is also brought to the top margin. Paragraph indentions are unusually deep. Sans serif type is used.*

For four and a half centuries the basic design of text pages remained constant. The modern movement beginning in the early twentieth century in painting and architecture was an attempt to create forms of expression consistent with the Machine Age. All traditional forms were questioned as to their suitability to a new era which seemed intent on cutting itself off from the past. The format of books was, of course, one of the natural fields of exploration. It was predictable that solutions would take forms contrary to traditional ones (see Figure 4). It was at this time that an extreme school of design arose opposite the traditionalists, and many strange and unreadable results appeared. These experiments had little effect on the design of mass produced volumes and to this day have had negligible effect. Tests invariably indicate that the more easily read page is one that follows traditional forms. Many of the experimental pages today take their form from new ways of writing. The stricture against the printer coming between the author and his reader is difficult to observe. Perhaps the new literary forms require new typographic forms to make clear their meaning. As of now these explorations are necessarily limited to the so-called underground press and to avant-garde publishers. Whether their efforts will eventually be felt in the trade press is questionable.

FIGURE 5. *From the* Freiburg Picture Bible *of 1410. These simple and decorative drawings are essentially line renditions with flat, transparent colors applied to limited areas. The step from this point to cutting similar drawings in wood was a logical and simple one.*

Type Styles

Format is conditioned by all of the elements that make up the printed book but type styles probably play the most significant role. The grid mentioned earlier is determined by the size and shape of type used on a page. A general rule of thumb is that a line of type should, for greatest legibility, be the equivalent of one and a half lower-case alphabets of the type face used. With this as a spring board, consider the development of type. The invention of the means of casting individual letters in metal originated in Mainz, Germany. The letters cast were those in common manuscript use in the Mainz area, the Gothic miniscule.

Gothic architecture, in spite of its decorative excesses, was more honest in its open display of solutions to strains and stresses, thrusts and counter-thrusts than any architecture up to the modern movement of the twentieth century. The Gothic miniscule was uniquely appropriate to its time. The familiar comparison of a manuscript in the Gothic hand with the richly colored, heavily leaded glass of a cathedral is reasonable.

FIGURE 6. *A page from Aldus'* Hypnerotomachia, *printed in 1499, illustrates a nearly perfect harmony between the wood block illustrations and Griffo's Roman type.*

The tall, condensed angularity of the hand did not make for rapid reading; nor was it intended to. If subjected to the above mentioned rule of thumb on ideal line length, it is evident that its greatest legibility was in relatively short lines. The generous size of the codex page, roughly 12 × 18 inches, determined that the most legible and satisfactory arrangement was in two columns. The magnificent Mazarin Bible, one of the earliest printed books, is suitable evidence of the beauty and majesty of the Gothic miniscule set in two columns. It took a type case of 292 characters to achieve the close approximation of the manuscript hand. As the demand for imitations of manuscript books gave way to an acceptance of the new art of printing, many of the special characters, ligatures, abbreviations, etc., that were peculiar to manuscript hands disappeared. A development that helped bring about that acceptance was that of the Roman letter form in Renaissance Italy. This letter, of which Nicholas Jenson's is the foremost example, was a direct descendant of the humanist hand developed in Italy. It was a highly deliberate reversion to an outlook completely opposed to that of previous centuries—a pre-Gothic attitude, drawing

Resti di feudalismo, come si è detto, ce n'erano ancora
molti nelle usanze fiorentine: ma la città nella quale avevano sparso i semi meravigliosi della civiltà nuova, Dante e il Boccaccio, Giotto e l'Orcagna, dove novellavano gaiamente Franco Sacchetti e Ser Giovanni, come si ingrandiva e si abbelliva, così si trasformava, e i suoi costumi andavano scalzando a poco a poco il mondo vecchio. Accanto alle vecchie famiglie nobili, quelle ricchissime dei mercanti si affermavano in potenza e in preferenza.

A rigore il ritmo della vita cittadina, e le sue usanze cominciarono a variare dopo la rivincita delle Arti mercantesche.

{ Pagina 4 }

FIGURE 6a. *An Italian book of the 1920s shows much the same sensitivity to harmony between type and illustration that characterizes the work of Aldus in Figure 6.*

on classical models. It made possible the break from a calligraphic letter to one suited to metal type. This letter rapidly relegated the Gothic hand throughout most of Europe to use only for ecclesiastical books. The tradition still persists in pieces of a religious nature such as church bulletins, Christmas cards, and an occasional title page. However, in Germany the Fraktur and Schwabaker Gothic types were in common use well up into this century.

The widespread acceptance of the rounder Roman face and the development of smaller books made the two-column page impractical except for special texts such as the Polyglot Bibles.

The practice cited earlier of printing on dampened sheets had an effect on the appearance of the impression. As the type pressed into the sheet, the resultant impression was slightly larger than the face of the type since a fraction of the neck also printed.

As the manufacture of paper improved and as increasing demands made printing on dampened pages impractical, impressions became lighter and the appearance of a printed page was slightly altered. Printing on dampened paper has been for several centuries a luxury that only private presses or limited fine editions could afford.

The book designer has an unbelievably wide range of type faces at his disposal, and the decision as to which best suits his need is an important one. The terms allusive or picturesque typography refer to the selection of a type style that is in

IX PLAVTI COMOEDIIS·XX·QVARVM
CARMINA MAGNA IX PARTE IN
MENSVM SVVM RESTITVTA
SVNT M·D·XXII

Index verborum,quib-paule abstruserib-t lums verser.

Argumenta singularum Comordiarum.

Authors um.

Tralato dictionum grecarum.

FIGURE 7. *A title page from the Aldus press, produced after Aldus' death by his father-in-law, Andreas Asolano. The dolphin and anchor emblem, probably the most famous and most copied printer's mark in the history of printing, expresses one of the reasons for Aldus' eminence: "Make haste slowly."*

some way relevant to the text it presents. The terms can probably be stretched to cover the German preoccupation with the Fraktur letter and the Irish efforts to revive the Gaelic alphabet; both attempts at cohesion with certain nationalist aims. The problem of allusive typography has to be resolved by the designer's decision as to whether legibility is impaired or whether any self-consciousness intrudes.

There are a surprising number of book faces that are either hard to read, are tiring to read, or are distracting. Generally, any face that presents too great contrast between its thick and thin elements is tiring to read. Faces that are too condensed are difficult to read. Those that exaggerate any of its parts such as ascenders and descenders or serifs are distracting and the letter becomes self-conscious.

Periodically, readership tests are undertaken to measure, as scientifically as possible, ease of reading. Invariably, the type faces that follow traditional lines score highest. It bears out Stanley Morison's observation that "The typography of books requires an obedience to convention that is almost absolute" (*1*). Even at that, the choice of faces that fill that description is very wide. It ranges from the Venetian style of Jenson through the French refinements of Garamond and Granjon, the distinctly English flavor of Caslon, Baskerville, Bell, up to the recent Times Roman. Each of these names represents a distinct style; there are many variations of all of them. There are also a few excellent faces that do not fit any one of these families. The designer has to search them out.

FIGURE 8. *A title page of Robert Estienne, Paris, 1528. Another famous printer's emblem used as a dominant pictorial element.*

The Bauhaus, in the mid-twenties, raised the issue of relevance in all the arts: relevance of design to the Machine Age. It was a justifiable issue to raise, and much of our visible world today owes a debt to the Bauhaus. One of their concerns was with typography. A type face was designed that questioned the need of capital letters and eliminated them. Similar attempts at phonetic alphabets were made. Traditional ways of reading were too strong and these efforts failed. A less iconoclastic solution was the development of sans-serif faces in book weights. Many books, particularly from experimental presses and those publishers willing to explore in tentative areas, were printed entirely in sans-serif types. The accustomed texture and sparkle of traditional pages was gone. Instead, a flat, monotonous page resulted. To offset this monotony the whole traditional format of the type page was scuttled and new forms were tried, but none of the inventions, as far as pages of text were concerned, was a contribution to greater legibility or ease of reading. One of the more persistent explorations had to do with the problems presented by uneven word spacing. In the precise, mechanical appearance of lines of even weight sans-serif type, irregular spacing between words was quite noticeable and undesirable. The ideal was to hold to 4 to the em, or 5 to the em space. There are only two ways to do this. One is to establish a measure that would accommodate enough words that, in the event of an awkward break at the end of a line, one or two point adjustments between words would be permitted. The other method is to establish one margin and allow the other one, generally that on the right, to come as it will, and keep

FIGURE 9. De Natura Stirpium. *Simon de Colines, Paris, 1536.*

word spacing completely uniform. A little unevenness on the right margin provides an interesting page, but if the variation between lengths of lines is great, the eye tends to identify it with poetry and the smooth, easy reading necessary to maximum assimilation of the message is impaired.

Very few of these experiments with uncertain type styles and unusual page formats show up in the trade books, for economic reasons certainly, but also because of the wide acceptance of traditional styles.

The only foreseeable departure from tradition seems to lie in the area of computer graphics. It is impossible to state with any degree of certainty what this new technology might bring. The book designer of the future will almost surely have to be versed in computer programming. There is the possibility that, with electronic scanning devices and their capabilities in translating foreign languages, there may evolve a universal computer-oriented letter form.

JOHN FELL

THE UNIVERSITY PRESS AND
THE FELL TYPES

FIGURE 10. *Stanley Morison's expert touch in the handling of extensive information on a title page.*

Decorative Accessories

The tradition of visual symbols other than letters is as old as the codex. Some of the very early manuscripts were beautifully embellished with rich colors and gold leaf in intricate, mystical designs. Pagan symbols were woven into the early Christian iconography and conveyed, if not in definable terms, the sense of mystery and transcendence of the Christian religion. The *Book of Kells,* the *Lindisfarne Gospel* (see Figure 1), and the *Book of Durrow* must certainly have had an effect on the reader of the eighth century.

Wherever possible, decoration was used: large, intricate, and colorful initials; borders, head pieces, and tail pieces; leaves, flowers, animals, demons, people, and saints. They were a form of comment and not idle meaningless decoration. They were, as remarked earlier, a form of worship.

1

Complexity and
Contradiction
in Architecture

Robert Venturi

FIGURE 11. *A title page of a contemporary book, based on a grid designed to accommodate marginal photographs and captions as adjuncts to the text. The complete book has a cohesiveness and logic that are in pleasing accord with the subject matter.*

The usefulness of pictorial representation has never diminished, although it has undergone many metamorphoses. Prior to the invention of moveable type, the woodcut had proved an asset in the scriptorium. Before the use of woodcuts, scribes had embellished their pages with fairly simple drawings, made with the pen, sometimes simply colored (see Figure 5). Drawings of this sort were easily adapted to the discipline of the woodcut; they were ideally suited to it. With the development of printing, the woodcut came into its own. Its method of transferring ink to paper was identical to that of type, and an affinity was immediately apparent. The characteristics of the wood block dictated a fairly simple representation. Only the suggestion of shading, and thus of the third dimension, was practical. The fortunate result was the achievement of the two-dimensional integrity of a sheet of paper mentioned earlier. The weight of line in the woodcut could be varied to suit the texture of the type used. The 1,800 illustrations of the *Nuremburg Chronicle* complement the Gothic miniscule of the text, and the delicate woodcuts of the *Hypnerotomacia* are precisely the proper weight for the Roman type of Griffo's (see Figures 6 and 6a).

THE STONES OF

FLORENCE

BY MARY McCARTHY

FIGURE 12. *A sensitive relationship of type to the white page and to the dramatically-cropped photograph which it faces. There is a classicism about these two pages that befits the subject of the book and adds a dimension to its content.*

With the development of metal plates, both intaglio and raised surface, the possibilities of indicating a third dimension were greatly enhanced and the affinity with a two-dimensional surface was reduced.

Also, as the third dimension intruded the possibility of greater realism arose, and a new element was introduced to test the designer's mettle. As long as the restrictions of the woodcut dictated a two-dimensional representation, efforts were made to keep that illustration decorative and symbolic. It may be an oversimplification to attribute a naïveté and lack of sophistication to the early woodcuts in which people were completely out of scale to their surroundings. It may well be that the artist understood exactly what he was doing and in a medieval idiom foreshadowed the surrealists of the twentieth century. Whether or not this supposition has merit, the fact remains that those early drawings were in perfect harmony with the text. The harmony was not only visual, it was also literal. The illustrations, kept as symbols, did not intervene between the author and his reader. When it became possible to achieve a three-dimensional image through shading and better understanding of perspective, the artist's interpretation of the author's words inevitably took on an objectivity that often colored the reader's feelings about the text.

The designer has to be completely aware of this source of conflict and to resolve it intelligently. This matter of illustration best epitomizes the conflicts inherent in every phase of book design. The victory, in the highest meaning of the term, is that book which offers no obstacles to the reader's access to the author and which at the

THE PROBLEM

OF THE

Miſſale ſpeciale

ALLAN STEVENSON

PITTSBURGH
THOMAS C. PEARS III·
1967

FIGURE 13. *A formal title page from a contemporary book, illustrating:* (1) *The centering of each element in the area established for the text;* (2) *sound justification for using allusive typography in the words "Missale Speciale," and in the use of the watermark found in the paper of the original Missale, and* (3) *sensitivity to the proportions of the various elements grouped on the page.*

same time ennobles the author's efforts. These paragons are rare, but are well worth searching out. At the conclusion of this article is a list of the great printers, presses, and designers who have produced them, and in an amazing variety of ways.

Special Pages

The earliest books, both in manuscript form and in printed form, were uncomplicated from an organization standpoint. The first page, although often elaborately decorated, was the beginning of the text. Where the text ended, the book ended. The first colophon was used by Fust and Schoeffer in their *Psalter* of 1457. Among other information it pointed out that the book was not done by a pen but by the ingenious invention of printing. The first printer's device was also introduced by these two men; a mark that is widely known today as the emblem of the Printing House Craftsmen of America.

LOLLY

WILLOWES

OR THE LOVING
HUNTSMAN

By

SYLVIA TOWNSEND

WARNER

LONDON
CHATTO & WINDUS
1926

FIGURE 14. *A formal, traditional title page of a Chatto & Windus book of 1926 which, through great sensitivity in the selection and handling of type and in the use of white space, achieves a universality that will keep this particular edition from becoming dated.*

The first title page appeared in about 1480 as a simple statement of the name of the work and of the author. The next step was to include the printer's device on the title page. Some of those emblems became quite elaborate and to some extent illustrative. Their themes ranged from imitations of armorial bearings; play upon the name of a printer, such as the use of a rose in the mark of Germain Rose of Lyons; to illustration of aphorisms such as the dolphin and anchor of Aldus with its implication, "Make haste slowly" (see Figure 7). Because of the illustrative nature of some of these devices they were often quite large on the title page. They had nothing whatsoever to do with the text and could never be interpreted as a comment on it (see Figure 8). From the use of printer's devices it was a simple step to the purely illustrative title page. The bucolic bower of Coline's *De Natura Stirpium* printed in 1536 is a beautiful example of a sensitive use of illustration with, in no way, any debasement of the title page or the content of the book (see Figure 9). The comments and warnings on the use of illustrative matter discussed in the preceding section apply equally to the use of illustration on the title page.

One of the more important assets of a book designer is a finely tuned sense of proportion and nowhere will it be put more to the test than in the design of the title page. Exquisite examples of title pages range from those as elaborately decorated as the *De Natura Stirpium* to the most simple use of type with no decoration whatever (see Figures 10–12). Contrasts, whether between illustration and type or

THE·HISTORY·OF·THE·

·HOLY·WAR·

BY·THOMAS·FULLER

·D·D·

LONDON

WILLIAM PICKERING

1840

FIGURE 15. *A William Pickering title page of 1840. In the tradition of sixteenth century printing, it has nevertheless been modified and adapted to express both Pickering's and mid-nineteenth century England's tastes. The dolphin and anchor bear the legend, "Aldi Discip. Anglus."*

between large and small, bold or light types can only function satisfactorily if their proportions are right (see Figure 13). A sense of proportion determines whether to space between letters or to pull them in as tightly as possible; and where to use all capitals or all lower case or a mixture (see Figure 14).

As books proliferated; as many different uses were found for them; as editors, publishers, booksellers, copyright laws came into existence; a whole range of special pages other than the title page became necessary. Each of these special pages poses a different set of problems for the designer. It is often quite difficult to relate them to the design of the text pages. The grid that established margins and the position of lines of type in the text can be used to advantage, but a certain flexibility has to be assumed. In a table of contents, for example, the line-up of chapter heads on the left margin and the page numbers on the right, if the type page is wide, may be difficult to read. The positioning of problem elements such as the half-title which has a whole page to itself, the copyright notices, the dedication, the words "Contents" and "List of Illustrations," indeed the title of the book itself, all tend to go

FIGURE 16. *A section opening of* The Water of the Wondrous Isles," *Kelmscott Press, 1897. Typical of William Morris' revival of the fifteenth century.*

their separate ways. There are many solutions but no fixed formula is possible because no two books ever present identical problems. Most chapter beginnings start down the page from the top margin. This sinkage, as it is called, might establish a fixed horizontal line from which many of the disparate elements could hang. The ragged right principle discussed under typography is practical for much of the front matter. Everything lines up on the left margin and runs as necessary without undue spacing between words. The traditional solution is to establish fixed margins for text matter and to center all irregular matter, horizontally, in the area between.

There have been periodic attempts to solve all these troublesome problems by formula. Most of the attempts have been by mathematically inclined talents. Fra Luca de Pacioli wrote *The Divine Proportion* in 1497 based on Leonardo Da Vinci's studies of human proportions. Geoffrey Tory in his *Champfleury* of 1529 carried the same studies into type design. In 1683 Joseph Moxon proposed a system of type design based on a grid of several hundred squares. A few years later, Jacques Jaugeon, under commission of Louis XIV, also worked out a square grid upon

should both concur, as is sometimes the case, to despise
him for observing a neutrality.

For the latter part of his life, his chief amusement was
to sleep before the fire, and indolence grew upon him so
much, as he advanced in age, that he seldom cared to be
disturbed in his slumbers, even to eat his meals: His eyes
grew dim, his limbs failed him, his teeth dropped out of
his head, and, at length, a phthisic came very seasonably
to relieve him from the pains and calamities of long life.

Thus perished little *Pompey*, or *Pompey the Little*,
leaving his disconsolate mistress to bemoan his fate, and
me to write his eventful history.

FINIS

FIGURE 17. *An interesting use of a decorative woodcut, made possible only because the story ended in the middle of the page. This could have been fortuitous, but it probably took careful planning by the designer.* Pompey the Little, *from the Golden Cockerel Press.*

which to base type design, qualifying its effectiveness with the admission that "The eye is the sovereign ruler of taste." Early in the twentieth century a revival of interest in Greek art led to a system for achieving proper proportions and divisions of space. This system, called "dynamic symmetry," was also based on proportions of the human body.

Despite all of these serious and scholarly attempts to arrive at perfect solutions, we inevitably go back to Jaugeon's recognition of the eye's sovereignity over taste. Bruce Rogers, in discussing rules for establishing margins, said that the eye alone was the final judge. One of the best ways of developing perception is to become familiar with the tradition of fine printing, to keep alert as to what is being done today, and to try to see the common bonds and the points of departure.

Herewith the list of some, by no means all, great printers, presses, and designers.

FIFTEENTH CENTURY

Anything from the fifteenth century, or the period of incunabula, is rewarding in that this period was a groping toward an integrity of the printed book that would effectively separate it from the calligraphic efforts of the scribe.

FIGURE 18. *A title page from Nonesuch Press, 1924. The elaborate border, while in the idiom of the 1920s, owes a debt to the sixteenth century.*

SIXTEENTH CENTURY

In the sixteenth century in Italy there were Aldus Manutius, Ludovici Arrighi, and Antonio Blado. In France, Geoffrey Tory, Simon de Colines, Jean de Tournes, Gilles de Gourmont, and the Estiennes, Henri and Robert. In England, Richard Pynson, Wynken de Worde, and John Day; Christopher Plantin in Antwerp; Johann Froben in Basel.

SEVENTEENTH CENTURY

The seventeenth century, due largely to the religious wars that swept Europe, was a low period in the development of printing. The few outstanding printers of the century were the Imprimerie Royale in France, instituted by Richelieu in 1640, under the direction of Sebastien Cramoisy. In Holland, the Elzevirs popularized

FIGURE 19. *Title page of one volume of a complete set of Dickens, Nonesuch Press, 1937. See also the legend for Figure 19a.*

small books, especially pocket-sized editions of the classics and contemporary literature. In England, a royal charter was secured in 1636 from Charles I establishing the University Press at Oxford. In the New World, Stephen Day was its first printer, opening shop in Cambridge, Massachusetts.

EIGHTEENTH CENTURY

The eighteenth century saw resolutions of many of the political difficulties that had hampered the growth of printing, and the onward movement was resumed. In Britain, there were William Bowyer in London; R. and A. Foulis in Glasgow; Horace Walpole's Strawberry Hill Press at Twickenham; John Bell, William Bulmer, and Thomas Bensley in London; and John Baskerville in Birmingham. In Holland there was Johannes Enschedé. In France, Le Breton; Jean Girard Barbou; Peter Simon Fournier, le jeune; and Francois Didot. J. A. DaSilva in Lisbon; Giambattista Bodoni in Parma; Joachim Ibarra in Madrid; Bauer and Treutfel in Strasbourg; and Isaiah Thomas in Worcester, Massachusetts.

TWO CITIES.

FIGURE 19a. *Title page of one volume of a complete set of Dickens, Nonesuch Press, 1937. See also the legend for Figure 19. Each volume carries a facsimile of the title page of its first edition. The comparison between the fanciful style of the Gothic revival and the disciplined taste of Francis Meynell is worthy of careful examination. Which better expresses Dickens? And is that a factor to consider?*

NINETEENTH CENTURY

The nineteenth century saw the advance of large publishing, printing, and book-selling trades and the resultant anonymity of individual talents. A few names were not submerged. In France, Firmin Didot and Louis Perrin; James Ballantyne in Edinburgh; and in England, the Chiswick Press, Charles Whittingham and William Pickering (see Figure 15). J. G. Fick in Geneva; and late in the century, in England, one of the most unusual of all private presses, The Kelmscott of William Morris. The principle criticism of Morris' works is that he made the reading of them so difficult. Dissatisfied with the drabness of the contemporary art of printing, Morris attempted to revive some of the elaborate page design of the early printers (see Figure 16). The types he had cut for his private use harked back to the Italian Renaissance faces of Jenson. The very elaborate borders, initials, head pieces, etc., were designed by Edward Burne-Jones, one of the leaders in the pre-Raphaelite movement in painting, and by Morris himself. It has been said that the Kelmscott Chaucer is the most lavishly decorated piece of typography of the whole post-medieval period.

TWENTIETH CENTURY

The fire that Morris kindled at the end of the nineteenth century spread into the twentieth century and became increasingly the means of improving book design. The relatively limited demand for fine books has been enough to support a small limited output—at prices commensurate with the efforts put into them. The better presses of the twentieth century, from a standpoint of fine printing were, in England, the Doves Press of Cobden-Sanderson and Emery Walker; the Ashendene Press; the Vale Press; the Eragny Press of Lucien Pissarro; the Curwen Press; the Golden Cockerel (see Figure 17); Shakespeare Head Press; and The Nonesuch Press, although primarily publishers, was under the direction of Sir Francis Meynell, responsible for many fine books (see Figures 18, 19, and 19a). On the Continent there were Emil-Paul Freres in Paris; Cranach Press in Weimar; Bremer Press in Munich; Klingspor in Offenbach on Main; Janus Press in Germany; Zilverdistel Press in the Netherlands; and Giovanni Mardersteig in Verona. In the United States, The Village Press of Frederic Goudy; The Merrymount Press, Daniel Berkeley Updike; Bruce Rogers; The Riverside Press; The Yale University Press under Carl P. Rollins; The Princeton University Press under P. J. Conkright; The Spiral Press of Joseph Blumenthal; The Grabhorn Press; John Henry Nash; Pynson Printers, operated by Elmer Adler; and Southworth-Anthoensen Press.

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THOMAS ROSS

DETAIL CARDS

The term detail cards is uşed to identify a particular application of punched cards in an information system.

In any information system environment there are standard files containing information relating to the environment and there are random events representing transactions. Information from standard files are applied to the transactions for processing and the standard files are updated. For example, in solving a payroll problem, information on "rate of pay" is maintained within standard files; the transactions are "number of hours" worked by each person during a payroll period. Similarly, a file of library holdings, like a card catalog, is a standard file; while new acquisitions are transactions. In a system which uses punched cards and unit record equipment, the transactions are recorded in "Detail Cards." Standard file information is recorded in "Master Deck Cards."

One approach to the control of terminology used in a retrieval system is to prepare a dictionary of authorized terms and phrases on punched cards. Punched cards containing terms or phrases selected to represent a document to be added to the storage file are called detail cards. Detail cards may then be compared with the dictionary cards. In Reference *1* the machine discussed for carrying out this comparison is a piece of unit record equipment known as the collator.

The need for such precise delineation of the uses of punched cards has rapidly diminished in recent years due to the advent of the computer and the new terminology that has been coined. The computer is the principal machine in most modern day information storage systems. Present day terminology for the concept called detail cards would include data record, user record, or document record. A record is a fundamental unit of data handling not restricted to the data from a single punched card.

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K. L. MONTGOMERY

DETERIORATION OF LIBRARY MATERIALS

Man has been concerned, in one way or another, with environmental deterioration of materials for a long time, perhaps since he first appeared. Certainly by biblical times. St. Matthew records, "Do not store up for yourselves treasure on earth, where it grows rusty and moth-eaten, and thieves break in to steal it" (*1*).

Undoubtedly he did not refer to the treasures of the library for this would have contradicted preservation of his message for following ages.

The reasons we have libraries may be quite different in the minds of different people. One of the reasons, which most people will probably agree on, is to preserve for those who follow us our thoughts, intellectual and artistic creations, and man's historical records. Some of what is recorded and gets into libraries is not very important, and it does not make much difference if it lasts any longer than the people or events about which it is written. But some of the recorded material is very important and should be preserved for as long as there are men to read it. Sometimes we do not know one from the other. Thus, in the past it has been policy usually to nod in the direction of preservation by trying to utilize the most stable materials known to the art and science of the times, gambling that what is important will be recognized in time to take precautions to extend the useful life of the material on which it is recorded.

The deterioration of library materials is a complex subject because there are so many different kinds of materials used in the making of the documents, books, manuscripts, illustrations, charts, maps, bindings, magnetic tapes, photographic films, and the great many other forms which library items take, and there are so many different factors in the environment which cause the deterioration. Furthermore, there are many uses to which these library items are put, and many ways in which they are handled and stored. Finally there is much variation in knowledge regarding deterioration on the part of librarians and the clients who use them. The subject is often discharged with the same aplomb that goes with death and taxes.

As is the case with many things which men have manufactured, the design of books and documents, and the many other items in library collections, have not taken account of, and the materials used in their manufacture have often not been chosen, with a view to permanence. Admittedly there are exceptions, such as in certain paper and bindings for extra heavy handling and use (see Figure 1). Furthermore, even when permanence is one of the guiding principles, the materials available are often not resistant to the elements of the environment which tend to degrade them (see Figures 2, 3, and 4).

How few times, for example, have we custom-designed and manufactured, with carefully chosen climate-resistant materials, books to be used and stored in the tropics (hot-wet), as compared to those for use in temperate climates! The same may be said for books to be used in desert regions (hot-dry) or cold regions of the world (cold-wet or cold-dry)! Usually we manufacture things with materials which have come into common use where we happen to be, or in our country, and can compete in price. Little thought is given as to how well those things will resist time and the environment. There are some specialized exceptions such as particularly historic documents. Yet there are too many striking cases of vastly important historic documents in which the material is utterly unsuited to its important mission. Although in this discussion of the library materials deterioration problem we shall, of course, give examples of deteriorated items and we shall

FIGURE 1. *A fifteenth-century vegetable-tanned leather binding in which the leather is in excellent condition with the exception of breaking at the hinges from mechanical wear and tear over five centuries. (Photograph courtesy Paul N. Banks, Newberry Library, Chicago.)*

attempt to assess the problem realistically, truly this is hard to accomplish because we simply do not know the worst cases—they are long gone because they disappeared due to a deterioration.

The disregard of, or the inability to solve, the deterioration/permanence problem is not something peculiar to modern times. And most of the present-day library deterioration problems have been inherited from the past—immediate or remote. But modern times have tended to magnify the problem because of the great proliferation of library items and the highly competitive economic system modern man lives under. Not surprisingly, some of the early library materials utilized very permanent materials—baked clay tablets and stone, for instance. But as man moved ahead and had to produce greater and greater quantities of materials for documentary purposes, and had to do it on a competitive basis, the materials

FIGURE 2. *Water and mud damage from the Florence, Italy, flood of November 4, 1966. (Photograph courtesy Paul N. Banks, Newberry Library, Chicago.)*

FIGURE 3. *Extreme moisture damage. Staining of paper, fungal attack, and cracking and destruction of binding materials. (Photograph courtesy James Gear, National Archives, Washington, D.C.)*

FIGURE 4. *Deterioration of natural adhesive.* (*Photograph courtesy Paul N. Banks, Newberry Library, Chicago.*)

tended to become more and more fugitive. Little thought was given to permanence. Today, let it be hoped, we at least recognize a deterioration/permanence problem and attempt to determine just how lasting are the materials on which we impress our messages.

In this exposition of the library materials deterioration problem we shall not try to examine in minute detail the great variety of materials involved; that would simply be too big a job and not necessary. For example, some authorities state that there are some 7,000 different kinds of paper! Certainly there are untold varieties of leather from hundreds of kinds of animals; there are numerous inks; the different kinds of glues, adhesives, coatings, we leave to your imagination; now that synthetic plastics are so widely used, they too are appearing in libraries in numerous forms—bindings, threads, microfilms and microfiche, magnetic tapes, photographic negatives and positives, and so on and on. It will be our intent to treat "classes" of materials—paper in general, leather, glues, plastics, etc.

Then there is the matter of environment—that all-pervasive complex of energy forms and chemical substances which we must have in order to exist, but which in the deterioration sense comprises a miasma waiting to bring degradation and

FIGURE 5. *Damage from migration of injurious substances from deteriorating groundwood paper. (Photograph courtesy Paul N. Banks, Newberry Library, Chicago.)*

destruction to the library collection. Again, we cannot examine this in detail. But we shall attempt to analyze and appreciate the more significant factors so that we can understand how environment causes our deterioration problem.

Regarding use and handling of library collections, it is not our mission to discuss these very much under deterioration. Not that these do not have a great part in destroying library collections. Misuse (see Figure 5) and bad handling practices cause rapid and enormous damage to books and other library items. But then, too, so do fire, flood, earthquake, windstorms, and war (see Figure 2). But these are not what we generally mean when we talk about "deterioration." Storage is a different matter. The general discussion of the entire exposition will have bad storage conditions in mind. Good storage will be emphasized in another section of this Encyclopedia.

Finally, there will be a companion section in this Encyclopedia on *Preservation*. There, hopefully, one will find a discussion about how to slow down or even almost stop deterioration. There will be discussion of how it is possible to overcome many forms of deterioration and bring permanence to many of the items in most libraries by treatments, restoration techniques, environmental controls, use of improved and carefully selected materials, careful handling, and a variety of other techniques.

Various authorities have been calling attention to the library materials deterioration problem for many hundreds of years. The book and newsprint paper deterioration history is threaded through with efforts of farsighted people. These dedicated souls tried hard to get the message around that support was needed to underwrite investigation of this problem. Further, they tried to show that unless materials of sufficiently high quality and permanence were used for new books, and restorative treatments applied to books already deteriorated, truly our library collections would not be available in a usable condition to posterity.

We know, for example, about an Egyptian scribe who reported some 3,000 years ago that papyrus scrolls in his charge had been wetted by rain and had to be dried and unrolled to see if the ink writing had been washed off (2). Further, the Chinese in about A.D. 500 felt they knew enough to preserve paper for several hundreds of years. Evidently the subject was common enough in the mind of Shakespeare so that he included it in one of his works.

Williams (3), in his review of deterioration of library collections, recalls the concern of Frederick I, Barbarossa, emperor of the Occident who, in the twelfth century, banned the use of paper in deeds and charters because he feared it to be too perishable. Grove (4) in 1964 traced concern over the matter of paper deterioration to the fifteenth-century Benedictine abbot Johann Tritheim who, worried about paper, placed more faith in vellum. William (3) also brings to our attention that newsprint paper deterioration supports a whole literature of its own and was recognized as a problem sometime around Civil War days. Grove (4) traces from the early 1860s the story of the introduction of papers with inferior permanence properties into the newspaper business, and the many and varied efforts, some quite well founded and thoughtful, some rather naive, either to employ better papers or to try and restore strength and permanence to newspaper collections already on inferior papers.

Although we all know that there are many kinds of materials used in books (the term "books" is meant to include all forms of written records), and we know further that all materials tend to deteriorate to a greater or lesser extent, the one general class of materials that seems to have attracted the most attention in the history of the library materials deterioration problem is paper.* This is not difficult to understand in view of the central role played by paper in the history of libraries. This is not to denigrate the role of other important materials such as the various forms of leather, cloth, threads, and adhesives. It does not overlook the ancients' use of baked clay tablets or messages scratched on stone, or the use of animal skins, papyrus, parchments, and vellum. Nor does it overlook modern efforts to record messages on photographic films or magnetic tapes. "Hard copy" of the written word has involved paper for a very long time, and it still does. Paper is still the "workhorse" in recording the messages we need in all walks of life and which end up in libraries.

*The term "paper" as used in this discussion refers only to the paper used in printing and publishing. It does not refer to the many hundreds or thousands of varieties of so-called "industrial papers."

The written record resides, for the most part, on paper. In spite of the many excellent properties of paper, some of the papers made in the past, and some of the papers being made today, do not enjoy long life. Long life here is intended to mean hundreds of years. Under the proper conditions of composition and environment, this perishable commodity can be remarkably stable and *will* persist for those hundreds of years. Unfortunately, there are too many cases of undesirable composition and bad environment.

The litany that could be recited illuminating the periodic complaints of men about the deteriorative ills of paper and other library materials is a long one. Borrowing some of the highlights from Williams (*3*) and Grove (*4*) and alluding to others (*5*), we recite only the following small part. About a century and a half ago, two British publications called attention to paper problems. In July 1823 one dealt with problems presumably caused by the chemicals used in making rag papers and John Murray in *The Gentlemen's Magazine* alluded to paper as "that wretched compound called paper." He went on to say that his copy of the "Bible printed at Oxford, 1816 (never used)" was "crumbling literally into dust," concluding that the cause of his misfortune was the chemicals employed in the making of the paper. We suspect that he did a disservice in his remarks, as do some disciples of deterioration prevention today, by overstating the matter.

Williams makes reference to Justin Winsor, the first president of the American Library Association, who spoke about deterioration problems of newspaper, probably about 1875, and attempted (largely unsuccessfully) to convince some Boston newspaper publishers to use more durable paper. The American Library Association recognized the deterioration problem by supporting a Committee on Deterioration of Newsprint Paper from 1910 to 1913 and from 1918 to 1920. In 1891, Rossiter Johnson called attention to inferior paper as a menace to permanence of literature, and in 1897 J. Y. W. MacAlister, Librarian of the Leeds Library, predicted that many of that library's books would not outlast the generation of readers he served. In 1898 the British had a Committee on the Deterioration of Paper; the Librarian of Congress discussed the subject of paper deterioration in his annual report; and the Italian government was petitioned by a group of librarians to set paper standards. In 1900 Pierre Dauze in France wrote that librarians were deeply disturbed by the library deterioration problem; in 1907 Cyril Davenport thought that in 100 years from the date of their publication a large majority of modern books would not be in a readable condition. In 1909 the U.S. Department of Agriculture, Bureau of Chemistry, published results of research on the durability of paper; in 1931 and 1934 Scribner of the National Bureau of Standards published studies on the preservation of records in libraries. In 1954 the present author tried to summarize many of the deterioration problems faced by paper makers and users (*6*).

Many of the efforts to resolve the deterioration problems associated with paper and other library materials have been met with apathy, ideas of misplaced thrift, charges that preventive or remedial actions would involve unjustifiable costs, ridicule, and sometimes downright antagonism.

There is another side of the story of course. There is a great deal of material printed that *is not* intended to be permanent, and to insist that all things that might end up in a library be printed on media that will endure forever is overdoing it. There *is* much in the paper and printing industries that has been built around paper as we have known it for the past hundred years or so, and to expect that this technology will be changed overnight is asking too much. Shatzkin (7) has reviewed the factors involved in publishing on permanent papers, and Thomas (8) has reviewed alkaline printing papers. Permanence is not the only quality to be considered. Other important properties must not easily be sacrificed to gain small improvements in permanence. A wholesale shift to neutral or alkaline papers, presumably to gain permanence, would tend to cause disruptions in the paper and publishing industries that would be difficult to handle. There appears to be willingness on the part of many in the industries, however, to make such a shift, if it is shown to be necessary and justifiable, but on the basis of a slower and more orderly transition.

Recently much has been done to bring the library materials deterioration problem to the attention of large numbers of people and to the levels of governmental, educational, industrial, and institutional administrations necessary to get effective programs of deterioration prevention underway. This applies both to introduction of permanent materials and to the commencement of programs of remedial treatment for important collections which are in various stages of deterioration already.

Notable has been the work of W. J. Barrow, reported in a group of publications (9–16) initially from the Virginia State Library, Richmond, Virginia, and later from the W. J. Barrow Research Laboratory, also in Richmond. Although Sutermeister (8), among others, had reported the deteriorative influence of high acid content in paper which results in rather rapid embrittlement and loss of strength, it took the work of Barrow to start a program in motion. Much credit is due to the Council on Library Resources, which provided the financial support for a considerable part of Barrow's work, and to Verner Clapp, who served as president of the council at the time.

What started the most influential of Barrow's work was a project to test the physical strength of nonfiction book papers as used in publications appearing from 1900 to 1949. The sample was statistically significant—a total of 500 books, 100 for each of the five decades represented. These books were chosen from a large number of publishers and various university presses. The tests were standard tear resistance and folding endurance. The results were sufficiently depressing as to cause Barrow to state, "If material which should be preserved indefinitely is going to pieces as rapidly as these figures indicate, it seems probable that most library books printed in the first half of the 20th century will be in an unusable condition in the next century." The measurement of the paper sample pH values indicated that most were definitely on the acid side. Subsequent work by Barrow on books from earlier decades provided much additional valuable data.

The Association of Research Libraries (3), aroused by Barrow's 1959 report, decided in 1960 to establish a committee "to develop a national program for the

preservation of research library materials with its primary concern directed toward the preservation of retrospective materials." At almost the same time a conference, sponsored by the American Library Association and the Virginia State Library, was held in Washington, D.C., to discuss "Permanent/Durable Book Paper" (*17*). At this conference Robert Kingery of the New York Public Library described the extent of the paper problem in large research collections and estimated costs to combat the deterioration. Among other things of a grave nature, he stated that about 10% of the collection of about 2,000,000 volumes in the Reference Department of the New York Public Library needed immediate attention because of deterioration problems. He estimated that as much as 50% of the collection needed some conservation attention.

The ARL Committee decided that as a first step it would be desirable to determine the quantitative dimensions of the paper deterioration problem. A study by the Research Triangle Institute and financed by the Council on Library Resources undertook to make a statistical sampling of the National Union Catalog. The findings indicated that in 1961 the catalog listed 14,376,000 different volumes containing 2,999,998,000 pages. Slightly more than 57% of the pages were in volumes published since 1869, and 56% of them were published abroad. No serials were included in the study (*3*).

The next important study, sponsored by the ARL Committee and funded by the Council on Library Resources, came in 1962 in which Gordon Williams made a comprehensive survey of the problems associated with the preservation of deteriorating books and gave recommendations for a solution. As E. E. Williams (*3*) points out, the findings of this study were debated at great length by the ARL but finally the results were adopted unanimously by the association. This is significant in that it thus represents the official attitudes of librarians of the institutions most vitally concerned with the problems of deteriorating books.

The Gordon Williams report (*18*) offered a flexible comprehensive plan whereby, with the proper support including that of the federal government, it will be possible to undertake actions which would insure the preservation of all books of significant value. It encompasses the use of approaches to the problem including preservation of books themselves whenever this is possible, as well as copying books on microforms. Furthermore it provides for the continuous and ready availability of the preserved materials to anyone who needs them. Finally it recommends that a federally supported central agency be created to play a major role in the program. Yet, one need not conclude from this that a mammoth federal center will be created for doing all the work and keeping all the books. Several alternative systems are discussed.

A National Commission on Libraries and Information Science was created in July 1970. Among many facets of the library and information science field that this commission will find itself responsible for will be that of providing the leadership and support for a national effort in library materials deterioration prevention as well as preserving the immense national resources now in libraries.

In our discussion of environment as the cause of deterioration, other terms like

permanence, stability, and durability will come into use. People in the paper industry make a definite distinction between permanence and durability. "Durability" connotes how well the paper will stand up under conditions of use and rough handling. "Permanence" connotes how well the paper resists aging, retains chemical stability of its components, and thus retains its original properties. Permanence is basically a chemical phenomenon; durability is a function of the physical properties of the fibers in papers and the way they are compounded to form a sheet. There is obviously a relationship between permanence and durability, and the proper balance must be achieved.

Deterioration as used here is a loss in the quality or value of a material or a decrease in its ability to fulfill a function for which it was intended. Generally, it is limited to impairment due to natural causes, as for example moisture, dryness, acids, alkalies, dust, moderate heat or cold, ultraviolet radiations, slow electrochemical reactions, or biological creatures including rodents, insects, bacteria, and fungi. We are all familiar with such common examples as iron rust, insect holes in paper, brittle paper, rotten wood, cracked paints, and crumbled leather bookbindings (see Figure 6). Usually these changes, caused by physical, chemical, and biological environmental factors, proceed at a fairly slow rate.

On a somewhat more analytic basis deterioration is a process of transition from a higher to a lower energy level. Most chemical substances like to rest in a lazy, comfortable, stable state. The more noble elements like gold remain in their stable elemental state and do not readily combine with other elements to form molecules of compounds. Less noble elements tend to form combinations with other elements where they find relative stability. Often when man makes chemicals into forms that he finds useful, he makes them unstable. And they respond to this by trying to revert to the stable states. For example, iron is made by converting stable ores, such as iron oxides, to elemental iron, perhaps in an alloy like steel. But iron does not want to be a free element. So it reacts with things like oxygen or the sulfides to be stable again, and that stable state is called rust. As things made of rust do not have the strength or other properties of iron or steel, the iron is said to have deteriorated.

Similarly, cotton and other plants make the sugar glucose and out of that biosynthesize cellulose from which various papers are made. Cellulose is a rather complex molecule made up of atoms of carbon, hydrogen, and oxygen. Carbon in this form is very useful in libraries as paper. But, when the conditions are right, the cellulose tends to break down into simpler molecules than cellulose and eventually to the stable carbon dioxide which can not serve as paper. Some of the conditions which affect paper cellulose in this way are acidity, heat, and light. These, together with biological agents, are agents of deterioration.

There are always forces that tend to cause reversion to stability whether it is rusting of metals, rotting of paper, deterioration of threads used in binding, or the destruction of glues or adhesives by ozone or whatnot. The total of the so-called forces that tend to cause changes in energy level may be termed the "environment." Environment determines which of the agents present in a given

FIGURE 6. *Leather binding and paper showing extreme damage presumably due to acid, dampness, mildew, and insects. Approximately late eighteenth century. (Sample courtesy James Gear, National Archives, Washington, D.C.)*

spot will shorten the useful life of materials. The intensity or amount of physical deteriorative agents—heat, sunlight, dust, sand, and grit—vary according to geographical location and the climate of the region. Chemical agents, i.e., moisture, salts, alkalies, acids, and all the polluting substances we now find in our atmosphere, are also functions of climate and, of course, of industrial effluents for the amount and intensity of their action. On the other hand, the biological agents we are here interested in—the fungi (molds), bacteria, insects, and animals such as rodents—depend upon the existence of optimum conditions of humidity, temperature, and nutrients to thrive in an active destructive way and so might be regarded as corollaries to the physical and chemical agents.

Of these various environmental factors, the major ones we must pay particular attention to as far as deterioration of library materials is concerned appear to be those shown in Table 1. But it should be noted that although acid gases are listed as environmental, a great deal of the acid is introduced into the paper not by the so-called natural environment but rather by the chemicals used in the manufacture of the paper. The important fact is that deterioration is caused by acid regardless of whether the paper encounters it in manufacture or in the environment. Therefore, the discussion of acid deterioration of paper will not emphasize where the acid came from so much as what the acid does to the cellulose fibers of the paper (see Figures 7 and 8).

The atmosphere is commonly thought of as the gaseous envelope, or air, that surrounds the earth. A representative composite analysis of dry air is shown in

TABLE 1

Environmental Factors Important
in Library Deterioration Problems

I. Atmospheric factors
   Pollutants
      Particulate matter
      Dust, dirt, etc.
   Gases
      Acidic components
      Oxidants
   Normal constituents
   Water
II. Radiant energy
   Light
   Heat
   Other radiation effects
III. Biological factors
   Microbiological agents
      Fungi, bacterial, actinomycetes
   Macrobiological agents
      Insects, rodents

FIGURE 7. *Muster rolls from the Civil War. Deterioration due to acid paper, acid ink, and carelessness. (Photograph courtesy James Gear, National Archives, Washington, D.C.)*

Table 2. The analysis of air is usually made after it has been freed of solids, such as dust, spores, and bacteria, and from water vapor. Water vapor, or humidity, represents a very important constituent of atmosphere. It will be discussed here as a separate topic because of its great independent influence on library materials. The composition of air varies with altitude, and certain constituents such as ozone may vary considerably. The figures in Table 2 may, however, be regarded as representative of the common components.

TABLE 2

Composition of Dry Air [a]

Substance	% By weight	% By volume
Nitrogen	75.53	78.00
Oxygen	23.16	20.95
Argon	1.27	0.93
Carbon dioxide	0.033	0.03
Neon		0.0018
Helium		0.0005
Methane		0.0002
Krypton		0.0001
Nitrous oxide		0.00005
Hydrogen		0.00005
Xenon		0.000008
Ozone		0.000001

[a] Ref. *19*, p. 25.

FIGURE 8. *This damage is thought to be due to acid paper but was accentuated by acidtype ink which caused the embrittled paper to break away approximately along the lines of lettering. Date on sample is 1844. (Sample courtesy James Gear, National Archives, Washington, D.C.)*

The atmosphere contains a host of other substances called pollutants, especially in industrialized urban areas. As the major and largest library collections tend to be concentrated in urban areas to serve the greatest concentrations of people, the problem is clearly aggravated.

Most of the pollutants occur in very small concentrations in comparison with the normal atmospheric constituents, yet some occur in high enough concentrations to have adverse affects. To provide an idea of the dimensions of air pollution, the emissions of the principal pollutants into the atmosphere in the United States have been estimated by the National Research Council of the National Academy of Sciences to be about 125 million tons per year at the present time (*20*). The

TABLE 3

Principal Atmospheric Pollutants in the United States [a]

	Millions of tons/year	%
By Type		
Carbon monoxide	65	52
Oxides of sulfur	23	18
Hydrocarbons	15	12
Particulate matter	12	10
Oxides of nitrogen	8	6
Other gases and vapors	2	2
TOTAL	125	100
By Source		
Transportation	74.8	59.9
Manufacturing	23.4	18.7
Generation of electricity	15.7	12.5
Space heating	7.8	6.3
Refuse disposal	3.3	2.6
TOTAL	125.0	100.0

[a] Ref. *21*, p. 11.

amounts by types and sources are shown in Table 3. Other estimates go as high as 300 million tons per year (*22*).

A complete listing of all substances found as contaminants or pollutants in the atmosphere would require several pages. Table 4 presents a partial listing. Those representing the greatest known hazard to library materials for the most part will be those that are either acidic or oxidizing. Notable deleterious substances in the library and museum fields are sulfur dioxide, the oxides of nitrogen, and ozone. These substances play roles in a rather complicated system of photochemical atmospheric pollutants which are seriously damaging to man, animals, vegetation, and materials.

Sulfur dioxide, or at least the SO_2-containing pollutants from coal burning, has been recognized since the thirteenth century as a damaging pollutant in the atmosphere. But photochemical air pollution is a fairly recently recognized phenomenon, first noticed about 25 years ago because of its effect in causing cracking of rubber products and damage to plant species.

One of the symptoms of photochemical air pollution is the presence of high concentrations of oxidizing substances. Photochemical smog consists of mixtures of gaseous and particulate (aerosol) products resulting from atmospheric photochemical reactions of gases evolved primarily from the combustion of organic fuels. Ultraviolet radiation from sunlight is responsible for the initiation of atmospheric reactions between the oxides of nitrogen and such photochemically reactive substances as olefins, aromatic hydrocarbons, aldehydes, and to a limited extent some

TABLE 4

Atmospheric Substances Considered as Pollutants

Particulate matter (aerosols)	Gases
Dust, dirt, smoke	Carbon monoxide
Coal and coke dust	Nitric oxide
Fly ash	Nitrous oxide
Salt particles	Sulfur dioxide
Calcium and ammonium sulfates	Ozone
Nitrates	Olefins
Chlorides	Aromatic hydrocarbons
Solid oxides	Aldehydes
Soot	Paraffins
Tars	Hydrogen sulfide
Spores	Halogen compounds
Bacteria	Ammonia

paraffins, producing a dynamic complex of oxidizing substances not yet completely defined chemically. A number of products are formed in this photochemical smog-forming process through the initiating photodissociation of nitrogen dioxide with the concomitant formation of atomic oxygen. This permits ozone formation, already present normally to some extent in the atmosphere and known to be a principal oxidizer. In addition, there is formation of the strong oxidants, the organic peroxides, of which the peroxyacyl nitrates have been identified. These comprise an homologous series of organic peroxide nitrogen compounds which have been designated as PaNs compounds. In addition to the foregoing, there are formed other unidentified oxidants, oxygenated compounds such as carbonyl compounds (aldehydes and ketones) and certain degradation products such as carbon monoxide and carbon dioxide. Thus the principal identifiable photochemical atmospheric pollutants are thought to be ozone, the PaNs, and the oxides of nitrogen, chiefly nitrogen dioxide. The latter, comprising usually about 10% of total oxidants, are relatively weak oxidants.

A seemingly anomalous phenomenon in the air pollution field should be noted. It is especially interesting to the librarian because of the importance of the acidic sulfur dioxide to the degradation of paper. Sulfur dioxide is a reducing substance whereas the photochemical air pollutants we have been discussing are oxidizing substances. Ordinarily one would expect that such oxidants as ozone and sulfur dioxide should react with each other until there is an excess of one or the other. The extreme dilution of these pollutants in the atmosphere, however, permits them to coexist, and one may note oxidizing and reducing degradation phenomena simultaneously (23).

Water occurs in all the normal states of matter—solid, liquid, and gas. It also takes many forms—ice, snow, glaze, sleet or hail, ice fog, liquid water, rain, water in the aerosol form of fog or mist, and finally water vapor. Water vapor is water

TABLE 5

Relationship between Temperature, Absolute Humidity, and Relative Humidity (*24*)

Temperature		Absolute humidity (g/kg)		
°C	°F	20% relative humidity	60% relative humidity	100% relative humidity
0	32	0.38	2.28	3.82
20	68	1.43	8.69	14.61
40	104	4.55	28.30	48.64
60	140	12.50	83.55	152.45

in the gaseous phase and is usually referred to in terms of humidity. For the consideration of the librarian, water vapor is the most important form of water. The materials of the librarian—his buildings, his collections, and practically all that he works with—are protected for the most part against all forms of water except water vapor. This discussion will cover water only in the vapor form and will not consider the less usual, albeit devastating, damage which may come about from such phenomena as floods or liquid water damage as might be caused by sprinkler systems and the like.

Humidity measurements include absolute and relative humidity. Absolute humidity is measured in terms of the mass of water vapor per unit volume of natural air. Relative humidity expresses the ratio of the actual water vapor content of the air to its total capacity at the given temperature. The warmer the air, the greater the amount of water vapor it is capable of holding. When air holds as much water vapor as it is capable of holding at that temperature, it is said to be saturated, and is at its dew point.

An enlightening way of showing the relations between temperature, relative humidity, and absolute humidity is that of Table 5 taken from Plenderleith and Philippot (*24*). This shows how the actual amount of water in the atmosphere increases, for a given relative humidity, as the temperature rises.

We are here concerned more with the effect of humidity on library materials than on library workers or patrons. Nonetheless, because temperature and humidity conditions in libraries are usually chosen with both materials and people in mind, a few remarks should be made about factors of human comfort. Cold air with high humidity feels colder than dry air of the same temperature. On the other hand, hot air with high relative humidity feels warmer than it actually is. These effects are due to a combination of heat conduction from the body at the temperatures and humidities involved as well as to the cooling effect on the body brought about by evaporation of water from body surfaces. The feeling of comfort or discomfort experienced by man is then a result of both temperature and humidity. The U.S. Weather Bureau has developed a temperature–humidity or comfort index which gives values in the 70 to 80 range, reflecting outdoor atmospheric conditions

of temperature and humidity as a measure of comfort or discomfort in warm weather. This index, I_{th}, is measured as follows:

$$I_{th} = 0.4 \text{ [dry bulb temperature (F}^\circ\text{)} + \text{wet bulb temperature (F}^\circ\text{)]} + 15$$

When this index is 70 most people feel comfortable; at 75 about half the population is satisfied; at 80 most people are uncomfortable. Without unnecessarily over-simplifying a subject that is complex at best, man is an aqueous creature. In order to exist in his most healthy state he must maintain a proper water balance with his surroundings. This may sometimes call for humidity conditions that would be considered a bit on the uncomfortable side. He cannot suffer dehydration of any magnitude for more than short time periods without serious physiological effects.

The various materials the librarian is dealing with daily also must remain in equilibrium with the proper humidity in order to retain their most desirable properties and endure for long periods of time. These conditions are not necessarily the same for all library materials. It stands to reason that some sort of happy medium must be chosen so that most materials involved are in or near some reasonably favorable range of humidity.

When considering the matter of humidity and temperature with reference to the possible damaging effects of the heat and water on objects (books, manuscripts, museum items, etc.), it is very important to remember that it is the temperature and humidity conditions of the object that control deterioration reactions. These conditions are not always the same as the measured ambient or atmospheric conditions except when they are under constant control. For example, in a library, if an object such as a book is at a temperature higher or lower than that of the air in the library, the relative humidity of the layer of air close to the book will differ considerably from that of the ambient room air. This has given rise to the term "object humidity" (25), which, of course, refers to the relative humidity of the thin film of air in closest contact with the surface of the book. If the temperature conditions in a library vary greatly over the period of a day, relative humidities thought to be in the safe range, perhaps 45 to 55%, can rise to much higher humidities conducive to mildew or other damage to books, paper, leather, and other objects.

The nature of water is such that it is important both as a chemical agent and as a physical agent. Often it acts in both roles simultaneously. For example, when water dissolves carbon dioxide, a small amount of the water reacts chemically to form the compound H_2CO_3. Most of the water, however, plays the physical role of acting as a solvent medium for ionization and the production of hydrogen ions, responsible for the acidic properties of the solution. Water may be regarded as extremely active in promoting reactions between other substances, entering into chemical reactions itself, and serving as the medium for the interaction of numerous otherwise inert substances.

Among its most important roles, water is required for the hydration of many

substances in our everyday life. Some of these roles are not completely understood, and often not sufficiently appreciated. The role of water as a plasticizer for certain materials such as nylon is important in preserving the properties of the substance over long periods. The maintenance of proper water levels in paper, wood, and leather, to mention a few materials, is absolutely required to prevent drying out with consequent brittleness and eventual disintegration. The discovery of ancient records or historical and art objects usually poses severe restoration problems of at least partial rehydration before the objects can be handled to any great extent or studied and exhibited. The objects have endured because they were dry and undisturbed, but to be of practical value they must if possible be restored to a water content consonant with usable properties.

On the other hand, the presence of excessive water in materials can bring about destruction. Certain constitutents of materials such as dyes and adhesives may be dissolved out. Other components may become hydrated to the point of becoming pulp as in the case of cellulosic materials in paper. Or excess water may cause certain materials to become adhesives and cause pages of paper to stick together almost beyond separation.

Excessive water may also bring about the completely different problem of biological attack. This is usually manifested as the growth of fungi or mildew and is accompanied by the characteristic musty odor but more importantly by staining of paper, leather, and other materials and weakening or even destruction of the materials if permitted to progress too far.

To obtain an idea of the humidity conditions in his particular city, the librarian has access to the records of the U.S. Weather Bureau. Certain of this information in relation to the materials deterioration problem also has been consolidated in texts (6,26). To obtain a balanced and meaningful idea of the conditions of humidity, one should look at values for relative humidity, precipitation, and temperature. A more complete set of data would also include values for the saturated vapor pressure, for vapor pressure, for depression of wet bulb, and for dew points. The relationship between absolute and relative humidity must also be kept in mind.

There are many other factors that play a part in determining the real significance of the climatic environment of a given location. Some of the elements that are important include local variations in conditions. For example, we all know that rainfall is measured at relatively few spots for a given city. In large cities it may simultaneously be raining in some but not other sections. Humidity and temperature conditions may vary from spot to spot depending upon such factors as existence of local bodies of water, vegetation, and protection from sun. Daily ranges vary from spot to spot. In extreme climates, as in the desert, precipitation values may not have much significance. For example, there may be long periods of no rainfall at all. Suddenly the area may receive a 2-inch rain. This could give an average value of perhaps 0.17 inch per year—a meaningless figure. Wind conditions also can influence conditions significantly and vary greatly from spot to spot and time to time.

Of all the chemical and physical agents of deterioration, sunlight probably accounts for the most widespread destruction of materials *outdoors*. Materials used mainly indoors for the most part are protected from the powerful effects of solar radiation. Nonetheless, they are subject to damage by the radiant energy of natural light entering the building via windows, skylights, and doors, and by artificial sources of illumination. Thus, although light is not regarded as being as damaging to library collections as some other deteriorative factors, it is certainly worthy of attention. The effectiveness of radiant energy as an agent of deterioration is explained by the fact that some portions of the electromagnetic radiation spectrum are able to bring about photochemical reactions with the materials being irradiated either alone or in the presence of other agents like moisture or oxygen.

Sunlight, or solar radiation, and certain sources of artificial light are important in photochemical and photosensitized reactions because they are the sources of the radiant energy that make the reactions possible. In nonphotochemical reactions, the energy is provided by heat. Solar radiations comprise wavelengths from about 1,500 to 1,200,000 Ångström* units in the electromagnetic spectrum. Radiation is classified according to wavelengths of which the shortest are as low as 10^{-14} centimeter and the longest are measured in kilometers. The shortest are known as cosmic rays, followed by gamma radiation, X-rays, ultraviolet rays, visible light, infrared rays, radio waves, and radiations from power lines, the last having wavelengths measured in kilometers. Of solar radiations, about 99% of the energy lies between wavelengths of 1,500 and 40,000 Ångströms. About half the energy is in the visible region between 3,800 and 7,700 Ångströms, and the other half in the invisible ultraviolet and infrared.

Two fundamental laws of photochemistry are at work in photochemical reactions. The first states that light must be absorbed by the reacting atoms or molecules; the second law states that one molecule of a reacting substance may be activated by the absorption of one light quantum. A light quantum is the smallest amount of energy that can be removed from a beam of light by any material system. Whereas a molecule can absorb multiples of quanta, it cannot absorb less than one. The power or energy of this quantum unit is expressed by the term $h\nu$, where h is Planck's constant or approximately 6.6×10^{-27} erg sec. The frequency of the particular light is expressed by ν. The energy of quanta in long wavelength radiation ranges (low frequency radiation) such as infrared is much lower than that in the short wavelength (high frequency) radiation such as ultraviolet.

We can now relate to the energy required for chemical reactions to proceed. Most chemical reactions that proceed with reasonably slow rates at room temperature require something like 25 kilocalories (kcal) per gram-molecule for activation. Those which go on only at very high temperatures may require 100 kcal per gram-molecule or even more. For the breaking of bonds between atoms such as carbon-carbon and carbon-hydrogen bonds, 84 and 100 kcal, respectively, are required (27). By reference to Table 6, we can see why radiation in the short wavelength

*An Ångström unit $= 1 \times 10^{-8}$ centimeter.

TABLE 6

Energy in Various Types of Radiation (28)

Description	Wavelength (Ångströms)	Frequency	Calories/ einstein
X-Rays	1	3×10^{19}	2.84×10^8
Ultraviolet	1,000	3×10^{15}	284,500
Ultraviolet	2,000	1.5×10^{15}	142,300
Ultraviolet	3,000	1×10^{15}	94,840
Visible (violet)	4,000	7.5×10^{14}	71,120
Visible (blue-green)	5,000	6×10^{14}	57,000
Visible (orange)	6,000	5×10^{14}	47,400
Visible (red)	7,000	4.3×10^{14}	40,600
Visible (red)	8,000	3.7×10^{14}	35,500
Near infrared	10,000	3×10^{14}	28,450
Infrared	100,000	3×10^{13}	2,845
Far infrared	1,000,000	3×10^{12}	284

regions such as blue-green to ultraviolet are required to activate the majority of photochemical reactions and why these wavelengths are so important to the materials deterioration problem. In the longer wavelength (low frequency) ranges of the solar spectrum, as with infrared, the energy of quanta is relatively small. Quanta can influence vibrations and rotation and thus heat molecules in this range, but they cannot provide enough energy to overcome the forces which hold their atoms together. In the visible and especially the ultraviolet ranges of the spectrum, chemical bonds can be broken. The only limit of these reactions in the atmosphere is due to the presence of the ozone layer in the upper atmosphere which does not permit radiation of wavelengths below 2,900 Angstrom units to reach the earth's surface (27).

An informative example of the comparative damaging effect and the luminosity of radiant energy is provided in Table 7. This is taken from a report by the National Bureau of Standards describing work done in connection with preservation of the Declaration of Independence and Constitution of the United States (animal parchments). The particular sample was of a low grade paper and is used only for illustration. Animal parchment deterioration under light is not as rapid as is the case with this sample of paper. The influence of wavelength of the radiation on ability to destroy the paper is clearly demonstrated.

In brief summary then, in photochemical reactions the energy supplied by radiation must first be absorbed and may result in displacement of electrons in the reactants. If the energy of electronic excitation displaces atoms within a molecule, chemical reaction may take place. If the atomic displacement is large enough, the molecule may dissociate. If atoms are displaced, but not enough to be expelled, molecular reactions may occur. The energy of the particular radiation must be at least as great as or greater than the energy of activation of the reaction. Whether

TABLE 7

Comparison of Damage and Usefulness Factors of Radiant Energy (29)

Wavelength (millimicrons)	Relative damage factors	Relative luminosity factors (usefulness)
360	145	0.0000
380	107	0.0000
400	66	0.0004
420	37	0.0040
440	20	0.023
460	12	0.060
480	6.5	0.139
500	3.7	0.323
520	2.1	0.710
540	1.2	0.954
560	.7	0.995
580	.4	0.870
600	.2	0.631
620	.1	0.381
640	.05	0.175
660	.0	0.061
680	.0	0.017
700	.0	0.004
720	.0	0.001

or not activation and reaction occur depends not upon the total amount of energy in a beam of radiation but upon the intensity of the radiation, i.e., the amount of energy per quantum.

It is difficult to visualize any phenomena in the material world in which heat or cold is not involved in some way, for the complete absence of heat would be that point at which there is no molecular motion—absolute zero or zero degree Kelvin. Heat is, then, the energy a body possesses by virtue of the fact that its molecules are in motion. There is always some heat in a body except at absolute zero, and for our purposes we should think in terms of how much heat is available rather than whether or not there is heat in a body. Heat, and its correlative cold, or the absence of heat, act as powerful agents of chemical and physical deterioration for two very simple basic reasons. The physical properties of almost all materials are greatly influenced by changes in temperature, and second, the rate of almost all chemical reactions is greatly affected by the temperature of the reactants.

The concepts of heat and temperature are often confused. Temperature, or the degree of heat content of a body, is a function of the speed of motion of the molecules in the body. Heat depends upon both the speed of motion and the number of molecules. Thermodynamically, heat is defined as energy in transmission because of a temperature gradiant. Heat, then, may be viewed as the energy that

passes from one body to another because of differences in temperature. These bodies may be gases, liquids, or solids, or any combinations of these states of matter.

There are three modes of transmission of heat—convection, conduction, and radiation. All three are important in the library materials permanence problem. Convection is the process of transmitting heat by means of the movement of heated matter from one place to another, and takes place in liquids and gases. The heating of a building with a hot-air furnace is a good example of convection at work. The air heated by the furnace expands, becomes less dense than the cold air above it, rises, and thus causes movement of heat throughout the building by currents of heated air.

Conduction is the process of transferring heat from one molecule to another. An example is that of a bar of metal in a flame. As the molecules nearest the heat of the flame are heated and move more rapidly from the heat, they strike adjacent molecules. These in turn strike more molecules and the heat is transmitted throughout the bar of metal.

We have already discussed radiant energy briefly in the section on light. Heat is also transmitted by radiation. Whereas in the cases of convection and conduction, heat is transmitted via material media, radiant energy may be transmitted through space in waveforms. This radiant energy, falling upon a body, causes molecular motion with the resultant heating of the body.

As in the case of most other environmental factors, heat rarely has the opportunity to act alone. Deleterious effects are usually caused in combination with other factors such as humidity, sunlight, pollutants, and biological agents. Changes in temperature are often very damaging because of expansion or contraction of materials with consequent cracking. The action of heat in driving off water or other solvents and plasticizers and the consequent brittleness often can cause destruction of paper, leather, some plastics, and other materials. Heat plays a very important part in affecting the speed of chemical reactions. A rise of 10°F roughly doubles the rate of many chemical reactions. Included in these may be reactions with air pollutants. Holding materials at low temperatures is often an acceptable method of prolonging useful life.

The influence of heat on the water content of materials and of the atmosphere is important in the library materials permanence problem. With a given water content of the atmosphere, a sudden drop in temperature will bring about a rise in relative humidity. If the rise is sufficient, condensation of the water, leading to the formation of liquid water, can occur on the surfaces whose temperature has dropped. If this occurs often enough or for a sufficient time, water damage to susceptible materials can result. Condensation due to temperature changes in air-cooled buildings is discussed in considerable detail by Verrall (30). This is recommended for study by those responsible for such libraries, especially those in older buildings, in small wooden buildings, or in buildings with crawl space.

Finally, the influence of heat in combination with biological agents cannot be overlooked. Although humidity is a much more important environmental factor as far as occurrence and damage by microbiological agents, heat does play a part

even with these organisms. Heat plays a much more important part with the macro-biological agents—insects and rodents.

The biological agents of deterioration do not cause great damage in the majority of urban libraries in the United States. However, this should not be misunderstood to mean that the biological deterioration problem no longer exists in any urban libraries or is not a serious source of trouble in some libraries throughout the world. The problem of deterioration of books and archival materials caused by biological agents often becomes of great importance in some countries. Certainly if one includes museums along with libraries, biological agents assume tremendous importance in damaging historic and artistic cultural works. Museums, of course, commonly include in their collections many materials rarely if ever found in libraries and many of these are particularly susceptible to damage by biological agents. It is of the greatest importance to be aware of infestations of certain microbiological and biological agents when newly discovered materials are brought into museums and/or libraries. It is essential that such materials be treated to destroy the organisms before they enter the collections. Although rare book collections do not constitute large parts of the over-all collections in many of our modern urban libraries, it is nonetheless essential that such newly introduced materials of often uncertain history and composition be examined and treated adequately before acceptance.

Fungi (molds), bacteria, and actinomycetes constitute organisms referred to usually as microbiological agents (see Figure 9). Taken alone they are usually too small to be studied by the naked eye. In sufficiently large numbers their colonies are, of course, visible. Theoretically, the bacteria could be of importance to libraries. However, few if any cases have been recorded. There are bacteria which do attack cellulosic materials, such as those found in paper, and do considerable damage. But library environmental conditions are not conducive to such attack, and only a few cases of actinomycete damage to library materials have been recorded.

The fungi constitute the most important of the microbiological agents to the librarian for the most part because they thrive best at relatively dry conditions in comparison with bacteria. That is to say, although fungi require high relative humidities, they do not thrive well in the presence of liquid water. Bacteria, on the other hand, require comparatively aqueous conditions for growth and multiplication.

The fungi are extremely numerous in genera and species and are ubiquitous. Spores of fungi are to be found just about anywhere under, on, and above the earth, and await only the proper conditions of moisture, temperature, and sometimes light to vegetate, grow, and reproduce. It is perfectly safe to state that every library in the world is liberally seeded with perhaps hundreds of genera and species of fungi. Thus, the important idea in control of fungi is to maintain temperature and humidity conditions at levels not conducive to growth of the microorganism. This does not mean that cleanliness and removal of dust and dirt do not assist in reduction of the fungal problem, but it does mean that cleanliness is only part of the story.

The growth and reproduction of fungi are influenced by a number of environ-

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FIGURE 9. *Fungal spotting damage. (Photograph courtesy Paul N. Banks, Newberry Library, Chicago.)*

mental factors—temperature, relative humidity, light, oxygen, and nutrients. Fungi are much more tolerant of relatively large temperature ranges than they are of other environmental factors. That is, they may be expected to be viable at

unexpectedly low and unexpectedly high temperatures. Three temperatures are important to growth and reproduction—the temperature below which no growth and reproduction occur, the temperature range at which most rapid growth takes place, and the temperature above which no growth occurs. Fungi of one sort or another have been found to grow at temperatures approximating freezing and as high as 50–55°C. Low-temperature growth of fungi is common as witness events that often occur in your refrigerator. The temperature range for optimal growth and reproduction is variable depending upon genera and species of fungi but may be said to approximate 15 to 35°C or about 59 to 95°F. The average optimum is about 86°F when the relative humidity is 95 to 100%. The absence of growth and reproduction at low temperature does not signify death of fungal spores. Many will withstand prolonged periods of freezing or subfreezing temperatures and, upon restoration to favorable temperatures, will again grow and reproduce. However, alternation of below-freezing with above-freezing temperatures is not tolerated well by most species. High temperatures and especially high temperatures combined with moist conditions will kill most fungi and fungal spores. In order consistently to kill fungal spores, steam pressure at 15 pounds per square inch, corresponding to a temperature of 250°F, for 15 minutes is required. (This is not a recommended way of sterilizing library materials!)

Relative humidity is very important to growth of fungi. Generally it is believed that below 70% relative humidity there is little opportunity for growth. At 80 to 95% relative humidity most forms grow well. Above 95% relative humidity growth is luxurious. We must not forget, however, that the combination of temperature and relative humidity is important. Optimum humidity at 86°F is between 95 and 100% relative humidity. Optimum temperature at close to 100% relative humidity is about 100°F. Optimum temperature at lower humidities, e.g., 70% relative humidity, is considerably lower.

Light does not appear to be an essential requirement for most fungi. Generally, fungi will grow either in the light or dark. The characteristics of light in libraries does not appear, therefore, to be of any consequence to the fungal problem either pro or con.

Although there are many bacteria which can thrive under anaerobic conditions, most fungi require oxygen for growth. This requirement has no influence on the library problem. Fungi require several nutrients, some of which do have an influence on growth in libraries. Required are carbon, hydrogen, nitrogen, sulfur, potassium, magnesium, and phosphorus. Certain trace elements may also be required such as iron, zinc, copper, manganese, and in some cases calcium. Certain of the vitamins are also needed. These nutrients may be provided in many forms; e.g., carbon may be provided in the form of carbohydrate. The inorganic requirements may be in the form of salts of metallic elements. Nitrogen is essential, in the reduced form of ammonium ion, as oxidized nitrate, or in the organic form of amino acids or proteins.

The fungal nutrient problem is interesting to the librarian for several reasons. Certain fungi will consume cellulose and can therefore do irreparable damage to

FIGURE 10. *This paper, late eighteenth century, several sheets thick, shows severe damage by insects as well as by mildew. The right edge suffered too much moisture and adheres badly where mildew stain shows. (Sample courtesy James Gear, National Archives, Washington, D.C.)*

paper. Others thrive on the nutrients in leather, in glues, pastes, and other adhesives, or on binding threads. Some, though not consuming constituents of books or other library materials, stain surfaces because of certain highly colored metabolic products.

As was brought out above, many of the constituents of polluted atmospheres,

FIGURE 11. *The board removed from a binding which has been riddled with insects. (Photograph courtesy Paul N. Banks, Newberry Library, Chicago.)*

especially the particulate matter, are the salts and organic matter needed by fungi. It becomes important then in the air pollution problem to control the situation not only to prevent soiling or even chemical reaction with library materials but also to reduce provision of microbiological nutrients.

Numerous orders, families, genera, and species of insects are of importance to libraries (see Figures 10 and 11). Like the microbiological agents, insects are not considered to be a major problem in most urban American libraries. Again, cleanliness, awareness, and periodic inspections rather easily control insects. They can be eradicated by fumigation or the application of insecticides, but they should not be scorned as potential problems. They can be brought in by careless patrons; there are numerous cases where thoughtless users have left such insect attractants as food particles, candy wrappers, and similar matter in books. The introduction of insect infestations in acquisitions of old collections from poorly kept quarters makes it practically mandatory to sterilize such materials before adding them to shelves or storage areas. Table 8 provides some ideas of the varieties of insects which from time to time have been encountered in libraries around the world. Types of materials which may be attacked are also shown.

No effort will be made to discuss the environmental, respiratory, or nutritional requirements of these many insects. These factors vary widely. Suffice it to say that

TABLE 8

Insect Agents of Deterioration

Insects	Materials attacked
Thysanurans	Starchy material, glue, book-
Silverfish	bindings, photographs, labels,
Bristletails	paper sizings, onionskin paper,
Fishmoths	cellophane, wax paper, slick
Firebrats	magazine paper
Termites	Books, paper, pasteboard,
Reticulotermes	blueprints, documents, labels,
Calotermes	cardboard boxes. Termite damage
Heterotermes	is often accidental
Cockroaches	Bindings, leaves of books,
German, small tan	magazines, paper boxes,
American, large brown	parchment, leather, fabrics
Oriental, large black	
Australian cockroach	
Smoky-brown cockroach	
Brown banded cockroach	
Surinam cockroach	
Wood cockroach	
"Bookworms"	Consume or damage all types
Sitodrepo panicea	of materials in books, paper,
Anobiidae of genera:	paste, bindings, cover, etc.
Catorama	
Dorcatoma	
Stegobium	
Gastrallus	
Stegobium paniceum	
(bread beetle)	
Death-watch beetle	
Furniture beetle	
Booklice	Starch, glue, bindings
Psocids	
Cerambycidae	Various library materials
Longhorned beetle	
Dermestidae	Books: leather or
Longhorned beetle	silk bindings
Clothes moths	Many book materials

insects are found under numerous combinations of climatic conditions (from extremely dry to hot and humid) and occurrence of nutritional factors. Low temperatures, however, discourage most insects.

Atmospheric pollutants are important to the librarian not only because of their physiological effects on himself and his clients but because of their deleterious effects on his collections. Thomson (31) summarized air pollution as it pertains

to conservation chemists, and librarians interested in protecting their collections will find much of interest in his review.

There is no question but that the public, as well as the government officials in the United States, are now quite aware that the air pollution problem is of vast importance to all aspects of American life. Far reaching programs have already commenced to alleviate conditions. But the problem is still with us and we must be aware of the damage that has already been done and continues to occur.

Even if we are successful in reducing or even eliminating the introduction of particulate matter into the air by industrial emitters such as chimneys and stacks, it is unlikely that it will be possible to eliminate all problems of common dust, dirt, sand, and the conglomerate of finely divided particulates which are caught up from streets, buildings, fields, and other sources and blown about by winds. Thus, it will probably always be necessary to clean up such materials from library collections by dusting or use of vacuum cleaners or preventing the particulates from entering the buildings by using high efficiency filters.

A glance at Table 4 reminds us of the types of particulate matter. Although much of the dust and dirt is quite dry—which is why it is so easily picked up by the wind—it nonetheless soils book pages and bindings. If conditions are moist, such dirt can stain the materials and be difficult to remove. If it contains nutrients for fungi and conditions are moist, mildew can occur and cause spotting, staining, and discoloration. The abrasive action of dust and dirt on paper and other library materials such as leather is also a serious deterioration problem. If the dust or dirt carries acidic or alkaline substances and conditions are moist, it can alter the pH of the paper or other materials and cause deterioration. Dust and dirt on photographic films can cause scratches (*32*). Users also warned against the dangers of dust and dirt with magnetic tapes (*33,34*).

One of the most important deterioration problems librarians have faced for years is that of book paper as a consequence of low pH, i.e., high acid content (see Figures 12 and 13). As mentioned earlier, this problem is not solely from the environment. Much of the acid has come from methods of manufacture of the papers which have gone into books all over the world for a very considerable time. Yet, part of the problem is caused by acidic components, especially sulfur dioxide, in the atmosphere. Nitrogen oxides in the polluted atmosphere of many of our cities give rise to some nitric acid. This too adds to the hydrolytic degradation problem with paper.

The subject of permanence, or its opposite—impermanence ("aging")—of paper, as well as of many other library materials, has a very large literature (*5,6,35-46*), and includes, in addition to the effects of acid, those of heat, light, biological agents, paper composition, and miscellaneous causes of deterioration.

The subject of acid deterioration of paper was reviewed recently by Smith (*47*). There does not appear to be any question that acidity causes paper impermanence. Numerous investigations of the subject have produced overwhelming evidence. The deterioration is characterized as hydrolytic and is chiefly an attack catalyzed by hydronium ions on cellulose, the chief fibrous ingredient of paper. The rate of

FIGURE 12. *Extreme embrittlement of paper, presumably from excessive acidity. (Photograph courtesy Paul N. Banks, Newberry Library, Chicago.)*

the deterioration increases with hydronium ion concentration, i.e., with a lowering of the pH values of the paper as measured on a water extract. The deterioration is manifested by a decrease in strength (tear resistance) and a loss of flexibility (folding endurance).

A very considerable portion of the acid in papers can come from the materials used in manufacturing, chiefly alum-rosin sizing. Barrow was one of the first modern research workers to call attention in an effective way to the fact that the acidity causing impermanence in paper is a consequence of the constituents used in the manufacturing process. This acid source appears to be more important than that of polluted atmospheres. Some earlier workers had, of course, discussed the matter. At the turn of the twentieth century expert opinion thought that a minimum pH of 4.0 for a hot-water extract from first-class, permanent book paper was acceptable (47). We now know that this is much too acid and that paper with this acid content will embrittle too quickly with time.

The opinions about the pH required for stable permanent papers altered as time passed. By 1928 workers were claiming that the pH of hot-water extracts should be at least 4.5 and preferably above 4.7. By 1936 it was recognized that

FIGURE 13. *Acid deterioration of paper only about 20-years old. (Photograph courtesy Edward E. White and Hannah B. Friedman, New York Public Library.)*

a hot-water extract pH of less than 5.0 is a major cause of deterioration in even the best classes of paper. By 1937 claims were being made that a minimum hot-water pH of 6.0 is necessary for permanent printing papers (47). Recent recommendations leave the impression that hot-water pH extract values should approximate neutrality, i.e., pH 7.0, or even be on the alkaline side of neutrality (47).

Although acidic components of paper play the major role in paper deterioration, the acidic components of polluted atmospheres cannot be dismissed. There is excellent evidence that atmospheres containing SO_2 can lower paper folding endurance as much as 15% in 10 days when the SO_2 concentrations approximate what might be expected in badly polluted cities. Slow oxidation of carbohydrates of paper with the production of carboxylic acids and an accompanying production of hydronium ions or decrease in pH occurs in accelerated aging of papers and presumably also in natural aging.

Discussions of the acidity due to sulfur emissions are usually in terms of sulfur dioxide which, in contact with water, forms sulfurous acid. To get sulfuric acid, a much stronger acid and oxidizing agent than sulfurous acid, sulfur dioxide, must be oxidized to sulfur trioxide. When sulfur dioxide is emitted from stacks or chimneys it is almost immediately oxidized to the trioxide, probably catalyzed by

ash constituents. The sulfuric acid formed in the presence of water is largely responsible for the bluish smokes typical of what is called "sulfur dioxide" emissions. In areas where strongly oxidizing materials such as nitrogen dioxide, ozone, peroxides, and the peroxy-free radicals are present, more rapid sulfur dioxide oxidation to trioxide may be expected. Automobile exhaust and also olefins in the presence of nitrogen oxides also appear to cause more rapid sulfur dioxide oxidation by the photochemically produced oxidants. The presence of iron and manganese salts also materially increases SO_2 oxidation to SO_3 (48).

For some time there was a question of whether sulfur dioxide pollution of the atmosphere could cause paper deterioration in books. Numerous kinds of paper in books, however, have been demonstrated to pick up enough acidity by SO_2 penetration throughout an exposed book to have devastating effects on permanence. Although the position of the paper in the book and the distance from the edge of the paper has an influence, no parts of the paper appear to escape deteriorating effects (47). Hudson (49) was able to measure the pH of a sample of twenty-five books varying from 150 to 350 years of age. His results confirmed that atmospheric pollution is one of the causes of low pH values, particularly at the edges of pages.

Hudson (42,50) also developed a method for measuring affinity of sulfur dioxide for paper and for examining the effects of such variables as temperature and humidity on this affinity. He found that even good quality papers easily pick up sulfur dioxide at concentrations that can be expected in the atmosphere of any normal city. The moisture content of the paper is closely related to the rate of sulfur dioxide pickup. Pickup rate is increased by storage under damp conditions. High pickup is also favored by high ambient temperatures. The conditions in books would be different, of course, than the test conditions because most of the paper in books is protected by the edges. Other studies have shown, however, that there is diffusion of acid into the body of the book. Still other investigations have shown that chemicals can migrate from page to page or document to document (51).

Langwell (41,43) found that SO_2 itself is not damaging to paper. But he too found it combines readily in the presence of metallic impurities to form sulfuric acid which is seriously detrimental. These metallic impurities occur in most modern papers and in many papers made after the middle of the eighteenth century. Parchments, vellums, and papers made before about 1750 are regarded as immune to this attack.

The role of the nitrogen oxides in the deterioration of paper and other library materials has not been investigated as extensively as that of the sulfur oxides. In addition to the role of helping oxidize sulfur dioxide to sulfur trioxide, the nitrogen oxides can themselves play an important part in deterioration. This extends beyond the role with paper and into the realm of other polymeric materials in library usage such as rubber adhesives and synthetic elastomers used as fabrics, threads, and adhesives. The nitrogen oxides are being investigated extensively as modern air pollution problems, and it is hoped they will be investigated at greater length as library problems.

Sulfur acids also play an important part in the deterioration of leather (6,52,53).

FIGURE 14. *Corner of a book bound within the past 15 years. The joints have started cracking and powdering despite the fact that the boards have probably not been opened more than a dozen times. The leather seems to be held together by its pigment finish. (Photography courtesy Paul N. Banks, Newberry Library, Chicago.)*

Many old leathers are more acidic than fresh leathers. What has been referred to as "red rot" is actually an acidic deterioration. Sulfur dioxide from polluted atmospheres, catalyzed at the leather surface to trioxide and subsequently converted to sulfuric acid, is thought to be the degrading agent. This form of deterioration is very damaging to the leather and can cause its complete destruction. The leather becomes dry, reddish-brown and porous, and tends to peel or powder. The leather is easily scratched, corners wear easily, and cracks appear (see Figure 14).

Smith reviewed the subject of preservation of leather bookbindings from sulfuric acid deterioration (*52*). This review summarizes the salient points:

1. Sulfuric acid is a prime cause of leather bookbinding deterioration.
2. Sulfuric acid is introduced into leather directly during certain steps of the tanning process and indirectly by adsorption and oxidation of sulfur dioxide from the atmosphere.
3. The chemical mechanism of deterioration by sulfuric acid on leather is hydrolysis.

4. The critical point of leather deterioration by sulfuric acid is approximately a pH of 3.

5. The addition of grease does not protect leather from deterioration by sulfuric acid.

6. Leather bookbindings can be protected to a limited degree by addition of certain salts.

7. Ideal protection for leather bookbindings would consist of isolating leather bookbindings from contamination by sulfuric acid and requiring storage in air-conditioned areas.

Certain deterioration problems faced by photographic materials should be included in the discussion of deterioration by atmospheric pollution, inasmuch as we are discussing acidic components and other agents of chemical deterioration such as sulfur dioxide, nitrogen oxides, peroxides, and hydrogen sulfide. Library acquisitions can include motion picture films, sheet films, roll film negatives, microfilm records in a variety of formats, photographic prints on film or paper, and possibly color films and prints. The deterioration problems encountered by photographic materials have been summarized by Eaton (54).

It has been known for many years that cellulose nitrate films are not stable and constitute a fire hazard. This material is not acceptable for archival use (32). Because nitrate films are chemically unstable, they give off nitrogen oxides which can form nitric acid in humid atmospheres. This will attack the photographic emulsion and make it sticky in appearance (55). The film then rapidly deteriorates. The nitrate film decomposition products can also attack acetate or "safety" type films which may be nearby and damage them.

The acetate "safety" films are made of cellulose diacetate, the triacetate, and mixed esters, such as cellulose acetate propionate or cellulose acetate butyrate. The acetate films have a high degree of chemical stability. The newer polyester films are equal to or better than the acetates in permanence and have good resistance to high temperatures. Cellulose acetate films are considered to be as stable as the best grade of paper.

Some of the deterioration problems of photographic materials are due to the processing steps, some to the backing used such as paper, and some to the environment. Needless to say, paper used as backing must be of high purity and quality and have good permanence itself.

Inadequate fixation or washing can produce later fading of the image. Residues of silver-hypo complexes can decompose to give an over-all yellow-brown stain of silver sulfide in the nonimage areas, residues of hypo complexes can decompose to give an over-all yellow-brown stain of silver sulfide in the nonimage areas, and residues of hypo (thiosulfates) can attack the silver image (54).

Photographic films and print images are not necessarily permanent even after complete fixation and washing. Although they contain very little or no hypo and silver salts, the images are still susceptible to environmental conditions such as the presence of hydrogen sulfide, sulfur dioxide, hydrogen peroxide, and certain organic vapors (paint fumes), and high humidity and temperature (54).

It is usually recommended that photo prints be dry mounted for archival purposes to avoid pastes, adhesives, and cements. These are often hygroscopic and may contain sulfur compounds which can cause fading in local areas. One should also avoid the use of rubber bands around film rolls because of residual sulfur from vulcanization. Adhesive tapes, tape splices, bleached papers, and printing inks also should be avoided as deteriorative to films and prints (54).

About 1961 it was noted that many microfilms were evidencing spots and other blemishes. These were referred to as "aging blemishes." McCamy and his associates investigated the phenomena, identified six types of blemishes, and decided they were caused by oxidation-reduction reactions initiated by gaseous reactants (56–58). The gaseous reactants were traced to the cardboard cartons the films were stored in. It was found that the spots can be caused by peroxides formed in the natural aging of the paper. The peroxide formation increases with humidity. These cartons were also found to release measurable amounts of formaldehyde and formic acid which can cause spots. They also found that certain types of plastics used as dividers with the microfilm can provide an acid environment which, combined with the peroxides, also can contribute to spot formation. In all of the experiments on the aging blemish phenomena they found that humidity was an important factor—high humidities contributing to the problem. Temperature was also involved but not as importantly as humidity. Recommendations were for storage at conditions not to exceed 40% relative humidity and 70°F (56–58).

Wilson (59) investigated the degradation of cellulose acetate films of the type used by archival agencies for the repair and reinforcement of weak or damaged documents. This information is chiefly of interest in connection with degradation of the films during hot application to the documents.

There appears to be a close relationship between the environmental factors of light, heat, and moisture and the deteriorative processes they trigger in paper. It is indeed difficult to separate the effects caused by the three factors. For this reason it has been common to discuss their combined effects as a general process of "aging." Certainly all three factors exert their influence simultaneously most of the time in library stacks, storage areas, and reading rooms.

It is appropriate to recall that the phenomena of stability, permanence, and durability of paper are also usually considered as a function of "aging." As pointed out earlier, permanence is usually considered to be a function of the chemical stability of paper whereas durability is considered as a function of the physical properties of the fibers and the way they are compounded to form a sheet. A paper intended for rough handling for a short lifetime must be durable but not necessarily permanent.

It is necessary to keep in mind, therefore, that the individual as well as the collective effects of light, heat, and moisture are mainly on the chemical stability of paper. One of the ways to determine the effects of these environmental factors on paper is by a time exposure. Some of the tests performed and the properties tested are reflectance (color and brightness); pH (acidity); folding endurance (brittleness);

FIGURE 15. *Severe microbiological damage from prolonged dampness along the spine area. (Photograph courtesy Paul N. Banks, Newberry Library, Chicago.)*

and tear, burst, and tensile (strength) measurements. The commonest are folding endurance and pH.

High temperature exposures of paper, even for short periods, cause yellowing and brittleness. Moderate heat over long periods has a slow aging effect on paper. Low temperatures are regarded as preservative to paper. A combination of moderate high temperature and low humidity will cause paper to dry out and become brittle. A moisture content in equilibrium with 30% relative humidity represents about as low a value as is safe for paper. If humidity is held above 75% relative humidity for long periods, mildewing will occur (Figure 15). It is recommended generally that the temperature be about 70 to 80°F and the relative humidity be 45 to 55% for effective preservation of paper (6,60). James Gear (personal communication, May 1969) at the National Archives states that they maintain a temperature of 74 ± 4°F and a relative humidity of 50 ± 4%. The new National Agricultural Library at Beltsville, Maryland was built to specifications equivalent to 50 to 60% relative humidity in the temperature range 74–78°F (61).

Werner (62) recommends for archival materials—chiefly paper and parchment—that the atmospheric moisture should be controlled between 50–60% relative humidity at a temperature of 60 to 75°F. At the same time, Werner gives 68%

relative humidity as the critical value above which mildew and mold growth will occur. Plenderleith (*36*) also states that 68% relative humidity is the absolute danger limit in the temperature range 60–75 °F. In actual practice, he states that 65% relative humidity is preferable as the permissible upper limit to guard against mildew.

Launer and Wilson (*63*) found that 100°C (212°F) for 3 days will cause extensive damage to paper. Mild heating will cause yellowing of paper made from new-rag, refined sulfite, old-rag soda-sulfite, and newsprint pulps, especially those bleached by light. They found that the yellow color caused by heating could be bleached out by light, and that the bleaching caused by light could be nullified by heating.

The effects of heat on paper vary greatly depending upon the quality of the paper and the nature of the various constituents used as fillers. Shaw and O'Leary (*64*) found that rag papers characterized as good book paper were not appreciably affected in heat tests. Purified wood pulp also produced a fairly stable paper. Paper made from a mixture of sulfite and soda pulp was less stable than those made from the purer fibers. There was a close relationship between the purity of the cellulosic fibers used and the stability of unsized papers made from them, but only when a small amount of alum and no rosin size was used. In other tests the acidity of the paper has had a great bearing on its ability to withstand heat.

Barrow (*12*, Vol. 1) measured folding endurance of new book paper after heat-aging at 120, 100, 80, and 60°C and plotted the data as regression lines for each temperature. This showed that it takes 7.5 times longer to reduce this paper's folding endurance to a given value for each drop of 20°C in temperature. The times required to reduce the paper from 219 to 65 folds by heating at temperatures from 120 to 60°C and, by extrapolation, the times required to produce the same result at temperatures below 60°C, are shown in Table 9.

Smith (*47*) utilized Browning's and Wink's (*65*) Arrhenius equation approach and calculated the effect of storage temperature on paper permanence. Permanence was expressed in terms of paper "half-life," similar to the concept usually employed

TABLE 9

Effect of Temperature on Paper Deterioration [a]

Temperature (°C)	Time (days) [b]	Temperature (°C)	Time (years), est.
120	0.4	40	3.5
100	3.0	20	26
80	22.5	0	195
60	169	−20	1,463
		−40	10,973

[a] Ref. *12*, Vol. 1.
[b] Time required to reduce folding endurance from 219 to 65 folds.

TABLE 10

Effect of Storage Temperature on Paper Impermanence (47)

Average storage temperature		Paper half-life (years) [a]
°F	°C	
140	60	1
122	50	4.1
104	40	18
95	35	40
86	30	88
77	25	204
72.5	22.5	320
68	20	490
63.5	17.5	760
59	15	1,200
50	10	3,100
41	5	7,900
32	0	21,000

[a] One folding endurance half-life is defined as 1 year at 60°C (140°F) for purposes of estimating half-life at lower temperatures.

in expressing the decay of radioactive elements. For example, a paper with an original fold endurance of 100 folds would, after an expenditure of its half-life, have a value of 50 folds, after a second half-life, 25, and so. Although an over-simplification of the matter, some of the results obtained at various temperatures for an ideal, high quality paper, defined as having a folding endurance half-life of 1 year when stored at 60°C (140°F), are shown in Table 10. The accuracy of the prediction increases at higher temperatures or as the temperature of the experiment is approached.

Luner (44) also discusses the Browning and Wink application of the Arrhenius equation for developing values by which to predict paper aging. He points out that there are a number of difficulties inherent in the use of the Arrhenius equation which are not readily apparent. Further, the characteristics of the various papers have a strong influence on the results. More information is needed on the chemical and physical reactions that contribute to loss of paper permanence over a temperature range before the Arrhenius relationship can be used with confidence to predict paper permanence. Nonetheless, the equation appears to be a very useful tool in studies of paper permanence properties in libraries.

Smith (47) joins the effects of temperature and acidity on paper permanence, using considerations similar to those used with reference to storage temperature. For this purpose he defined a paper as having a half-life of 100 years at a pH of 6.0 and a temperature of 68°F (20°C). He then varied the pH and temperature to

TABLE 11

Action of pH and Temperature on Paper Half-Life (in Years) (47)

Temperature (°F)	pH		
	6.0	5.0	4.0
Hot Water pH			
68	100	53	28
72.5	65	35	18
77	42	22	12
86	18	10	5.1
95	8.2	4.6	2.4
104	3.7	1.9	1.0
Cold Water pH			
68	100	10	365 [a]
72.5	65	6.5	240
77	42	4.2	150
86	18	1.8	66
95	8.2	0.82	30
104	3.7	0.37	17

[a] Figures in this portion of the pH = 4.0 column are given in days and were computed by extrapolating the cold water pH line.

obtain half-life values. The effect of pH change on half-life was estimated as 53% and 10% half-life retention for an increase in acidity* of one hot and one cold water extraction pH unit, respectively. The effect of temperature change on half-life was estimated as in the previous example. Table 11 provides his results. The method of prediction indicates that both pH and storage temperature have strong influences in producing the deteriorated condition of books in many libraries.

Humidity, or rather the water contained in paper, might be considered as the third most important factor, after pH and storage temperature, relating to paper deterioration in libraries. Although we have seen that excessive dryness is thought by some to cause paper to become brittle, and certainly too much moisture is conducive to mildew or fungal growth, apparently the role of moisture is not that easily dismissed. Some water in paper, as in many materials, is in a bound form; it cannot enter into or catalyze chemical reactions as easily as free water. The water in paper in equilibrium with 50% relative humidity has been reported by Browning and Wink (65) to hasten the rate of deterioration during accelerated aging by ten times that of a bonedry paper.

Recommendations of a relative humidity of 50% for storage and for library stack and reading room values may emphasize current physical properties of a paper at the expense of its future properties (47). It is very difficult, however, to recom-

*Represented by a decrease in pH value.

mend the optimum value, for there is not sufficient information available today, particularly with reference to values below 50% relative humidity.

The effect of relative humidity and temperature on paper is discussed at some length by Wink (66) who brings out that properties such as folding endurance are extremely dependent upon humidity control. Mason (67), in discussing the effects of low humidity climates on brittleness in paper, suggests that water should be added to the atmosphere since, for every 10% rise in relative humidity, the folding strength of paper doubles. Obviously, this curve levels off fairly rapidly. In making recommendations for rare book collections, Mason (67) suggests a separate air conditioning machine—a system capable of maintaining a *constant* temperature of 70°F (or lower if personnel can stand it) and 50% relative humidity. This would introduce costs, however, that many libraries might not be able to afford. Storm (68), in making recommendations for preserving rare book collections, stipulates 68–75°F and 45–50% relative humidity. Storm states, however, that 65°F would be better for books of all ages and kinds but is a little chilly for people.

Noblecourt (69) suggests the following relative humidities for storage of library materials at 60–75°F: 45 to 63% for newspapers, leather, buckram, printed books, maps, music, manuscripts, parchment, engravings, prints, and drawings; and 50 to 63% for postage stamps, adhesive labels, and acetate and celluloid base photographic films. These conditions, though mentioned in connection with reducing the occurrence of or the attack by mildew, were also made with the thought in mind of preserving other characteristics of the paper and library materials.

Raistrick (70) calls attention to the effects of heat and moisture on leather, stating that a common cause of deterioration is the combined action of the two factors. Such damage shows itself in loss of strength and hardening of the leather. Storage in the region of 40°C (104°F) and 100% relative humidity causes considerable loss of strength of most types of leather. Increased stiffness and crackiness, loss in area, and fall in shrinkage temperature are also reported. In the tests Raistrick performed, all leathers lost about 50% strength after 5 weeks at 60°C (140°F) and 100% relative humidity.

Temperature and humidity are also important factors in the stability and permanence of photographic materials in storage. Eaton (54) warns against storage of photographic materials in moist air and above 50% relative humidity to avoid fungus growth. However, he points out that very low relative humidities can cause film brittleness, curl, and static charge. Generally, he recommends, the temperature should be 70°F and relative humidity 40–50%. We might recall that in connection with the aging blemish problem with microfilm McCamy (56) recommended that humidity not be permitted to exceed 40% nor temperature to rise above 21°C (69.8°F). Eastman Kodak (32) warns against high humidity as potentially causing films to buckle or flute. They also point out that metal film reels can corrode at high humidities, and rust particles can damage the image. But, they say, prolonged storage under 25% relative humidity can cause the film to become dry and brittle so that it may crack or break if handled carelessly.

Temperature and humidity are factors that must be given attention when storing

magnetic tapes. Here, however, the permissible ranges appear to be much broader. The ranges of 40 to 90°F and 20 to 80% relative humidity appear to be acceptable (*34*). It is suspected that these ranges will be tightened considerably after more years of experience with this medium. A helpful bibliography on magnetic tape aging knowledge is provided by Davison and his colleagues (*33*).

As for light, recalling the admonitions of many people who have written on the subject of materials deterioration by light, Stolow (*71*) summed up the matter succinctly for museum curators as follows:

> The deteriorating effects of light on museum collections depend on the intensity of the radiation; the time of exposure; the spectral characteristics of the radiation; and the intrinsic capacity of individual materials to absorb and be affected by the radiant energy. External factors also influence the rate of deterioration—humidity, temperature, and active gases in the atmosphere. We know we cannot consider light as a single danger; high temperature, high humidity, and the presence of oxygen usually speed up the process of deterioration. Essentially, we must take into consideration: the characteristics of the radiation, the materials exposed, and the condition of their exposure. Until laboratory tests prove to the contrary, any museum curator must assume that the extent of photochemical damage will be reduced in direct proportion to the reduction of the intensity of illumination or the time of exposure—no matter what the light source. He must also remember the important factor of temperature: for with a ten-degree rise in temperature the rate of chemical change can double. Depriving an object of oxygen ... can also serve to minimize photochemical change in that oxygen is often necessary to propagate intermediate steps in photochemical reactions.

Stolow's remarks apply to library collections also. Practically speaking, librarians usually cannot provide the special environments for their collections that curators can for unusual objects. But for rare library items, the situations are much the same for the two types of institutions. The deteriorating effects of light are not considered as serious for library materials as are those caused by acidity, heat, and humidity, but light warrants attention.

The effect of light, and the need for adequate lighting in libraries, archival depositories, and museum collections, have been reported on and reviewed many times (*5,6,37,39,60,63,71–85*). Of the various materials found in libraries in large quantities, paper represents the materials most affected by light. Other library materials subject to deterioration by light (*6*) include textile (cotton) binding materials, binding cords and thread, parchment, and various types of plastics, rubbers and adhesives, inks (*86*), and many dyes (*76,78*).

The effect of sunlight on inks was investigated by Barrow (*86*). He found, for example, that some of the iron-gall inks of the colonial period in America turned from black to rusty-brown, or faded out completely. His tests indicated that sunlight decomposes the tannic acid in the ink, causing the browning or fading.

The high polymer cellulose is the basic material in paper which undergoes degradation.* Cellulose itself does not absorb visible radiation and one might expect

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*For a discussion of the nature of paper as it pertains to the library deterioration problem, see Browning (*87*).

that it would not be degraded by wavelengths longer than about 400 millimicrons. But several investigators have shown it to be affected by wavelengths as high as 460 millimicrons. Feller (*80*) suggests that perhaps some components of paper other than cellulose—glue, rosin, or other constituents—absorb the visible violet and blue and sensitize the paper to deterioration. The exact mode of action of sunlight on cellulose is not completely known. But there appear to be roles played in addition to that of light, by oxygen or ozone, by moisture, and possibly by other reactants.

The action of ultraviolet light upon cellulose leads to the formation of oxycellulose. Photochemical degradation of cellulose is apparently due to oxidation of cellulose by atmospheric oxygen, ozone, or some of the other atmospheric oxidants discussed earlier. The reaction is accelerated by water vapor, and is preceded by absorption of ultraviolet light (*88,89*).

It is fairly well agreed that the sunlight resistance of paper in general depends to a large extent on the composition of the paper and on the kind of cellulosic material present. Yet, all papers are susceptible to damage by sunlight. Launer and Wilson (*63*) found that photochemical stability of papers is related to the kind and source of materials used in manufacture, and they rated different papers in the following decreasing order of resistance: new rag, refined sulfite, old rag, soda-sulfite, and newsprint. The presence of rosin, glue, alum, iron, lignin, or other substances, whether included accidentally or purposely, has a strong bearing on degradation of paper by light.

Although there is no question whatever that unfiltered sunlight is a strong degrader of almost all organic materials, and all kinds of paper are certainly included, the problem of light deterioration of paper of most concern to librarians, archivists, and museum curators is not that caused by unfiltered sunlight. Rather, it is that caused by the light which enters the building through windows or skylights and the artificial light used for illuminating the premises.

Studies of the degradation of cellulose products by radiation have shown that the greatest damage is caused by ultraviolet energy of wavelengths shorter than 360 millimicrons. However, damage is still appreciable for wavelengths up to 500 millimicrons. This includes all the violet and blue part of the visible spectrum (*6,90*). Launer and Wilson (*63*) demonstrated that the light usually affecting papers is in the range of 330 to 440 millimicrons. They pointed out that direct sunlight, light from the quartz-mercury arc, and from the unfiltered carbon-arc all fail to represent the kind of light to which record papers are normally subjected in libraries and archives. They noted that exposure in these places is limited to indirect sunlight transmitted by window glass or to that from the tungsten incandescent lamp.

Launer and Wilson (*63*) used a light source filtered to eliminate all infrared as well as the ultraviolet shorter than 330 millimicrons for a series of tests. Thus they had a light source with wavelengths of approximately 330 to 750 millimicrons with a strong band at 389 millimicrons. In these tests they showed that discoloration of paper is a combined effect of light and heat. The yellowing of delignified paper, commonly ascribed to light, is due to heat or age. When heat effects were eliminated during irradiation by control of temperature, the papers actually bleached, and even

lignified paper bleached when irradiated in an oxygen-free nitrogen atmosphere. The two apparently opposite effects—bleaching and yellowing—may occur simultaneously. If a white paper turns yellow when irradiated, reactions other than photochemical may be involved. Papers containing lignin will, however, yellow in air or oxygen even in the absence of heat effects. Paper scorched brown at high temperatures, or yellowed at 100°C, as well as a 250-year-old yellowed paper, were all bleached by light.

Launer and Wilson (63) also showed that water vapor accelerates the effect of light on paper made of cotton cellulose but has the reverse effect on paper made from wood pulp. Free rosin and sulfuric acid increases the effect of light on cotton, rag, and purified woodpulp papers much more than on inferior papers.

Work done by the National Bureau of Standards, in connection with the preservation of the Declaration of Independence and the United States Constitution, shows the relationship of the wavelengths of light and the damage done to paper and parchment exposed to this light. Reference is made to Table 7.

Judd (75) did studies to extend the range shown in Table 7 to 300 millimicrons. Some of these adapted values are shown in Table 12, and illustrate how rapidly

TABLE 12

Probable Relative Damage [a]

Wavelength (millimicrons)	Probable relative damage
300	775
320	450
340	263
360	145
380	107
540	1.2

[a] Adapted from Judd (75); i.e., Judd's values × 100.

relative damage increases as we get deeper into the shorter wavelengths.

Judd (75) makes the statement:

> The probable rate of damage from radiation continues to rise with decreasing wavelengths below 300 millimicrons; but this is of no interest in museum lighting because none of the light sources available emits appreciably at wavelengths below the band, 290 to 310 millimicrons, characterized by the value of probable rate of damage at 300 millimicrons. Similarly, the probable rate of damage from radiation continues to fall with increasing wavelength above 640 millimicrons and is known not to reach zero short of 1100 millimicrons (note that the infrared can be photographed to about this wavelength), but these small probable rates of damage to the average museum object are negligible compared to those associated with the shorter-wave energy emitted by all light sources suitable for museums.

TABLE 13

Recommended Minimum Illumination Values in Foot-Candles (77)

	1931	1932	1937	1938	1941	1947	1949	1952	1956
Reading rooms	10	7½–10	20	30	30	25	20	30–50	30–50
Workrooms	—	7½–10	30	20	30	25	20	30	30
Periodical room	—	7½–10	20	—	—	25	20	—	—
Card catalog	8	—	—	10	25	25	—	30	30
Stacks	1½	—	10	5	10–15	25	—	10–30	10–30
Corridors	3	3–4	5	5	5	5	—	—	5–10
Lavatories	5	—	—	—	10	10	—	—	10

What Judd says about museum light sources and damage can generally be considered to hold true for libraries. It should be recognized, of course, that the museum curator's lighting problem is somewhat different from that of the librarian. Museum objects of historical or artistic value vary greatly in their material nature. There is also always a problem of exhibiting these objects to the best artistic advantage to permit the viewer to see them as the original artist intended. Many of these objects already have suffered considerable deterioration. Many more of the objects in museums and art galleries must be displayed to the best color advantages, e.g., paintings.

Judd brings out clearly the dilemma of the museum curator (75):

> From the estimate of probable relative rate of damage of museum objects from radiation* it may be seen that every light source giving good color rendition (radiant emittance well distributed throughout the visible range, 380 to 760 millimicrons) is necessarily associated with appreciable radiation hazard. ... The directors of museums have therefore to make a difficult choice for each museum object. Either they can display the treasure by a light source yielding a good approximation to the color rendition of natural daylight, thereby eventually destroying it by photochemical decomposition; or they can seal the treasure in a vault screened from all radiation and filled with an inert gas, thereby preserving it indefinitely but also preventing anybody from ever seeing it; or they can adopt some compromise between these two.

The librarian's problems of illumination are simpler. He wishes chiefly to provide suitable light by which clients may read or study, albeit often for extended time periods, without doing damage either to his client's eyes or to the items in his collections.

Studies of damage by radiation to museum collections are quite applicable to library problems. For example, White (77), in discussing library lighting standards, brings out the fact that recommendations for illumination in libraries have increased considerably over the period of 1931 to 1956. Table 13 shows the recom-

*Radiation values provided in Judd's tables.

mended values. White also points out that some libraries (Kent State Library and Davenport Public Library) have already gone to levels of 70 to 100 footcandles in reading rooms. Blackwell (*82*) reports on the lighting requirements for sample library tasks. His data ranges from 0.9 footcandle required for very easily read print to 141.0 footcandles for reading difficult spirit-duplicated samples. Some of his recommended lighting standards for libraries range considerably higher than those reported on by White.

Judd's report on museum lighting (*75*) provides interesting data both from the standpoint of relative damaging effects per footcandle for a large number of different light sources and for consideration against the increasing levels of illumination being recommended for libraries. Judd's data are shown in Table 14. Here he reports on six light sources—an incandescent lamp of color temperature 2,854°K; a daylight fluorescent lamp of 8,000°K; a warm-white deluxe fluorescent of 2,900°K; a cool-white deluxe fluorescent of 4,300°K; natural sunlight at 30° altitude and an air-mass of 2 with 5,300°K; and the zenith sky equivalent to 11,000°K.* He makes combinations of these sources with no filter and with four different filters, including window glass, to give a total of 30 combinations. His figures are calculated and expressed as the probable rate of damage per footcandle. Judd (*75*) states:

> It is believed that these computed results indicate reliably the relative rates of photo-chemical decomposition of cellulose by these light sources. Furthermore, these computed results are the best estimates of radiation hazard for museum objects generally that we can make from presently available information. These estimates are submitted as guides in the selection of light sources for museums.

It is not intended that any quantitative conclusions be drawn by combining White's and Judd's reports, only to draw attention to the manner in which increasing values of illumination bring increasing probabilities of deterioration.

This article has presented some evidence of the deterioration problems faced by modern libraries. As the rate of library growth has increased, the problem has accelerated. Furthermore, as the materials on which library items are recorded have tended to proliferate and to become more complicated, the extent of deterioration and need for preservation have increased. Society is faced today with a set of difficulties, the solution to which will require the united effort of librarians, physical scientists, administrators, funding sources, and a host of technically trained, highly skilled conservation and preservation experts.

It is encouraging to note that considerable attention is being given to the questions. Those concerned are beginning to understand what kinds of materials should be used in our books and other library media so that there will be fewer problems in the future. Some good techniques to slow down deterioration in the media already in libraries and to preserve the collections for many years to come are being developed. Librarians are coming to a realization of the environmental conditions required in libraries if collections are to enjoy long life.

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*Feller (*73*) points out that zenith sky has the greatest proportion of ultraviolet and blue light per lumen of any source of illumination under consideration in museum lighting.

TABLE 14

Probable Rate of Damage per Foot-Candle for Thirty Light Sources Expressed in
Per Cent Relative to Zenith Sky, Sources Arranged in Order of
Probable Rate of Damage (75)

Light source	Filter	Probable rate of damage per foot-candle relative to zenith sky (%)
Zenith sky	None	100.0
Zenith sky	Kingsport water white	70.4
Zenith sky	Window glass	32.9
Sun at altitude 30°	None	16.5
Sun at altitude 30°	Kingsport water white	12.9
Cool-white deluxe	None	11.5
Zenith sky	Greenish nultra	11.3
Cool-white deluxe	Kingsport water white	9.6
Warm-white deluxe	None	9.2
Sun at altitude 30°	Window glass	8.9
Daylight fluorescent	None	8.4
Daylight fluorescent	Kingsport water white	8.2
Daylight fluorescent	Window glass	7.5
Zenith sky	Noviol 0	7.0
Warm-white deluxe	Kingsport water white	6.9
Cool-white deluxe	Window glass	6.1
Daylight fluorescent	Greenish nultra	5.5
Sun at altitude 30°	Greenish nultra	4.7
Warm-white deluxe	Window glass	4.4
Daylight fluorescent	Noviol 0	4.1
Cool-white deluxe	Greenish nultra	3.4
Sun at altitude 30°	Noviol 0	3.3
Incandescent	None	2.8
Incandescent	Kingsport water white	2.7
Cool-white deluxe	Noviol 0	2.5
Incandescent	Window glass	2.2
Warm-white deluxe	Greenish nultra	2.1
Incandescent	Greenish nultra	1.4
Warm-white deluxe	Noviol 0	1.4
Incandescent	Noviol 0	1.1

If this knowledge can be exploited to the fullest it will be possible to reduce the deterioration issue to controllable dimensions and to enhance the likelihood of handing down to the generations to come the knowledge mankind has accumulated with so much hardship.

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DETROIT PUBLIC LIBRARY

Every public library should have a personality of its own, otherwise it is simply copying what is being done in other places. The Detroit Public Library developed its own strong personality and then won wide recognition as a significant institution in the library world, not by single-shot spectaculars but by being ever in tune with the needs of the people it served. To understand it, one must know something of its community.

For a North American community Detroit is a very old city, one of the limited few in the United States which can lay claim to nearly three centuries of continuous existence. From its earliest time, Detroit was not the usual frontier post made up of backwoodsmen but was a center of influence made up of leaders who brought to the city a broad educational and cultural background. For six decades it was a center of French domination for the vast empire we now know as the upper Great Lakes region. Then followed four decades under English rule because the narrows of the Detroit River provided an easy means of controlling the fur trade and later the other trade of the vast, rich hinterland. Strangely, even today, though for other reasons, Detroit still is a center of wide influence and leadership. Of the ten largest industrial corporations in this country from the standpoint of the value of their products (*1*), three have their headquarters and their research organizations located in Detroit. Five labor unions, one a giant among labor organizations, also have their headquarters in Detroit. The presence of these forces—industry and labor—both heavily concerned with research, has created the need for in-depth library facilities. Many cities with a comparable population do not require such facilities because they have only branch plants or are primarily distributing centers. The scientists and the creative and investigative thinkers who provide leadership in a highly competitive society require access to a distinguished library with rich resources.

For many years until after World War II when the Wayne State University Library began to develop, the Detroit Public Library was the only big library in the metropolitan area. This paucity of major reference libraries resulted in the development at the Detroit Public Library of one of the most distinguished reference-research collections to be found in any public library outside of New York City.

The Detroit Public Library thus has become a dual-type institution. One part is the Reference-Research Services made up of ten very large specialized departments: Sociology and Government; Technology and Science; Language and Literature; History and Travel; Music and the Performing Arts; Fine Arts; Business and Finance; Philosophy, Religion and Education; Burton Historical Collection (a special endowed collection having nearly 5 million manuscripts, letters, and papers as well as about 175,000 books, all relating to the Old Northwest Territory together with its Canadian antecedents); and General Reference department including the Bibliographic Center. Two further parts of the reference-research portion of the total library are important independently operated units which have not attained to

departmental status. They are the Rare Book Room and the Automotive History Collection. The ten special departments and the two separate collections are under the general administration and coordination of an assistant director.

The second great area of public service, under the direction of another assistant director, is the Home Reading Services. This part of the library is concerned with the broad diffusion of existing knowledge for all age and educational levels. The Home Reading Services operates twenty-eight branch libraries; two bookmobiles; services of various types in prisons, hospitals, convalescent homes, and other institutions; as well as deposit collections in schools remote from branch libraries. This major section of library activity also encompasses many services located in the Main Library building, such as the Browsing Library, the Children's Library, the Educational Film Department, and the Schools Department which provides collections of books requested by elementary school classroom teachers for use in connection with special projects at the time they are being studied.

In setting up the lines of authority for the two broad areas of public service, it was decided that service objectives rather than buildings provided the natural and important demarcation between the two. Thus the old pattern used in many libraries in the 1920s, that of having a Chief of Main Library and a Chief of Branches, was refined and became instead Director of Reference-Research Services and Director of Home Reading Services, each, as referred to earlier, at the assistant director level.

To keep this dual library operation functioning compatibly and not competitively, some clarifications were essential.

1. The education and training requirements for the staffs are identical. The natural interest of persons hired determines the assignment given.

2. Salary levels for the two units are identical.

3. Both areas of the library are autonomous in selecting their new books. In other words, the Home Reading Services can and does reject books approved by some department of the Reference-Research Services for its departmental collection. Conversely the Reference-Research Services can reject a book approved for the Home Reading Services. The logic of the latter can be readily understood with an example. A new book on pencil drawing may be the very thing most branch libraries need and want in their type of service, but the Fine Arts Department might well feel that purchase of that same title for its collection represented a wasteful expenditure on a subject already comprehensively represented in its book collection.

The catalog problems of how to show such a nonconformist fact as having a book in the total institutional collection which was not available in the Main Library was settled by a direct forthright statement on the cards: "In branches only."

4. To avoid confusion in responsibility for purchasing materials, it became necessary to define carefully the objectives of each of the two services as follows:

The Home Reading Services provides the books for general non-specialized readers, then through stimulation and guidance, promotes their use, to the end that children, young people, men and women, may have opportunity and encouragement for their fullest development as individuals, as members of a family, as

citizens. Since this service is concerned with the best personal development of people through existing knowledge rather than with the refinement and extension of knowledge itself, its purpose in selecting books is to choose the best and the most usable that are available at varying levels.

The Reference-Research Services have the responsibility for preserving knowledge in its most comprehensive sense, and for maintaining open avenues for the exercise of intellectual freedom of inquiry. To carry this out, they must provide the usual as well as the obscure, the scholarly, and even the socially, religiously or politically unorthodox materials necessary for research.

5. Any book in either part of the library can be made available through inter-loan for lending to a reader in any other unit of the library if the book is not limited to a strictly reference basis.

6. To protect the specialized departments against a mass call that might thereby subvert their fundamental purpose of developing book collections with very broad title coverage, these departments are limited to holdings of only three copies of any book. If this number proves inadequate for the demands being made on the department, then the matter is referred to the Home Reading Services whose responsibility it is to serve the mass call that develops for any title in the library. Without this built-in protection a department such as Language and Literature might be inundated by secondary school requests for such ordinary titles as *The Merchant of Venice* or *Julius Caesar*.

As in all coordinated ventures of any type, good will and a spirit of cooperation from the top authorities all the way down is essential. This has always existed because emphasis through the years has been on the fact that each person on the staff represents not a particular department or branch, but rather the Detroit Public Library.

The scope of the book collections of the Reference-Research section of the library is very broad because the community it serves has broad interests. No library, however, can excel in all fields. The sheer mass of materials involved would preclude such a possibility. For this reason four levels of development for subjects have been established in the library's planning for Reference-Research departments:

1. Subjects which are merely represented to provide some information on them but which were not intended to be built up. Examples are propaganda literature, some medical and legal books, and reproductions of fine arts prints illustrative of different types of art expression.

2. Subjects on which a good representative collection for wide reading and study are maintained. In this category are Education, Psychology, some areas of History such as Latin American History, and some phases of Literature.

3. Subjects on which extensive and specialized materials for heavy reference—not research—will be maintained. A primary difference between this heavy reference development and the research level of development in number 4 subjects is that

number 3 is concerned with acquiring all contemporary data on the subject, whereas number 4 does this plus acquiring the historical background of the subject. In the number 3 group are Bibliography, Sociology, Modern Poetry, and Music.

4. The most highly developed level of subjects are those brought to such a point of completeness that they could, even in the most discriminating sense, be termed research collections. The selection of these subjects was neither capricious nor imitative of other institutions. They were singled out because they represent subjects of dominant interest in Detroit. They are four in number:

(a) History of the Old Northwest Territory, now generally thought of as the Great Lakes area. This collection, known as the Burton Historical Collection, has been described earlier.

(b) Selected aspects of Technology, with particular emphasis on metal working, mechanical engineering, and allied subjects. With nearly 150,000 books and periodicals, this collection has become one of the most comprehensive in its subject field.

(c) Automotive History, including the early developments in New England and the still earlier developments in Europe.

(d) Labor, including publications of all federal agencies related to labor since the Bureau of Labor was established in 1885; all publications of the International Labor Office since 1919; studies of such organizations as Brookings Institution, Russell Sage Foundation, Twentieth Century Fund, National Bureau of Economic Research, and the National Industrial Conference Board; files of labor organizations; and many long out-of-print classics in the field.

Added to these was the Labor collection of the John Crerar Library acquired through purchase. The core of this great collection was assembled in part by the noted economist, Richard T. Ely, and in part by the great Dutch scholar, C. V. Gerritson, of Amsterdam.

While the book collections of the Reference-Research Services have acquired real distinction for their inclusiveness and depth, the Home Reading Services have become equally distinguished because of the vigor, the originality, the comprehensiveness, and the effectiveness of its efforts to reach out into the community with programs of stimulation and education. These included a wide variety of marriage and family life programs; programs concerned with the major social, national, and civic problems; cultural appreciation programs; and Great Books discussion programs. Detroit was one of the original three cities to introduce Great Books discussions once the sponsors at the University of Chicago decided to experiment with it beyond the Chicago area. An unusual feature of these vigorous outreach efforts was that they were primarily branch based and were not dependent on the Main Library as is so often the case.

In other ways, too, there was a continuous searching for means to improve the service to patrons. One dramatic change developed from raising the serious question as to whether the book classification system then used, i.e., the Dewey Decimal classification, was appropriate for the objectives of the Home Reading Services. Or did public libraries, more than a century ago, merely take over from university

libraries their plan of book organization and then carry on unquestioningly with a system devised for an entirely different purpose?

In 1936 a proposed solution to these questions was suggested by the then Associate Director of the Library, Ralph A. Ulveling. Failure to win administrative endorsement at that time delayed an actual testing of the plan until 1941. Then Mr. Ulveling, the new Library Director, and Miss Ruth Rutzen, the head of the Home Reading Services, worked out the necessary details to implement the broad scheme and tried it out in a limited book collection in the Main Library's Browsing Library. A few years later when the Edison Branch Library was opened, the branch library's entire book collection was organized on the new plan. This plan, named Reader Interest Classification by John Chancellor, then the Adult Education Specialist at American Library Association headquarters, was heartily commended as a major advance in adult education by Lyman Bryson, a widely recognized national leader in that field. More than a decade later, in 1955, a distinguished foreign visitor, S. Das Gupta of Delhi University, characterized Reader Interest Classification as one of the most original developments made by American libraries in the twentieth century. Following his return to India, he devoted considerable space to a report on the classification in a fourteen-page summation of his impressions of American libraries (2). In this he said, "The Detroit scheme of classification is a fine example of what the right kind of techniques in its right place can achieve to liven up a mass of books in such a way that the arrangement itself communes with life." Eight years later, on the other side of the world, the well-known Swedish librarian, Sigurd Moehlenbrock, reported that the "arrangement of the bookstack according to the so-called Reader Interest Classification scheme originally devised in Detroit has been gaining some ground in Swedish libraries, thereby influencing the arrangement of the various rooms of the library premises where this system has been applied. . . . The experience gained so far is entirely positive and most encouraging for further experimentation" (3).

This kind of exploratory professional spirit in the Home Reading Services has through the years led to many innovations which later were widely adopted by other libraries of this country.

The present Main Library building, which opened in 1921, is the third structure on as many different sites to house the library. It was designed by Cass Gilbert of New York, one of America's great architects of the early twentieth century, who won the commission through a national competition. Many of the distinguished features of the building were later used by the architect in his design of the U.S. Supreme Court building which for many years was reputed to be the finest building in Washington. It is a matter of pride to Detroiters that, nearly a decade after the Detroit Library was dedicated, it was selected by a jury of architects as one of the three most distinguished public library buildings of this country. The other two libraries sharing this honor were the Boston Public Library and the Indianapolis Public Library.

By the time World War II started, both Detroit and its library had grown so enormously that within a very few years plans were being made to enlarge the building by 133%, from 180,000 to 420,000 square feet. The new addition, con-

sisting of two great wings and a connecting concourse, was designed by Francis Keally and Cass Gilbert, Jr., both of New York. So successfully have the interiors of the old and the new been blended that even experienced librarians from other cities are unaware of when they are passing from the older structure into the 1963 sections of the building.

The legal status of the Detroit Public Library is an anomaly that may yet prove to be a twentieth century blessing. The library is not a part of the municipal government of the City of Detroit. Nor is it under the authority of the Board of Education though that board appoints, but cannot control, the library's governing board which is officially known as the Detroit Library Commission. In effect, the Library Commission is a completely separate unit of local government within the state.

Such peculiar anomalies usually are the outgrowth of very logical events which developed step by step, but which have long since been forgotten in today's world. The Detroit Public Library's status falls into just such a pattern. It developed in this way.

With the kind of cultural and intellectual leaders who dominated Detroit's early history, it is not surprising that in the very first constitution, adopted for the new State of Michigan in 1835, provision was made for the establishment of a library in every township of the state, and that all fines for breaches of the state penal code should go for the support of these libraries. It is a matter of pride to librarians in Michigan that that earliest reference to libraries has been retained in substance in every revision of the State Constitution down to and including the present one. Through the years this has brought substantial help to local libraries as can be judged from the 1969–1970 figure of $4,828,818. Of this amount, the Detroit Public Library received $210,000. These funds are in addition to State Aid funds going to the Detroit Public Library of approximately $346,000.

Legal provisions, like the penal fines provision, sometimes exist on paper and are not fully implemented. So it was that the Detroit Board of Education in the 1840s and 1850s, aware that some funds should be available to Detroit for library purposes, initiated steps to establish the Detroit Public Library. By 1865, just as the Civil War was drawing to a close, the library was opened for service in the building that a few years earlier had been the state's first capitol.

Fifteen years later it became evident that the library was becoming too large and too important an activity to be operated by a committee of the Board of Education. However, the board refused to support the library's proposed separation unless it could appoint the members of the library's governing board. Once this matter was agreed on, the state in 1881 enacted legislation creating the Detroit Library Commission. Subsequent changes enacted in the early 1900s gave authority to the commission to hold property in its own name and to issue library bonds under specified conditions.

As we look to the future, which in all probability will see the in-depth book collections and services of main libraries in the core cities of the major metropolitan areas become metropolitan libraries supported by all the cities and counties it serves or by the state for the benefit of its metropolitan population, the Detroit Public Library is admirably readied for the change. The reasons are threefold:

1. The service functions of the library are already separated. The Home Reading Services could continue to render the usual general reader services to the city proper just as do all suburban libraries for their respective cities.

The Reference-Research Services, which are already a coordinated, well-developed group of specialized services with its own skilled staff of specialists, could readily serve the larger area once a proper base of support and a suitable governing board, representative of the wider area, was established.

2. The rock on which so many new conceptions split—providing an adequate building for the joint activity—would not exist in this case. The building, adequate in size, is already available.

3. Because of the legal independence of the library, which even now holds title to its own properties, the legal confusion and complications that would inhere in separating a service from a city government do not apply in this instance. This is not to imply that no problems will be encountered, but rather to say that they should be far less than would be true for most other public libraries.

Finally, statistics have been eliminated from this account of the library because they are seldom truly revealing about the quality of a library's service and further because they are usually out of date by the time they get into print in any long enduring reference tool. But the philosophy behind a library's development and the motivating forces which guided it are the keys to its mediocrity or its greatness. Therefore, the names of the library's directors and the length of their service periods are shown:

Henry Chaney	1865–1878
Manasseh Hickey	1878–1880
Henry Gillman	1880–1885
Henry Munson Utley	1885–1912
Adam Strohm	1912–1941
Ralph A. Ulveling	1941–1967
Charles M. Mohrhardt	1967–1970
Clara S. Jones	1970–

The latest director to be appointed, Mrs. Clara S. Jones, was a member of the library's staff for a quarter of a century and a branch librarian for 18 years of that period. She is the first woman to hold the Director's position and she is the first black person to head a major public library in this country.

Adequate accounts of the first six directors are to be found in a centennial history of the library by Frank B. Woodford, published by Wayne State University Press in 1965. The seventh director, Charles M. Mohrhardt, had a very long record of service in the library, first as head of the Technology Department and then for 26 years as associate director. He, too, is adequately presented in the centennial history though his term as director did not begin until 2 years after the publication of the book.

No account of the library would be complete without at least a brief reference to the Friends of the Detroit Public Library which was started in 1942. Through the vigorous efforts of its members and through gifts and bequests, it has become one of the largest and one of the most affluent organizations of its type attached to any

public library. Its accomplishments have included purchasing and presenting rare books and expensive reference books and films each year, conducting a lecture series open to the public, sponsoring exhibitions complete with well edited catalogs, providing funds for equipping the Library's Auditorium, and financing the murals on the west wall of Adam Strohm Hall. The Friends also financed the writing and the publication of the library history, referred to earlier, which closes with these words.

> And what of the future? That can be assessed from its past. As human knowledge and experience increase, so it may confidently be predicted, will the Library grow, adding new specialized collections as the need for them arises. That it will tend to become the control point of a metropolitan area library system seems almost certain. In this role, it will only be carrying on in the tradition of public service to which its founders dedicated it in 1865. . . .
>
> The history of the Detroit Public Library is more than a chronicle of the past. It is a promise of the future.

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DEWEY DECIMAL CLASSIFICATION

See also *Dewey, Melvil; Library of Congress Classification; Universal Decimal Classification*

The Dewey Decimal system was the first of the popular general subject classification schemes for libraries, and it remains, nearly a hundred years after its introduction in 1876, the most familiar, the most widely used, and the most closely attuned to a wide spectrum of user requirements.

Like all the classical schemes, the Dewey Decimal Classification is basically an arrangement of disciplines, or fields of study, with specific subjects collocated under each and repeated as required, e.g., iron from the points of view of chemistry, geology, mining, metallurgy, engineering properties, manufacturing procedures, and art work. Its sequence is based at the broadest level on Francis Bacon's chart of human learning and at the middle levels on nineteenth-century concepts, but at the most specific levels, because of its continuous development on the basis of current publication, it usually follows contemporary scientific and educational consensuses.

The Dewey Decimal system has gained widespread acceptance and usage for many reasons, probably most of all for the simplicity, ingenuity, and adaptability of its notation. The system begins by arranging all knowledge as represented by library materials within ten "classes" identified by 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, the most universally recognized of all written symbols. To class 0 are assigned "generalities," i.e., general newspapers and encyclopedias and other works dealing with many subjects from many points of view and also certain specialized disciplines that deal with knowledge generally, such as library and information science, museology, and journalism. To each of classes 1–9 is assigned a major discipline or group of related disciplines; thus to class 1 are assigned philosophy and psychology, to class 2 religion, to class 3 the social sciences, to class 4 language, to class 5 pure sciences, to class 6 the applied sciences, and to class 9 general geography and history. The notation used to designate each class consists of 100 three-digit numbers, e.g., 600–699 for the applied sciences. Each class is separated into ten subclasses or "divisions," with the first division given over to generalities on the class as a whole, e.g., 600–609 for general works on the applied sciences, 610–619 for the medical sciences, 620–629 for engineering and allied operations, 630–639 for agriculture and agricultural industries. In turn each division is separated into ten "sections," with the first devoted to generalities on the division as a whole, e.g., 630 general works on agriculture, 631 farming activities, 632 plant diseases and pests and their control, 633 production of field crops, 636 production of livestock and domestic animals. The notation permits further subdivision to any degree desired, with the addition, following any three-digit number from 000 to 999, of a decimal point and as many more digits as may be required, e.g., 631 farming, 631.3 agricultural machinery and equipment, 631.5 crop production, 631.55 harvesting, 631.58 special methods of production, 631.586 dry farming, 631.587 irrigation farming, 631.5872 irrigation by furrow system, 631.5873 irrigation by border system.

Superimposed on the decimal arrangement is a mnemonic system of repeaters, the utilization of certain digits and combinations of digits bearing again and again the same meanings, so that groups can be combined into synthetic numbers without constant enumeration of all possible variations. For example, 05, one of the "standard subdivisions," may be added to any number to mean periodicals on the subject, e.g., 605 periodicals on the applied sciences, 630.5 periodicals on agriculture, 631.05 periodicals on farming, 631.5505 periodicals on harvesting. Under numerous defined circumstances the digits 45 may be used to mean Italy, e.g., 945 history of Italy, 914.5 geography of Italy, 631.50945 crop production in Italy. Other more specialized combinations are provided with great frequency; for example, the last digit of each of the numbers 631.51 tillage in general, 631.53 plant propagation in general, 631.55 harvesting in general may be added to the number for each of various specific crops to indicate the application of each of these activities to the production of each of those crops, e.g., 633.14 production of rye, 633.141 tillage for rye, 633.143 propagation of rye, 633.145 harvesting rye, 634.713 production of blackberries, 634.7131 tillage for blackberries, 634.7133 propagation of blackberries, 634.7135 harvesting blackberries. This device, first introduced in the Dewey

system and still at its simplest therein, has been adapted and extended in most later classification schemes.

The various parts of the schedules are developed along hierarchical lines, which means that, for the most part, each successive division of a discipline or subject corresponds to a lengthening of the significant notation by one digit, e.g.,

600	Applied sciences
630	Agriculture and agricultural industries
631	Farming
631.5	Crop production
631.58	Special cultivation methods
631.587	Irrigation farming
631.5872	By furrow system

This makes it possible for the system to be used readily in both detailed and broad classification, and thus in the arrangement of both large and small, specialized and general, open-shelf and closed-shelf collections of library materials. With the advent of machine techniques, it has been found that hierarchical notation lends itself admirably to searching by computer.

Another feature that has contributed to the widespread acceptance of the Dewey Decimal Classification is its index, which, from the beginning, was considered the heart of the system. The index is full and detailed, giving not just one number per subject, but various numbers for the many aspects or points of view from which a specific subject may be treated, e.g.,

Aerodynamics	
aeronautics	629.1323
astronautics	629.4151
meteorology	551.5153
physics	533.62
Gambling	
criminology	364.172
customs	394.3
ethics	175.9
mathematics	519.1
recreation	795.01

Still another quality of the system that has contributed to its widespread acceptance, usage, and endurance is its liberality in expanding old topics and inserting new ones while maintaining as far as possible its established order. For example, even though the classification makers of the nineteenth century could not have conceived of electronic engineering, of Czechoslovakia, of fascism, or of modern biochemistry, the Dewey Decimal Classification editors of the twentieth century found it possible, without resorting to basic dislocations, to broaden headings and group topics to provide for these heretofore unknown subjects. Electronic engineering, along with such other new subjects as internal combustion engineering, nuclear

engineering, and pneumatic engineering, was combined in 621 with what was formerly known as "mechanical engineering" under the more general term "applied physics." Czechoslovakia was grouped with Germany and with various other parts of the former Austro-Hungarian Empire in area notation 43, formerly called "Germany," with the new grouping phrase "Central Europe." Fascism was appropriately provided for under both political science in 320 and economics in 330. Biochemistry was split among 574 under general biology, 581 under botany, 591 under zoology, and 612 under human physiology. On the other hand, when changed viewpoints and new knowledge required that arrangements be revised, revised they were, e.g., the Latter-Day Saints were transferred from 290 under non-Christian religions to 280 under Christian denominations, the Philippine Islands from the notation for Oceania to that for Southeast Asia, and housing for the working classes from the discipline of labor economics to that of sociology; also, the rapidly changing discipline of psychology was completely reorganized and redeveloped on its original base notation 150.

The most striking feature of the Dewey Decimal system's editorial and publishing history has been its continuing effort to meet and solve the problems of use both centrally and in the field.

The Decimal Classification was first devised in 1873 by Melvil Dewey for the Amherst College Library and was published anonymously in 1876 as *A Classification and Subject Index, for Cataloguing and Arranging the Books and Pamphlets of a Library* (1), consisting of fewer than 1,000 three-digit numbers on ten pages, equivalent to what later came to be known as the Third Summary, and of eighteen pages of index. Even within this limited scope one may see the first development of some of the sophisticated concepts later adopted by other systems, such as successive division of a subject by two or more principles. For example, comparative philology was classed in 410, with specific topics in 411–418, e.g., 415 comparative grammar. Following this in 420–490 were classed specific languages, each with provision for the same specific topics in mnemonic notation, e.g., 420 English philology, 425 English grammar. The concept of facet analysis was formalized, regularized, and named by other classification makers at a later time, but Dewey invented it.

Nine years later, in 1885, the second edition appeared with the title used thereafter for twelve more editions and destined to become familiar to countless librarians, *Decimal Classification and Relativ Index*, by Melvil Dewey (2). This edition was "greatly enlarged" with 12 pages of summaries, 178 pages of "sub-sections" or schedules, and 80 pages of index. It included three auxiliary tables on four pages, and introduced thousands of numbers of four and five digits and a good many of six digits—e.g., 264.033 Anglican litany, 271.973 Franciscan sisterhoods, 349.372 Justinian sources of Roman law, 628.253 manholes—and in the 800s many of seven digits, e.g., 839.8364 Hans Christian Andersen. It introduced definitions, cross references, the standard subdivisions such as 05 for periodicals with instructions that they could be used under any number, and many of the other familiar features characterizing the most recent editions, including the "divide-like" or

traditional number-building note, by application of which the classifier could devise numbers of as many as nine digits, e.g., 581.974796 flora of Erie County, New York. The feature of division by more than one principle was extended in a few fields, e.g., 328.4–328.9 legislative bodies of special countries, with 1 journals through 9 history under each country.

As compared with its predecessor, the second edition contained not only many expansions but also numerous changes: parts of topics were transferred in fifteen cases from one number to another, e.g., the "mining" of "hydraulic and mining" engineering from 628 to 622; 129 topics were transferred entirely from one number to another, e.g., "ornamental botany" from 583 to 716; 192 headings were revised and enlarged, e.g., 629 from "instruments and field books" to "other branches of engineering." But, said Dewey in the introduction (2, p. 46):

> Librarians making the necessary changes for the revised edition need not fear that a series of editions hav begun each of which will call for such changes. The changes here submitted ar the accumulation of twelve years' experience in using the system. They hav all been very carefully considered, and while the first edition was in its nature tentativ, this one may be considered as having the numbers settled after sufficient trial and not likely to be again altered, tho of course certain subjects not yet subdivided will in due time hav subdivisions added.

During the next 57 years, twelve more editions appeared, at intervals varying from 2 to 12 years. These were prepared by Dewey himself, by his associates W. R. Biscoe, May Seymour, and Dorcas Fellows, and by C. J. Mazney and Myron W. Getchell. These editions, the third through the fourteenth, followed closely the pattern set by the second edition. The schedules grew to 1,046 pages, the index to 737 pages, and the auxiliary tables to 17 pages. The thirteenth edition (3) included a fifty-five-page alternative scheme for psychology based on 159.9, and the fourteenth (4) a thirty-five-page alternative scheme for taxonomic botany based on 582. Numbers grew longer as new subjects were inserted and older ones subdivided, some numbers being printed in the schedules in twelve and thirteen digits, mostly in the engineering sections, where knowledge accrued and diversified at a rate quite unforeseen by the young Dewey. The standard subdivisions grew to as many as six digits, with opportunities for building them up to nine or ten digits, the whole applicable to base numbers of up to twelve or thirteen digits; thus full notations of twenty-three digits were possible. The "divide-like" feature was widely used, though the feature of division by more than one principle was extended very little beyond the level allowed in the second edition. Expansions were frequently uneven, e.g., in the fourteenth edition, under 670 manufactures, the classifier could find 671 metals, 672 iron and steel, 673 other metals, 674 wood, 675 leather and fur, 676 paper, 678 rubber, and 679 miscellaneous each with no decimal subdivision whatever, yet 677 textiles had well over a hundred printed out plus—one of the few new instances of successive division—the opportunity to add nearly six hundred more by the simple expedient of dividing each kind of textile fiber by each kind of process.

Honoring Dewey's pledge in the second edition that the numbers were "settled,"

later editions through the fourteenth made very few changes or relocations—not more than one or two per edition. (A relocation is an adjustment that results in the shifting of a topic from one number to another differing in respects other than length.)

Few efforts were made to improve format, modernize terminology, or clarify instructions, except where actual expansions and new entries were inserted. For this reason, the fourteenth edition used language almost as archaic as that of the second edition.

Then, in 1951, the fifteenth or "standard" edition appeared under the editorship of Milton J. Ferguson (5). This was the culmination of a long-time hope on the part of users that "Dewey" could be modernized, standardized, evenly developed. The degree of expansion was leveled off, e.g., the numbers 671–679 had from 2 to 29 subdivisions each, depending on libraries' needs; terminology was made modern; definitions were full; and instructions explicit. Number-building procedures were extended, one of the noteworthy examples being the division of 673 nonferrous metals manufactures first by kind of metal like 669 metallurgy, and then by procedure like 671 metal manufactures in general. There were numerous much-needed new expansions, e.g., under manufactures, under Judaism, under sociology; but, at the same time, there were so many reductions to achieve the standard size aimed at for use with collections of up to 200,000 volumes, that in many parts of the schedules the hierarchical pattern of subject matter and notation was lost from view, e.g.,

942	[History of] England
.1	London
.34	Channel Islands
.89	Isle of Man
.9	Wales

There was, in fact, a diminution of schedule entries from 31,364 in the fourteenth to 4,688 in the fifteenth edition. In response to complaints that continued adherence to the Dewey promise of no change was making the system less and less satisfactory in use, the editors introduced approximately one thousand relocations.

Users found the index, which had been prepared by a professional indexer, quite unsatisfactory, and so a revision of the fifteenth edition, incorporating a new index and a few minor changes, was published in 1952 under the editorship of Godfrey Dewey. son of Melvil Dewey. The new index was also made available separately. This was the first edition to be designated on its title page, *Dewey Decimal Classification & Relative Index* (6).

The sixteenth edition, 1958 (7), the first to be edited under the direction of the Library of Congress and the first to be published as a two-volume set (schedules and index, respectively), showed reaction in many important ways from the fifteenth edition. which had not been well received by many users. Although it did not return in degree of fullness of schedule entries to the level of the fourteenth which in many sections was more detailed than practical library requirements called for, e.g., 022.965 door mats [for libraries], it did fully restore the hierarchical pattern, and it

retained and developed further most of the new expansions of the fifteenth; it, too, was a standard edition but for a much larger library collection than 200,000 volumes. The amount of detail was based on the principle that it should be sufficient "to make specific provision for topics of interest and importance to libraries" (8). The sixteenth edition had, in fact, 17,928 schedule entries, but, because it made much more use of the number-building features of the system (including division by more than one principle) than had the fourteenth, it probably provided more practically usable class numbers than any earlier edition. On relocations it took a middle ground between its two immediate predecessors. Although it acknowledged that the system could not indefinitely remain viable if it failed to recognize new knowledge, new points of view, and new interrelationships, yet it yielded to the complaints of established libraries that many of the fifteenth edition's relocations were costly and unnecessary; consequently, it restored 528 of them to their fourteenth-edition positions. On the other hand, it initiated many new ones, so that its total relocation count, from both fourteenth and fifteenth editions, was 1,603. In terminology, the sixteenth edition was thoroughly modern; its instructions and classification aids were full and precise—in fact, it was near to being overloaded with enumerations of included topics, i.e., topics without sufficient importance or literature to merit their own numbers and therefore recommended to be classed with the more inclusive subjects of which they formed parts; its format was pleasing.

Although it enjoyed all these good qualities, the sixteenth edition tried so hard to fulfill the expressed needs of established libraries that had a strong economic interest in maintaining stability of the system that, like many of its predecessors, it failed to be consistent or truly hierarchical; in fact, it suffered from a lack of predictability and of principle. For example, under 371 teaching and school organization and administration, it advised classifiers that here were to be classed comprehensive works on these subjects at all levels, but that the subjects when dealt with from a particular level were to be classed with that level, e.g., 373 secondary level; then it proceeded under certain subdivisions of 371 to make specific provision for specific topics at secondary level, e.g., 371.213 admission to secondary school, 371.857 high school Greek-letter societies. It misplaced conservation of wildlife in 799 as a subdivision of hunting, under recreation. It provided that virtually any subject as it applies to the American Indian be classed in one of two spans, either under history of North America or under that of South America, e.g., North American Indian pottery in 970.67383, but pottery of any other origin or style, including other primitive races, in 738.3.

The seventeenth edition, which was published in 1965 (9), continued and advanced the many good features of the sixteenth, but reacted vigorously to its inconsistency and failure to be fully hierarchical, and, in so doing, displayed some faults of its own, as well as some excellent new qualities. It showed a small reduction in schedule entries to 17,132; virtually all the reduction came in the history schedules, which were no longer used as the primary basis for geographical division of any subject but were replaced by a 5,110-entry "Area Table." However, where the sixteenth edition provided 842 "divide-like" instruction notes, the seventeenth pro-

vided 2,651, thus increasing enormously the possibilities for expansion through number building. Recommendations for dividing in turn by more than one principle were greatly extended. Notations for specific books grew much longer, not so much by explicit provision as because of the opportunities for synthesizing numbers. Relocations decreased to 746, but their effect was perhaps greater than in the sixteenth because some of them affected quite large classes of material in libraries. The lengthy enumerations of topics were greatly reduced in number.

The best received and most obvious new feature was the Area Table, which had been introduced so that, for geographic concepts at least, numbers could be built by the simple process of adding digits instead of by the complex one, often confusing to classifiers, of "dividing."

However, the most important new feature was the emphasis on consistency, predictability, and the principle of hierarchy, which assumes that what is true of a whole is true of its parts and, therefore, that what is said once at the point of widest applicability governs equally all subdivisions of the heading where it is stated. This emphasis resulted in the elimination of much repetitive matter, the relocation of many topics still misplaced (e.g., flower arrangement from 635.9, a branch of technology, to 745.9, among the minor arts), and the provision of instructions on which feature to class by in those cases where cross-classification was expected to be a factor. Instead of trying, as the sixteenth had, to anticipate and enumerate all the subjects on which books might be written, the seventeenth edition established principles that would enable a classifier to place a book correctly, if not precisely, without awaiting a ruling from the editors.

There was also a newly conceived index. Previous indexes had contained entries chiefly for those topics that were named in the schedules, plus significant synonyms and subtopics, but had supplied numbers only for those aspects where the topics were named, making no effort to guide the classifier to the vast hidden resources of the system; for example, the sixteenth edition index indicated that digestive organs of animals were classed in 591.43, but made no reference to the instruction at 591 that indicated that all topics in subdivisions of 591 when applied to specific animals or groups of animals should be classed in the taxonomic numbers 592–599. The new seventeenth index provided full information for only a limited number of broad core concepts, referred to these from more specific topics, and made many "scatter" references to remind the classifier of other aspects, e.g., under digestive tract, "see also specific animals." This procedure called attention to many possibilities often previously overlooked, but frequently it did not supply a precise number that could be used without close scrutiny of the schedules. Because of the scarcity of exact numbers this index proved to be difficult and time consuming to use, and was replaced in 1967 by a conventional index (10).

As we have seen, the system's expansive hierarchical notation makes it adaptable to both detailed and broad classification. Any notation may be cut by as many digits as are desired, down to a minimum of three, each successively shorter number being less specific but equally correct. For example, works on irrigation farming by furrow system are equally correctly classed, but successively less specifically pro-

vided for, in 631.5872, 631.587, 631.58, 631.5, 631, 630, 600. While the full editions could be used by libraries of any size and requiring any degree of specificity, nine abridged editions, appearing from 1894 to 1965, supplied reduction on a ready-made basis for the special benefit of small libraries and untrained librarians (*11,12*). The fourth through the ninth abridged editions were based on the twelfth through the seventeenth unabridged editions, respectively, although the seventh abridged anticipated some of the new features of the sixteenth unabridged. Size ranged from 192 to 594 pages; however, earlier editions spelled out all provisions in detail without number-building instructions and, in fact, it was only in the seventh abridged edition, 1953, that the classifier was instructed to divide 914–919 like 940–999 instead of being presented with a list of countries and states with their individual geography and travel numbers.

Dewey's classification never lacked for users or champions. Though often criticized, it was adopted by libraries rapidly and widely, first at home and then abroad, until it could almost be said that to the layman "Dewey Decimal Classification" was synonymous with "library economy" or at least with "cataloging." The initial popularity was due, as we have seen, to a number of important qualities of the scheme, but to these must be added Dewey's own skills as a promoter. Except for the Expansive Classification of Charles A. Cutter, who did not live to bring his system to its full expansion and did not make arrangements for its continuation and development, Dewey's classification had no serious competition for half a century: the Library of Congress Classification was developed on a largely pragmatic basis for a specific collection, Brown's Subject Classification was adopted only in the United Kingdom, and not very widely there, and the Universal Decimal Classification was but a detailed expansion of Dewey with the United States emphasis removed. If Dewey's Decimal Classification had a head start on these, it had even more of an advantage over such more recent and more sophisticated schemes as Bliss's Bibliographic and Ranganathan's Colon Classifications. Only after World War II, with the rise of information science on the one hand and the demand for broader centralized service by the Library of Congress on the other, did other systems come into their own as serious rivals. As recently as 1954 the Dewey Decimal Classification was used by 85% of college and university libraries and 98% of public libraries in the United States. It remains the basic scheme taught in beginning courses in library schools. It is used in countless bibliographies. Even though many college and university libraries in North America, and a few public libraries, abandoned it in the 1960s for the Library of Congress system (some of the reasons for this are described in several of the sections that follow), its sales continued to grow and its use to widen, as shown in the following tabulation:

First through eleventh editions	500-7,600 copies each
Twelfth	9.750
Thirteenth	9,340
Fourteenth	15.632
Fifteenth (and fifteenth revised)	22,245
Sixteenth	31,011
Seventeenth	37,139

Abridged editions have sold approximately twice as many copies as their respective unabridged parents.

Use was so substantial even by 1901 that in that year the American Library Association's Catalog Section voted unanimously that Decimal Classification numbers should appear on the recently initiated Library of Congress printed catalog cards, and this request was repeated with increasing urgency until 1930, when an office was established in the Library of Congress for the purpose of assigning Dewey numbers to titles cataloged by the library; this office, which was operated as a part of the American Library Association until 1933, when it was taken over by the Library of Congress itself, was directed in its early days by David J. Haykin, who in 1954 became the first editor of the sixteenth edition. Bibliographical services that later followed the Library of Congress in providing central application of Decimal Classification to specific titles included the H. W. Wilson Company's catalog cards and *Standard Catalogs*, the American Library Association's *Booklist*, the R. R. Bowker Company's *Publishers' Weekly* and *American Book Publishing Record*, and the British National Bibliography's catalog cards and bibliographies. One of the reasons why numerous libraries discontinued the use of Dewey in the 1960s was that over a period of many years the percentage of new Library of Congress titles covered by Decimal Classification had dwindled, until 1966 when a reverse trend set in that in 3 years raised the Decimal Classification's annual coverage from 21,000 to 71,000 titles. It is difficult to overestimate the importance of centralized application in promoting the acceptance of the system, and in providing a basis for its realistic expansion to meet the requirements for classifying actual books and pamphlets and not just pieces of knowledge on which little or no publication exists.

Such a simple and ingenious notation system as the Decimal Classification enjoys is highly adaptable and, far more than any other system, Dewey has been subjected to very many unofficial shifts and grafts of its numbers in order to achieve real or fancied advantages. Among the real advantages have been the preempting of short notations, officially assigned to American, Anglo-Saxon, or Western cultural topics such as language, literature, religion, and public administration, and instead using them for topics favored in other cultural situations. Unfortunately, this notation, the Decimal Classification's great strength, has also been its great weakness: the temptation to play with it becomes nearly irresistible, and many libraries that have not resisted have later found themselves blocked off from taking proper advantage of the central services and so have chosen to throw out both baby and bath water by giving up the Decimal Classification altogether. This was another of the reasons for the shift to the Library of Congress system in the 1960s by some.

One notable feature of the distribution picture is the continually growing foreign market: one-fourth of the sixteenth edition sales went abroad, to over 100 countries, as did one-third of the seventeenth. It is a remarkable tribute to the Dewey Decimal Classification's vitality and its responsiveness and adaptability to users' needs that, oriented as it traditionally is toward the United States and the West, it is yet the classification of choice in so many other contexts. It is used widely in nearly all the present and former British Commonwealth nations, Spanish America, Norway, Italy, Greece, Israel, the Arab countries, the Far East, and Southeast Asia. It has

been translated with or without abridgment, expansion, and adaptation and with or without official authorization into scores of languages as diverse as Chinese, Hebrew, Spanish, Thai, Turkish, and Welsh. The Nippon Decimal Classification faithfully follows Dewey's notational devices but rearranges the basic order of classes.

Authorized and unauthorized guides have been issued, as have mini-abridgments such as the *Introduction to Dewey Decimal Classification for British Schools* (*13*), homemade expansions, and "improvements" to meet all kinds of special needs. The most notable and by far the most widely used of all the adaptations was Paul Otlet and Henri La Fontaine's Classification Décimale, now grown into the UDC or Universal Decimal Classification.

Awareness on the part of the publishers and the editors that a substantial portion of the foreign market was dissatisfied with the traditional pragmatism of the Dewey system, and that a still more substantial portion was dissatisfied with the United States and Western emphasis, led to a field survey on the use of the Dewey Decimal Classification abroad, mainly in the Far and Middle East and in Africa, conducted for the American Library Association in 1964 by Sarah K. Vann and Pauline A. Seely. Even the sixteenth edition offered some optional provisions for relief of libraries wishing to emphasize and give shorter notations to favored languages, literatures, religions, and the like; the seventeenth, which though published in 1965 was textually almost complete by the time of the survey, offered many more; and the eighteenth is expected to offer still more.

Meantime, the library service of the Pan American Union, secretariat of the Organization of American States, maintained close liaison with the library use of the Dewey Decimal Classification in Latin America, and the (British) Library Association conducted a questionnaire survey of its use in the United Kingdom. And plans were projected for a comprehensive survey of North American use.

In the Preface to the first edition Dewey said, "The system was devised for cataloguing and indexing purposes, but it was found on trial to be equally valuable for numbering and arranging books and pamphlets on the shelves" (*1*, p. 3). The titles of early editions reflect this fact. The first edition, as we have seen, was called a classification and subject index "for cataloguing and arranging" books and pamphlets. The second edition's subtitle stated that the classification was "for arranging, cataloging and indexing," that of the third "for arranging and cataloging," and that of the fourth simply "for libraries, clippings, notes, etc." The victory in North America of the dictionary over the classed catalog ordained that as succeeding editions appeared the emphasis should be less and less on cataloging and more and more on arranging. In fact, it was understood in the early part of the twentieth century that the Universal Decimal Classification was the bibliographic version and the Dewey Decimal Classification the library shelving version of what was fundamentally the same system. Developments of later years led the Universal Decimal Classification to offer itself in competition with the Dewey Decimal Classification at the library shelving level, while the continually growing foreign use of Dewey, including use in classified catalogs, and the constant pressure from many foreign users for development of Dewey along the more modern and more sophisti-

cated lines of detailed subject analysis, contributed to the move of the Dewey Decimal Classification in its seventeenth edition toward wider application of theoretical principles and the provision for closer classification following specified citation orders.

Even while widely accepted, the system never lacked critics. Early objections were based on the premise that 1,000 heads were more than a library could ever need. Among somewhat later objects of attack were the limitations of the decimal system and its "Procrustean bed" of ten, and the "unnatural" sequence that separated economics from commerce, political science from public administration, linguistics from belles lettres, social sciences from history. In the 1950s and 1960s the attacks were based mainly on the relocations, the excessive detail and overlong numbers, and the insufficiently helpful indexes of the fifteenth and seventeenth editions; these were more of the reasons why some libraries abandoned Dewey.

The disapproval of as many as 1,000 entries was, of course, short-lived, and the Procrustean-bed controversy eventually died down except that the limitation to ten digits was a partial cause of long numbers. In the age of large and departmentalized libraries the requirement of a logical sequence among the main classes, if, indeed, there can be consensus on such a sequence, came to be of little significance.

However, relocations were another matter. Always the system was fought over by the established libraries that had an economic interest in maintaining the "integrity of numbers," and the service-oriented personnel who believed that an obsolete system could not long survive and that the Decimal Classification should "keep pace with knowledge." After 66 years of nearly complete stability the fifteenth edition, as we have seen, sided with the progressives, for which attitude it was criticized more than it was praised. The sixteenth suffered from ambivalence, restoring some relocations of the fifteenth but retaining others and initiating many new ones. The seventeenth went unabashedly progressive; in it the editors stated that a reasonable amount of continuing relocation was not only desirable but inevitable (9, p. 46). However, they later announced that, together with the approximately 375 relocations anticipated for the eighteenth edition, the relocations in the fifteenth through seventeenth editions had fairly well caught up with the explosive growth of and the unprecedented changes in knowledge that had occurred between Dewey's pledge of 1885 and the year 1969, so that beginning with the nineteenth edition only current growth and changes would have to be recognized by relocations. There was also the promise of the computer, which, properly used, could make updating of the system and reclassification of books both economical and speedy.

As knowledge grew and publications became more and more specialized, as foreign demands for a Decimal Classification that could cope with subject analysis became more insistent, and as the schedules became inevitably more detailed, numbers did, indeed, become longer, not so much in the schedules, except in a few sections such as electronic and aeronautical engineering, but more in the increasing application of number-building instructions. Some numbers assigned by the Library of Congress reached out into the range of fifteen and more digits. Admittedly many—even most—libraries did not require such detail; the editors pointed out

repeatedly that any number could be cut to any degree desired if not less than three digits, and that it was more desirable for libraries not needing full detail to cut centrally supplied long numbers than for libraries needing full detail to add their own extensions to truncated numbers supplied centrally or to make up their own extensions where the schedules made inadequate provision. The objection to this argument was that, under increasing work loads, libraries wanted to transfer numbers mechanically and without alteration from Library of Congress cards and tapes and could not afford professional time to make judicious cuts. Thereupon, in 1967, numbers on Library of Congress cards began to be printed in such a fashion as to show where reasonable cuts might be made, and beginning in 1969 the Library of Congress tapes made it possible to make the cuts mechanically. It was also recognized that one result of the proposed survey of North American use might be the discovery that too few libraries required long numbers to justify their continuation, and that there might therefore be a definite reduction in the nineteenth edition schedules or at least in the fullness of Library of Congress application of them. A reduction in the schedules would imply making other arrangements for meeting foreign requirements and the requirements of subject analysis and retrieval, but a reduction merely in the fullness of centralized application would not so gravely affect Decimal Classification use for meeting such requirements.

As we have seen, wide discontent expressed over their indexes was followed by the preparation of revised indexes for the fifteenth (6) and the seventeenth (10) editions. Plans for the eighteenth edition included an enlarged index with all the traditional virtues plus a multiplicity of guides to hidden resources, therefore combining the good features and eliminating as far as possible the deficiencies of the two seventeenth-edition indexes.

It may be seen from this brief summary of complaints and editorial responses that the Decimal Classification is user-oriented, but that its chief unsolved problem at the close of the 1960s is how to take full advantage of its flexibility in order to serve a wide diversity of needs, from the elementary-school library of less than 1,000 volumes in rural areas of the United States to the newly sprouting public libraries of South America and Africa to the great public and university collections of industrial North America to the subject analysis requirements of the theoreticians in the United Kingdom and India. Can one system, however versatile, be all things to all groups? For a time it appeared that one group which the Dewey Decimal Classification could leave out of its calculations was United States colleges and universities, many of which were riding the "bandwagon of the sixties" by converting to the Library of Congress system; however, by the end of the decade the swing seemed to have lost its impetus, as great universities such as Illinois (14) and smaller ones such as Bowling Green State (15) looked hard at the problems and costs of conversion, decided to stay with Dewey, and published their reasons. Dewey, therefore, still serves the full spectrum, and must find ways to continue to do so with maximum satisfaction, or at least minimum dissatisfaction, to each group.

The Dewey Decimal Classification remained under the immediate supervision of Melvil Dewey and his associates until 1924, when copyright control was given to the

Lake Placid Club Education Foundation, "on absolute condition that entire reciets abuv necesary expenses be uzed forever solely for improving D C and extending its usefulness, thereby preventing posibility that the work shud ever be made a source of either individual or institution profit" (9, p. 108). The Foundation created Forest Press, Inc., as its agent for the development and distribution of the classification, and the twelfth through fifteenth editions were prepared by editors and staff employed by the press, even though Dewey himself kept in touch until his death in 1931. Committees on the Decimal Classification were established to maintain liaison with the library profession; the current one is known as the Decimal Classification Editorial Policy Committee and consists entirely of librarians, many of them representing the American Library Association.

After the fiasco of the fifteenth edition, which was unsatisfactory to most large libraries and to all theoreticians, in 1954 the Forest Press and the Library of Congress entered into an agreement, for which the American Library Association was the catalytic agent, whereby the press would pay funds to the library and library personnel would edit the sixteenth full edition and the eighth abridged edition. Subsequently the agreement was renewed, and the library undertook to edit the seventeenth full, the ninth abridged, the eighteenth full, and the tenth abridged editions. All these were prepared in the public spotlight (as was the fifteenth) and given the Library of Congress's best efforts. Meantime the press, with additional funds from other sources, supported a survey of foreign use, projected a survey of North American use, and began to reorganize its own operations with a librarian, Richard B. Sealock, in charge, so as to be more flexibly responsive to the requirements of the worldwide multiplicity of users.

No account of the Dewey Decimal Classification can be complete without reference to its key significance in the development of American and world librarianship. For the first time it made it possible for any library to enjoy the benefits of a classified book collection without devising and maintaining its own system. Consequently it enjoyed widespread adoption, as a result of which centralized application was undertaken. All these factors contributed to the general development of the open-access principle, which is perhaps America's greatest, certainly her most typical, contribution to librarianship and the historic democratization of libraries.

Praised and damned, once the subject of an "epitaph" (*16*), the Dewey Decimal Classification continues to be the world's most widely known and used subject classification.

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BENJAMIN A. CUSTER

DEWEY, MELVIL

On his eightieth birthday Melvil Dewey was at the Florida branch of the Lake Placid Club. He marked the occasion by writing a letter "to a fu personal frends" in which he reminisced about the movements he and his colleagues had led. Among them he considered five most prominent: the three associations founded in 1876, the professional journals started, the creation of the Decimal Classification, the establishment of the Library Bureau, and the development of the Lake Placid Club. This letter provided a final summary of statements made many times in his life, differing from others only in the fact that usually the establishment of the

FIGURE 1. *Melvil Dewey, 1851–1931.*

first library school was included. The omission this time was rectified in the two-page postscript to the letter which described the events of December 10th and in which he mentioned with pride the Columbia announcement that thereafter the school would annually observe the date as Founder's Day (*1*).

As a boy Dewey had considered becoming a foreign missionary, but before his college days were over he had definitely decided that his earlier interest in education was more suited to his aims. His ideas on education developed rapidly. In his view education was divided into two parts: formal education from kindergarten through college, and home education which continued through life. For both, the library had to play an important role. To realize his idea of a modern library making this contribution, Dewey had a growing conviction that four agencies were needed: a national association for promoting library interests; a journal to record proceedings, reports, and plans; a means of testing, experimenting, and cooperating on supplies, methods, equipment, and standards; and a school for training librarians (*2*). He dated the inception of the modern library movement as 1876.

The young man who was dedicating his life to the development of libraries as a major part of the educational structure was born on December 10, 1851, in Adams Center, near Watertown, New York, and was named Melville Louis Kossuth Dewey. As may be seen, simplified spelling shortened the first name and for a time the last, which became Dui, while the second and third given names were dropped. Eventually he was persuaded to restore the original spelling of his last name.

In Adams Center Dewey's father, Joel, made boots and shoes and ran a general store where Melvil helped after school and during the periods between the very short terms of the local school. A diary, started on his fifteenth birthday, recorded his activities: regular attendance at church and Sunday School and at a lodge of Good Templars aimed at temperance reform, with frequent exchange of overnight visits with boys from his school and lodge. The diary has entries about fishing, hunting, sleigh rides, skating, and family chores, with many comments on study both during and between school terms. College must have been in mind as he reviewed arithmetic and then algebra, turned to Latin, and reported reading such classics as Scott's *Lady of the Lake* and Macaulay's *History of England*. His resourcefulness was shown in the record of making a pair of boots for himself, taking inventory in the store, and in closing out the tobacco department of the store, in keeping with his lifelong abhorrence of tobacco and alcohol.

At the age of seventeen he took the examinations, received a third grade teacher's certificate, and did teach briefly. When his father sold the store and moved his family to Oneida, Melvil attended Oneida Seminary and then for a short time Alfred University to prepare for college.

In 1870 Melvil Dewey entered Amherst College and was graduated in 1874 but remained until April 1876. The college years seem to have been fairly routine. He kept largely clear of social affairs, attended programs of college events, but was rarely a participant. He joined Delta Kappa Epsilon fraternity and remained a loyal member and belonged to the Antivenenean Society, members of which vowed abstention from intoxicating drinks, opium, and tobacco.

It was here that he dedicated himself to every form of labor and timesaving devices and became so interested in takigraphy (shorthand) that he used it for his diary, accounts, notes, and speeches and taught it without pay to Amherst students. Even at this time he displayed a passion for abbreviations and simpler spelling.

He had more women friends than men but here the lifelong association and friendship with Walter S. Biscoe began. There were the usual rounds of study with frequent evenings of talks and occasional music or lectures. Dewey's favorite exercise seems to have been riding, and he was repeatedly found making arrangements for the exercise and care of his horse while he was away (*3*).

At the beginning of his junior year Dewey began work in the Amherst College library and stayed on after his graduation in 1874 as assistant and then acting librarian. As soon as he started work in the library, he noted with concern the

need for a better form of organization, one that would preclude the constant change and shifting that the methods then employed required. He determined to study as many libraries as possible and managed a series of visits to over fifty libraries in New York and New England. In his diary and in later statements he confessed that he was appalled at the lack of efficiency and the waste of time and money in duplication of work and in constant reclassification. He decided that a system of classification must be found that would be simple to use, that could be applied universally, and that would not have to be changed constantly. He said that the solution came to him one Sunday in church during a lengthy sermon. "It was to get absolute simplicity by using the simplest known symbols, the Arabic numerals as decimals with the ordinary significance of nought, to number a classification of all knowledge" (4).

As explained in every brochure and in introductions to the classification, the basic plan was to analyze and assign into decimal (ten) classes the whole of recorded human knowledge and to assemble the diversified aspects of any subject in an alphabetical Relativ Index.

By May 1873, in three brief memoranda (5), Dewey had laid his scheme of classification before the Amherst Library Committee and received permission to use it in the Amherst library. The first edition of forty-four pages was published in 1876 and Dewey contributed a chapter on the scheme to the publication of the U.S. Bureau of Education, Public Libraries in the United States (6). Here he gave credit to the Amherst professors for help in their respective subject fields and to others who had offered suggestions and criticisms, particularly Charles Ammi Cutter of the Boston Athenaeum Library and John Fiske of the Harvard Library.

Dewey left Amherst in April 1876 and established himself in Boston. Almost without funds, he nevertheless visited libraries, talked classification, and became involved in tentative plans for a library journal and an association of librarians, two of the four agencies he deemed necessary to carry forward progress in libraries. Dewey certainly was responsible for founding the Library Bureau and the library school and he often stated that he founded the asssociation and the journal. His contributions were truly great, and it was often said that but for the energetic secretary the Philadelphia conference might not have taken place and the association might have perished, but credit belongs to others as well (7).

In New York Frederick P. Leypoldt had started the Weekly Trade Circular which became the Publishers' Weekly. A feature of the second was a department of library notes. When Dewey learned in the spring of 1876 that this department might become a separate library periodical, he immediately informed Leypoldt and his associate, R. R. Bowker, that he had already proposed a library periodical to a Boston publisher. A conference of the three men in New York brought agreement to work together on the periodical with Dewey in Boston as managing editor while in New York Leypoldt was publisher and Bowker general editor. At the same meeting they discussed the possibility of calling a library conference to be held in Philadelphia in the summer during the Centennial Exposition

in that city. Actually, the suggestion for a conference had been made by others to the Commissioner of Education, but the solicitation of support, the appointment of a committee of arrangements, and the labor of bringing the plan to fruition were largely in the hands of Dewey.

The meeting of librarians in Philadelphia on October 4, 5, and 6 of 1876 resulted on the final day in the founding of the American Library Association with Justin Winsor as president and Melvil Dewey as secretary, a post he held without pay for 14 years until he became president in 1890.

During the summer of 1876 Dewey attended two other conferences in Philadelphia on subjects of great interest to him, spelling reform and the metric system. He became secretary of both the Spelling Reform Association and the American Metric Bureau.

Back in Boston, Dewey busied himself with editing the *American Library Journal* and with his unpaid secretaryships of the three associations. He was active, of course, in preparations for the 1877 ALA meeting in New York and in arrangements for twenty-two members to attend the conference of librarians in London which created the Library Association of the United Kingdom. When the association adopted for a time the *American Library Journal* as its official journal, the "American" in the title was dropped.

For 2 years, 1877–1879, Dewey maintained in his office the work of the ALA Supplies Committee, making an effort to test library supplies and equipment and in 1879, with C. A. Cutter and six others, organized the Readers and Writers Economy Company "to focalize and distribute the results of experiment and experience." At first the company was under Dewey management but when another element gained control, Dewey resigned in October 1880. Early in 1881 he bought out the Library Supply Department of the firm which closed in 1882. Then he established the Library Bureau, now a department of Remington Rand, and was president for 25 years (*8*).

The business failed in 1888 with Dewey as the chief creditor, but it was reorganized and placed in the hands of two trusted associates, H. E. Davidson and W. E. Parker. For many years the constant withdrawal by Dewey of money needed in the business caused strife with Davidson and Parker who frequently had to assume the bills. In spite of the president's inattention to requests and postponement of decisions, the business prospered, built factories for manufacture of library and business equipment, and established sales offices here and abroad. Dewey had considerable financial interest when he eventually sold his stock to put the money into development of the Lake Placid enterprise.

One of the ladies who attended the library conference in Philadelphia was Annie R. Godfrey, the young librarian of Wellesley College. She had attended Vassar College through the junior year before accepting the Wellesley post. Dewey's diary of April 18, 1876, recorded their chance meeting at Harvard that day where she had listened, along with the Harvard library assistants, to a talk by Dewey on the classification scheme he had devised. Her deep interest and her desire to carry on the Wellesley work successfully sent Annie Godfrey to the Philadelphia

meeting and also to the meeting in London in 1877. Her marriage to Dewey took place on October 19. 1878. Their only child. Godfrey, was born on September 3, 1887, while Dewey was librarian at Columbia College.

It was Columbia University (then Columbia College) which gave Melvil Dewey the opportunity to test his library theories, to display his organizing ability, and later to establish the school which he deemed necessary for library progress (9).

A new library building was under construction in 1883 and as it neared completion the forward-looking Library Committee of the Trustees recognized the need for a librarian with fresh ideas to unite the scattered collections of the college and to organize them to serve the college programs. The eminent Professor John Burgess of Columbia had known Dewey and his library work at Amherst and President Frederick A. P. Barnard had contacted Dewey at conferences on the metric system. Both men suggested Dewey for the library position, and urged him to apply and to have letters of recommendation sent to the committee. On April 18, 1883, Dewey appeared at a special meeting of the Trustees' Committee on the Library and presented his ideas on the organization and management of a college library and a proposal for a school for training librarians. So impressed were the members of the committee with Dewey's presentation that they assured him of their support and their proposal to recommend his appointment to the Board of Trustees (10). That body, on May 7, passed the resolution appointing Melvil Dewey Librarian in Chief for 3 years at a salary of $3,500 a year and referred the question of a library school to a special committee of seven trustees.

On June 4, 1883, the trustees authorized the employment of a list of persons submitted by Dewey including the "Wellesley Half Dozen," the six Wellesley graduates selected with the help of Alice Freeman, President of Wellesley College (11).

It was not until May 5, 1884, that the special committee on training for librarianship offered to the trustees resolutions favoring establishment of a school under the control of the Library Committee and under the general direction of the chief librarian who would have the title of Professor of Library Economy. Some very definite conditions were imposed, however. The school should involve no expense to the corporation, instruction was to be given by members of the library staff in addition to their regular duties, and the school must operate in the library building. A moderate tuition fee could be charged, proceeds from which could be applied to any necessary expense. The school finally opened on January 1, 1887, with twenty students, more than twice the number originally planned for. The increased enrollment made it necessary to clear out the hall of the old library above the chapel, connected to the new building for storage purposes. It was here that the first class of the School of Library Economy opened (12).

Fortunately Dewey's appointment as librarian came in time to allow him to make some practical adaptations of the new building to more efficient library administration. It is possible to give only a few details. The new building allowed the collections from a number of separate libraries to be brought together under central control. All of these had to be sorted, weeded, classified, and cataloged, and for the first time access was possible by author, title, and subject. When

brought together and classified the collection showed serious gaps which called for new acquisitions selected with the cooperation of faculty and other libraries in the area. Naturally the decimal classification was used and two new editions (13) appeared during the Columbia period, both edited by Walter S. Biscoe who had come from Amherst to work with Dewey.

Descriptions of the building and the services offered appeared in the college handbook, in the librarian's annual report, and in various other places. Details were given about means of communication; precautions for quiet; the system of electric bells, annunciators, and speaking tubes; book lifts; room and shelf labels; and shelf steps and handles (14).

Space problems immediately presented themselves. Dewey did what he could, but no workrooms had been provided, necessitating use of alcoves in the main reading room for cataloging, sacrificing space needed for books and readers, and subjecting the staff to frequent interruptions by library users.

Dewey's contributions to classification and his laborsaving devices and fondness for what some called "jimcraks" are well known but he is seldom given credit for his ideas on library service. He believed that the Columbia library, even though its prime consideration had to be the college, should be an important factor in the intellectual life of the city. Therefore, in every way he publicized the long hours of opening, including vacation periods, holidays, and evenings, and invited use by the townspeople, ladies as well as men. He made the library a center for meetings of such groups as the New York Library Club, the National Sunday School Library Union, and the Children's Library Association. Examples of his belief in cooperation are the work done by the library staff on a union list of periodicals currently received in the New York and Brooklyn public libraries, published under the auspices of the New York Library Club, and the early suggestions he made when setting down book selection policies of the possibility of agreements with other city libraries on subject fields to be emphasized by each.

In the college library about 30,000 volumes were accessible to all on the shelves of the large reading rooms. Assigned to service desks were two subject specialists, George Hall Baker in charge of the social sciences, including history and law, and William G. Baker in charge of the sciences, arts, and serials. These two, with other members of the staff, emphasized Dewey's desire to schedule "competent librarians who can give needed help and suggestions in the various departments" (15). In the *Handbook* Dewey pointed out that the library provided important works of reference "and aims to induce them [the students], by example, by discriminating counsel, and by direct training, to know these books, to use them intelligently, and to acquire the habit of hunting down a needed fact or verifying a mooted point . . ." (16). Brochures offered at the entrance, the catalogs being rapidly completed, and printed pamphlets of instruction assisted in this work, and at the beginning of a term Dewey offered a series of lectures on practical bibliography, books and reading, and literary methods (recording, organizing, and making available what is gained from books) (17). There were also, in addition to the Dewey series, lectures by librarians and subject specialists for the library

school students, to some of which the college students and faculty members as well as the general public were invited. A four-page leaflet explained the conditions of paid help and furnished a blank for application for such help. Considered an accommodation only, the assignment went to the lowest salaried assistant thought capable of handling it, the cost ranging from twenty-five cents to a dollar an hour depending upon the skill required (*18*). Capping all was, of course, the individual service to readers, particularly by the subject specialists assigned to the reading room.

During this time Dewey was continuing his secretarial work for the three associations founded in 1876. and from January 1887 on he bore a large portion of the lecture and teaching work of the library school.

Outsiders viewed Dewey's first reports as virtual textbooks of enlightened, progressive library administration and many sought advice by correspondence and in person. At first the students expressed their interest and praise in the college paper. President Barnard, until his illness in 1888, gave strong support and many of the faculty were impressed by the services offered to them and to students although some found the classification system and the catalogs puzzling. Eventually Dewey's arbitrary regulation, the fines levied on faculty members, and his failure to explain and defend budget decisions alienated many. The trustees as a whole and even the Library Committee, although they had approved the original organization plan, the first staff list, the changes in the building, and even the library school, by 1888 began to feel that with the original organization and classification finished, the costs for cataloging and administration should decline.

There were also other matters that alarmed the trustees and alienated members of the faculty. Dewey was overworked and at best had little patience; he resented criticism, particularly about the length of his reports and the editing of them and other materials by the chairman of the Printing Committee. Use of his Library Bureau for additional printing only increased the animosity. In other words, Dewey's energy and decision and anxiety to move ahead rapidly pushed his public relations into a sorry state which climaxed in a resolution for his dismissal as librarian at a trustees' meeting on November 5, 1888. The action was changed to suspension while a special committee investigated. Dewey was left in charge of the school, but another staff member was designated acting librarian (*19*).

At the December 3 meeting of the trustees, three of the committee reports given touched in part on the Dewey case (*20*). The Committee on the Course and Statutes considered the School of Library Economy. They doubted the expediency of continuing the school indefinitely but thought it should be carried at least through the current year. The Special Committee on Printing had considered a scheme "to secure a proper oversight of all the printing for which appropriations are made in the Board." The committee held that the "long and boastful statements" in the librarian's reports were "not in accordance with academic propriety and the dignity of the College" and they deplored the circulars printed by the Library Bureau which appeared as if issued by the college while "in orthography and general appearance" they were not creditable to the college.

The Special Committee on Dismissal, headed by the future president, Seth Low,

made three printed documents the focus of their investigation. One was a section on "Employment Registry" in the school's *Circular of Information*. The second was an application for admission to the library school based on a form used by the Library Bureau for applicants registering for positions, while the third was a circular letter to student applicants suggesting the importance of submitting photographs and personal details. When the ailing President Barnard affirmed that he had approved the printing of the offending documents, the committee decided that Dewey had conceived of the school as a training place for future librarians and also as an employment agency for those trained. Since the trustees had not held these same points of view, they had not understood the preparation of the circular letter. They considered use of such a letter a "grave fault" and the request for the personal information a serious mistake, but the practice had had endorsement. The trustees therefore adopted on December 3 three resolutions offered by the committee: tabling the investigation resolution, revoking the suspension, and discharging the committee. On December 6, as directed, the clerk sent a copy of the reports and of the resolutions to Dewey (*21*).

Earlier in the year (July 1888) Dewey's address at the Convocation of the University of the State of New York on "Libraries as Related to the Educational Work of the State" (*22*) drew much favorable attention. In June he became consulting librarian on fitting the west end of the capitol building for the state library. Later Whitelaw Reid, a member of the New York Board of Regents asked that Dewey advise the Library Committee of the Regents on plans for the reorganization of the state library. The governor had recommended abolishing the Board of Regents but the legislature had not acted. In carrying out his assignment Dewey studied not only the state library but the entire educational system of the state. His report, dated November 25, 1888, was in the form of a long letter to Reid in which he made recommendations for the state library, suggested a program for the regents, and wrote at some length about "the right man" to carry out this great work (*23*).

By December 7 the regents were in touch with Dewey about the position, but as early as November 28 Dewey had sent a confidential letter to over forty persons—"a few men whose opinions I most value." He spoke of his Convocation speech and of the need for a greater recognition of the importance of libraries. He said he had tried to find the right man to take up the duties and then wrote: "Please tell me frankly whether you think I am really the man for the place, or, vastly better, tell me who can be had to lead this new enterprise." Replies to this letter are not available, but typed excerpts from many of them are. The writers included such outstanding librarians and educators as C. A. Cutter, S. S. Green, F. M. Crunden, Henry Barnard, and former Commissioner of Education John Eaton. Many of the replies spoke of the great opportunity offered and of the broader field of usefulness, often with comments on personal characteristics which eminently fitted Dewey for the position: his knowledge and understanding of general education, his power of work, executive ability, inventive genius, and his enthusiasm and the capacity for infusing others with it. There were, however, several negative votes stressing uncertainty of the position, lack of tenure, the difficulties

of pioneer work, and the need of the library school at Columbia for his direction (24).

On December 12, 1888, the Board of Regents elected Dewey Secretary of the Board of Regents of the University of the State of New York and Director of the New York State Library. Although copies of the committee reports and the resolutions of the Columbia Trustees revoking his suspension had been sent to Dewey on December 6, he must have realized that it would be difficult, if not impossible, to overcome the dissatisfaction and opposition that had built up against him and that he would no longer have the freedom of action or the administrative support which had been his. On December 20, 1888, he sent his resignation to the Columbia College Trustees who formally accepted it at a meeting on January 7, 1889. On February 4 they approved a request for removal of the library school to Albany (25). On April 1, after the close of the current session, the School of Library Economy followed its founder to Albany where it remained until 1926. Along with the school went Walter S. Biscoe, always Dewey's loyal partner, and several others from the Columbia staff (26).

In Albany Dewey entered on his new duties with his characteristic energy and enthusiasm. The association work, the Decimal Classification revision, reestablishment of the library school, and nominal direction of the Library Bureau had to be maintained with the addition of all the new programs he had outlined for the state. He also had responsibility for the state library under which he administered the library school, now called the New York State Library School, and for the Home Education Department.

The appointment in Albany gave Dewey another opportunity to demonstrate his administrative ability and to further his ideas of education of which the libraries, in his estimation, were a vital part. To further the contributions of libraries there had to be trained librarians, support of libraries, recognition of their importance, and accessibility of books. To this end he had the library school transferred to Albany and persuaded as many graduates as possible to remain in New York state, he promoted state aid to libraries, inaugurated a system of traveling libraries, and published much in the way of lists of best books, "model" catalogs, pamphlets on methods, and other aids for librarians of little training or experience. Besides all this, at the state library he started another "Paid Help" service, developed the Legislative Reference Service, and established many special units such as a library for the blind, an education alcove, a medical unit, a manuscripts section, a women's library, a children's library until it was forced out by lack of space, and even a picture collection. He himself owned one of the early player pianos and he hoped to start a lending collection of rolls for player pianos.

But first of all he had to turn his attention to education in the state. In 1889 the legislature passed an act recodifying and consolidating educational laws related to the functions of the Board of Regents. In 1892 it passed the University Law revising and amplifying the law pertaining to higher education, including libraries, a law considered by many as "a model of condensed, accurate expression of wise, statesmanlike, educational legislation . . ." (27). For much of this Dewey was given large credit.

For 11 years Dewey remained as Secretary of the Board of Regents, struggling to keep the office out of politics and working toward the eventual unification of the educational system. At that time higher education was under the Board of Regents while the State Department of Public Instruction was responsible for grade school education. There were strong forces both favoring and opposing unification, and Dewey received much criticism. On the plea of overwork in his several positions and to remove himself from the struggle, on December 22, 1899, in a letter to the regents he asked to be relieved of his duties as secretary, retaining the directorship of the State Library, the Home Education Department, and the library school (28). The regents accepted the resignation and among the resolutions offered was this:

> The Board recognize in Mr. Dewey an organizer of genius, an executive of great skill, an educational leader of marked originality and energy, and an officer whose administration has coincided with the largely augmented usefulness and honor of the University (29).

The idea of unification continued and finally in 1904 the legislature passed the Unification Act which brought all the educational activities of the state under a State Education Department with one administrative head. Andrew S. Draper, who had been New York State Superintendent of Public Instruction from 1886 to 1892, was recalled from the presidency of the University of Illinois to become head under the new law. Dewey had stated that Draper was probably the best person for the position, but their personalities had clashed in the earlier years and in his new post Draper gave little support to Dewey and in his annual report criticized the administration of the state library. On September 21, 1905, Dewey resigned as Director of the State Library and of the Home Education Department, effective January 1, 1906. On December 4, 1905, he resigned as Director of the New York State Library School effective on the same date.

Other matters, some of long standing, were factors in Dewey's decision to resign. As Rider has pointed out: "Dewey, almost from the day he took over the Regents' secretaryship until he resigned eleven years later was repeatedly in some sort of major or minor conflict" (30). There were at various times difficulties with the legislature, the governor's office, the regents. Many of the matters were trivial but received newspaper headlines. A few examples illustrate the point. It was said that Dewey, for personal gain, required use of his *Decimal Classification* as a library school text until it was proved that, to avoid such charges, he gave copies to the students. A great believer in outdoor exercise, he bought bicycles wholesale and urged students and staff to ride. He sold the bicycles at cost, permitting installment payments, and proved that no gain was involved. There was a hearing on his purchase of a large home, with graft implied, but it was found that the home was heavily mortgaged. In 1895 a subcommittee of a Joint Committee of the Senate and Assembly to Investigate State Departments reported that there was no evidence that Dewey had used his office for private ends and added: "Not a single charge involving the integrity and official conduct of the accused was sustained" (31).

Finally, there was the charge of anti-Semitism, this at Lake Placid Club, and a petition to the regents demanding Dewey's resignation. To understand fully the ramifications of this involved matter it is necessary to consult the newspapers of the day and the official reports. Dewey was given a lengthy hearing in which he maintained that the whole matter referred to a private club which had a right to make its own rules of membership and that he was not a member of the council which made the rules. But this was the culmination of other personal attacks and on February 15, 1905, the regents were unanimous in their censure which ended: "The further control of a private business which continues to be conducted on such lines is incompatible with the legitimate requirements of his position" (*32*). This rebuke actually confronted Dewey with the problem of making a choice between the Lake Placid Club and his library positions. On September 21, 1905, the choice had been made and Melvil Dewey, at the age of fifty-four, closed his active library career at the end of that year.

When the Deweys left Albany for Lake Placid, it was to move permanently to a place they had frequented since 1893. Both were troubled with pollen allergies which for years sent them to various vacation spots in search of relief. Eventually they discovered the area in the Adirondacks near Lake Placid but on Mirror Lake. So impressed were they with the location that they invited a few friends to join them in what started as a cooperative club intended to attract persons of moderate means, especially librarians, teachers, and clergymen. It was quickly learned that strong central direction was needed and in 1896 the Lake Placid Club was incorporated as a membership corporation. In the threefold structure which came into being the club controlled the social organization, the membership, the regulations, and cooperated on the recreational programs. According to the by-laws:

> The purpose of the Lake Placid Club shall be to provide by cooperation among congenial people and amid beautiful natural surroundings all advantages of an ideal vacation or permanent country home at as moderate cost as consistent with highest standards of health, comfort, rest and attractive recreation, both summer and winter (*33*).

In order to carry on the business affairs the Lake Placid Company was established in 1900 under the New York State Stock Corporation Law to own and operate the club estate under contract. In 1922 the third part of the structure was chartered by the Regents of the University of the State of New York. The charter granted to the Lake Placid Club Education Foundation defined the foundation as follows:

> . . . an educational institution for the purpose of aiding and restoring to health and educational efficiency teachers, librarians and other educators of moderate means who have become incapacitated by overwork; establishing, maintaining and aiding schools, libraries, or other educational institutions, especially at Lake Placid; and instituting, organizing, or fostering other movements to advance public welfare through education by means of the Foundation press, conference, forums, addresses, guided reading and similar agencies (*34*).

Under the first part, called "restoration," selected individuals came as foundation guests to enjoy rest and relaxation. Maintenance of schools was exemplified by the Northwood School, a college preparatory school for boys, one of a group that Dewey hoped could be established at Lake Placid. The third aim was to promote educational projects in which the founders had special interest and which they called "seed-sowing." These included simpler spelling, the metric system, calendar reform, and the types of cultural and recreational activities fostered by the club, such as the Adirondack Music Festivals, dramatic productions, group singing, water sports, a library, and conferences. The building of the Agora Auditorium in 1923 and the chapel in 1924 as a memorial to Annie Dewey gave needed space for enlarged programs.

Not to be omitted was the Forest Press, Inc., publisher of the *Decimal Classification*. Although under foundation auspices, the press is semi-independent with its own board. In recent years the business office has been moved to Albany. When he left Albany, Dewey had some concern about the future of the DC and both then and later questioned whether it might be well to offer the work to a university for continuance. In 1927 the editorial office was moved to the Library of Congress, with arrangements for editorial policy to be controlled by a Joint Lake Placid Club Education Foundation–American Library Association Editorial Policy Committee. Before his death Dewey's dream of having DC numbers placed on Library of Congress printed cards along with the LC numbers was realized.

As soon as the foundation was fully organized, Melvil and Annie Dewey transferred their entire common stock of the Lake Placid Company and substantial other holdings to it, together with a deed of gift which provided that the foundation should exercise control to insure.

> . . . that Lake Placid Company can never become a mere money making corporation nor Lake Placid Club an ordinary summer and winter resort, but that both shall forever be conducted so to contribute to the Foundation work not only their yearly earnings in money but equally their influence and example in promoting those purposes for which the Foundation was created (*35*).

As soon as Dewey was able to turn his entire attention and energies to the development of Lake Placid, the rate of growth was phenomenal. In his eightieth birthday letter he spoke of the club growth from a rented house on 5 acres in 1895 to 412 buildings on 10,600 acres at the time he wrote and from a total business the first year of $4,800 to over $3 million annually. Lake Placid publications confirm this growth with similar statistics (*36*). Branches were opened for a time, one in 1927 on 3,000 acres in central Florida which included seven lakes, one of which was renamed Lake Placid. This southern Lake Placid is no longer owned by the company but during the 4 years which Dewey devoted to it, he saw great promise. The main organization of the enterprise remains much the same, but overextension and the depression brought financial difficulties which later required a rather drastic reorganization of the financial structure.

Dewey spent his last winters at Lake Placid Club, Florida, celebrated his eightieth birthday there, and it was there that his death occurred. Annie Dewey, stricken

with illness and blindness, but courageous and carrying on in spite of her affliction, had died in 1922 and 2 years later Dewey married Emily McKay Beal who had assisted Mrs. Dewey in her work at Lake Placid. Dewey paid tribute to both wives in his final birthday letter.

Any consideration of the accomplishments of Melvil Dewey must record his means of carrying out two of his cardinal beliefs, cooperation and communication. His work for so many years as secretary of the American Library Association, the Spelling Reform Association, and the American Metric Bureau has been mentioned. He was one of the group that went to London in 1877 at the time the Library Association was founded and thereafter took part in other international conferences. In fact, the New York State Library prepared for the ALA its exhibit for the Paris Exposition of 1900 which won a grand prize while Dewey received a distinguished merit award. While at Columbia he invited seventy-two librarians to meet in his office on June 18, 1885, where they voted to organize the New York Library Club, still in existence. He collaborated in the organization of the Children's Library Association to provide children with wholesome reading and became a trustee. While in Albany he was one of the group that in 1889 established the Association of State Librarians of which he became president in 1891. In 1890 it was the New York Library Association which organized, and elected Dewey first president. Even as he was about to leave the profession he was one of the administrators who established the American Library Institute "to provide for study and discussion of library problems by a representative body chosen from English speaking Americans, regardless of residence or official position" (37). He also actively supported a library department in the National Education Association. This impressive list omits all the special, or local, or regional groups which he assisted, such as the Civic League of Albany, the Fortnightly Club, the Vigilance League Committee on Civil Service, and the Men's Association of the Cathedral in Albany, to mention only a few.

Annie Dewey also made contributions to many associations. Most important, probably, was the Lake Placid Conference on Home Economics which became the American Home Economics Association. At the invitation of Annie Dewey and under her leadership and that of Ellen H. Richards, the group held ten of their annual conferences at the Lake Placid Club beginning in 1899.

If associations provided means for cooperative action, periodicals could furnish communication. In addition to his work on the *Library Journal,* Dewey contributed regularly to other magazines and started several. One was *Library Notes* which was greeted with consternation by the editors of *Library Journal* when the first issue appeared in June 1886. Dewey claimed that the *Library Journal* was expensive and was not reaching enough librarians and that a quarterly journal with a subscription price of one dollar would reach the smallest libraries and would be of great practical value. It was to present notes on standards and materials, discuss equipment and methods, and offer articles. Published by the Library Bureau, it was a means of setting forth many of Dewey's ideas, methods, and "jimcraks." The periodical was issued irregularly and ceased with number sixteen in the fourth volume in September 1898.

In 1896 Dewey supported publication by Library Bureau of *Public Libraries*, with Mary Eileen Ahern as editor. Dewey promised that he would try to send material for a department by him in the new periodical. His intentions were always good and the correspondence shows that he regularly offered advice and encouragement. It shows, also, the many times Miss Ahern expressed discouragement when Dewey was late with copy and she had to publish without his contribution. She remained, nevertheless, one of his staunchest supporters when he was in difficulty (*38*).

A tall, powerfully built man, lithe and wiry, Dewey gave an appearance of strength. His dark eyes behind glasses were alert and his manner bespoke nervous energy and intensity. In spite of a rather high pitched voice he was an inspiring speaker, and it was said that in meetings he was quick to grasp the ideas presented by others and able to summarize and clarify the different points of view. He encouraged women to enter the library profession and treated them as equals. He was serious, but approachable, energetic and aggressive but often tactless, a born organizer, capable of tremendous amounts of work with the capacity, when he wished, of inspiring others and gathering about him competent men and women.

From his youth he endeavored not to waste time, and as a young married couple he and Annie made out weekly and monthly schedules of activities. Dewey always had the best intentions but made more promises than he could possibly keep and near the end of his life, when asked to contribute to a proposed history of New York, replied that he was then 20 years behind in things he had pledged (*39*).

In spite of overwork and crowded schedules Dewey always found time for hospitality. On Friday evenings there was open house at the Dewey home, both in New York and in Albany, and students, faculty, and friends were welcome, whether or not the host and hostess could be present. There was dancing, singing, reading aloud, and discussion; in Albany there was the player piano and there were card games and other games such as Ping-Pong and billiards. Dewey retained his enthusiasm for action out of doors; he rode bicycles, usually kept a saddle horse as well as carriage horses, and owned automobiles from an early period. Visitors to the library or library school often stayed in the Dewey home and were met at the station or taken for drives in the latest of Dewey's means of conveyance. The hospitality continued at Lake Placid where students from the library school and other friends were regularly entertained. Many letters of thanks attest to the fact that the Deweys were charming hosts.

Dewey considered the library school one of his greatest accomplishments and therefore when he was offered positions in other universities, the correspondence always included the possibility of the new institution accepting the school. When he was to leave Albany he corresponded with several universities where he felt the school might find a good home. This was without consulting the regents who at that time had no intention of giving up the library school.

There is no question about Dewey's scholarship (he won many honors, including honorary doctoral degrees from Alfred and Syracuse Universities) or his leadership in the library profession. His classification went through twelve editions during

his lifetime and he was advising on the thirteenth in the last month of his life. He worked exhaustively for the American Library Association and advocated a central office and paid help long before the members were ready for the step. His influence on Columbia and on Albany remained long after he had left. In dedicating a new library building at Columbia in 1934, Nicholas Murray Butler called the library almost precisely 50 years old, dating it from the advent of Dewey (*40*). Similar statements could be made about his administration in Albany. Unfortunately, however, the years in Albany followed much the same pattern as those at Columbia—almost revolutionary accomplishments, strong support and admiration for his work, but eventual animosity from people whom Dewey had offended.

Dewey's active mind produced ideas rapidly, but he lacked the patience to educate others to his thinking. Having conceived the idea, he wanted immediate action and was unable to understand or appreciate the feelings of those who differed with him. He himself never held any animosity toward people who opposed him and he expected others to react in the same way.

He had loyal followers and faithful associates who understood the man and what he was trying to accomplish. In spite of all his business difficulties with Dewey, Davidson of the Library Bureau was able to say:

> Certain it is that his unquenchable ardor with which he inspired others not only to cooperate but to pick up the thought and translate it into individual initiative brought a library renown which will always belong to Melvil Dewey, creating a heritage for those who have or will come after (*41*).

"I was born with a disposition which has never left me," wrote Dewey when he was seventy-five, "to run things whenever I could get a chance," and he went on to speak of the dreams and visions of his youth about which some had said that he was chasing a rainbow. "But," he said, "the sleepy old world finally got its eyes open and admitted that we caught at least the trailing garments of our rainbow" (*42*). At the age of eighty he wrote of the credits given to him, "My share has been lyk a gadfly, to prod others into action" (*1*). Both statements are probably true, but they hardly describe this complex person whom Frank P. Hill described as "the most influential and effective librarian who ever dwelt among us" (*43*). In his final birthday letter he spoke of himself as a sundial "wher no wheels get rusti or slip a cog or get tired & long for rest." He promised another letter on his eighty-fifth birthday and said that what pleased him most in the letters just received was the undertone running through them that he was starting his ninth decade "with my lyf-long spirit of looking out not in, forward not bak, up not down" (*1*).

Sixteen days after his birthday, on December 26, 1931, Melvil Dewey died of a cerebral hemorrhage. His body was cremated and the ashes returned to Lake Placid to rest in the crypt of the chapel there.

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DIALOG INTERACTIVE INFORMATION RETRIEVAL SYSTEM

DIALOG is the name given to an interactive, computer-based information retrieval language developed at the Lockheed Palo Alto Research Laboratory. The DIALOG system consists of a series of computer programs which have been designed to make full use of direct access memory devices (in which data located anywhere on the device can be accessed in approximately the same amount of time) and video display units to provide the user a rapid and powerful means of identifying records within a file which satisfy a particular information need. By providing the user full display access to the indexing vocabulary, and the ability to modify search expressions, DIALOG becomes a data processing extension of the human operator who directs and controls the process according to his own personal needs. Figure 1 shows a DIALOG communications terminal which enables the user to communicate with the computer. The user issues commands to the computer by way of the keyboard, and he receives results on the display unit and/or on the teletype as appropriate. DIALOG allows the user with a well-defined search topic to proceed directly to desired records; the user who cannot so explicitly define his requirement is provided tools for browsing through the file. It is thus possible to investigate successive avenues of interest as they arise or are suggested by intermediate retrieval results.

The language procedures are easily learned, and the system has been used

FIGURE 1. *DIALOG communications terminal.*

successfully by educators, working scientists, engineers, and librarians. To understand how such an information retrieval system operates, one should be aware of historical solutions to the problem of information retrieval and should have a general grasp of the techniques employed within a computer to accomplish on-line retrieval of information.

The central problem in information retrieval is to identify and obtain those documents from a collection that contain desired information. The magnitude of the problem becomes apparent when it is realized that many current technical collections require several miles of shelf space for storage. The user attempting to identify all documents that might discuss welding defects in aluminum or the use of molybdenum disulfide as a solid lubricant in spacecraft, for example, faces an almost insurmountable information retrieval problem.

The historical solution to this problem has been to create an index to the information collection. Indexes can take many forms. Back-of-the-book indexes assist the reader in finding which pages of a book discuss a particular topic. Library card catalogs are indexes that enable the library user to find information through several access points: subject, author, corporate source, report number, and other collective characteristics. Although useful, manual indexes are limited in several ways. The more specific the indexing, the larger the index becomes, and the harder it is to find particular topics of interest in the index. Consequently, manual indexes usually contain only relatively general subject headings which apply to large numbers of documents. As a result, after finding a general topic of interest, the user still must scan a sometimes burdensome amount of material to identify specific items of interest. Another limitation inherent in manual indexes is the inability to combine or coordinate index elements into comprehensive groups. If one wishes to find what Stanford University has produced on the subject of teaching mathematics in the elementary grades, for example, the user has no way of combining the source entry point, Stanford University, with the subject entry points of mathematics and elementary education. Furthermore, there may be several source entries for Stanford University.

Computer-based information retrieval systems can largely overcome many of the limitations of manual systems if properly designed. In most cases computer-based retrieval systems not only allow the user to combine several retrieval parameters, but they also provide relatively rapid results. There are two major categories of computer retrieval systems, each of which approaches the retrieval problem in a somewhat different manner: serial search systems and direct access systems.

Serial search systems were the first to appear and were widely used during the early 1960s. With this approach, the collection or data base to be searched is normally contained on magnetic tape in serial fashion. Each record represents a document and contains the information elements found on a library catalog card (e.g., title, author, source, subject headings). To perform a search, a user fills out a form in which he describes as nearly as possible his interest. This search request is then coded by a person familiar with the collection and entered into the computer (usually along with several other search requests). The computer is controlled by a

relatively simple search program that causes it to read each successive record from magnetic tape, to compare the contents of the record with the elements specified in the search request, and then to copy the record out to a second magnetic tape if there has been a match, or to proceed to the next record. If the collection is large, it can take several hours for the computer to process the search requests. Furthermore, if the request has been too specific, the requestor is likely to get few if any results; if the specification has been too broad, the requestor can get several hundred citations printed out which he then must examine. Because the request had to be processed through an intermediary, there may have been further degradation in the quality of the results.

In direct access systems, indexes much like back-of-the-book indexes are constructed from the collection. For each index term or descriptor, the locations of all records in the collection containing that descriptor are listed on a direct access device. This index is commonly known as an inverted file. Whereas the book index indicates the locations of pages containing particular information, the inverted file indicates locations of records containing particular information. The main collection is also located on a direct access device. This file is commonly called the linear file. It is thus possible for the computer to look up a particular index term in the inverted file, to read off the list of locations or addresses for the citation records that contain the index term, and then to access directly the linear file for each location to copy the appropriate record—either to a display, as in the case of an on-line system, or to a printer, if this has been specified.

Whereas serial search systems can be efficiently operated only in a batch mode (i.e., each inquiry specifies the complete search process to be performed), direct access systems can be designed to be operated in either a batch or interactive mode (i.e., wherein the user can control and redirect the search process during execution). Typically, serial search systems are simpler and less costly to design but are more costly to operate than direct access systems. Direct access systems which provide for user interaction can typically produce higher quality results (i.e., a higher proportion of relevant results with fewer items missed).

Interactive systems can be further distinguished according to the rate and amount of information transferred during the search process. Systems designed for visual display terminals usually operate at relatively high speeds (120–240 characters per second) and transfer a larger amount of information but cost more to operate than teletype terminals, which operate at relatively slow speeds (10–15 characters per second).

It was decided from the outset that DIALOG was to provide maximum interaction between the user and the file. As a result, and even though relatively uneconomic at the time (1966), DIALOG was designed to include a terminal consisting of both a high-speed cathode ray tube display and an associated hard copy device (see Figure 1). From the user's point of view DIALOG consists of several plain English commands, such as DISPLAY, PRINT, and SELECT, which allow him to perform information retrieval functions. Commands are defined on the special characters above the numeric keys on the input keyboard so that a convenient command label

FIGURE 2. *DIALOG input keyboard with a command label strip.*

strip can be attached to the keyboard to identify the commands (see Figure 2). The commands are so designed that no prespecified sequence must be followed, i.e., the user is free to select any command he considers appropriate for the next step of the search. Consequently, the user completely controls the search process. At any point he can branch off the main path of his search to explore associated ideas suggested during the course of the search. The command key orientation results in a very simple clerical procedure: depress command key, key in operand data, press TRANS key to transfer the entire message to the computer. Corrections are made by backspacing and typing over incorrect characters. Following entry of each command, the system responds with information that assists the user in deciding the next step to take.

The final implication of the command orientation is that the search process is broken up into a sequence of small steps, each of which is very simple, and each of which results in feedback from the system. In this manner each step is completed correctly before proceeding, thus eliminating the need to reenter the entire search specification in case of an error, as must be done in batchtype systems.

In the context of these fundamental considerations, DIALOG design characteristics will be discussed with regard to six fundamental steps which are more or less followed in any retrieval process:

(1) Identify and select index terms which characterize the search interest.
(2) Coordinate individual terms into concept groups.
(3) Sample and evaluate intermediate search results.
(4) Modify (1) and/or (2) and redo (3).
(5) Output results.
(6) Review actual documents.

Machine implementation of each step will be compared with the historical solution in using the card catalog.

In using a card catalog, the searcher selects a generic noun or noun phrase related to his search interest and scans through the alphabetically arranged catalog entries looking for a match or a cross reference. If it is a large catalog, finding an acceptable entry can be time consuming. Most libraries do not provide a published catalog guide or index that would enable the searcher to identify subject headings of interest before approaching the card catalog.

In DIALOG, two commands, EXPAND and SELECT, are provided to assist the user in identifying and selecting desired index terms. One form of EXPAND provides a display of the alphabetically near index terms to the term entered together with an indication of the number of citations indexed by displayed terms, and also the number of cross reference or related terms associated with each displayed term. Figure 3 shows the display resulting from the command EXPAND "INTER-ACTION."† Each displayed term is numbered for easy reference. Another form of the EXPAND command allows the user to display the related terms in the same format as that just described (see Figure 4). The user is thus provided a window to the index and thesaurus to assist him in identifying useful index terms with which to characterize his search interest.

The SELECT command enables the user to construct a list of desired index terms for future reference. SELECT entries result in the definition of file subsets (referred to simply as sets) which are tagged with "set numbers" and are printed out on the terminal hard copy device.

The command, SELECT "COMPUTERS," for example, would result in the following output at the terminal:

Set No.	No. in set	Description of set (+ =or,* =and, — =not)
1	558	COMPUTERS

Once selected, a term (or more exactly, the file subset associated with the term) may be referenced by its set number. Citations associated with any set can be displayed, printed, selectively saved, or combined with other sets. If a selected term cannot be found, an error message is printed out for the user who then can automatically display the alphabetically near terms by depressing the EXPAND key. Each term is thus validated at time of entry, and the frequency of term use is recorded for later reference.

The card catalog contains a static collection of precoordinated subject headings (at least in the short run). Someone other than the searcher had to decide a priori the appropriate categories to be provided for retrieval. If categories are too broad, the searcher must manually examine a large number of citations to satisfy a specific

---

† Keyed entries by user are shown in quotation marks to distinguish them from command key entries.

```
                    EXPAND IT=INTERACTION
       REF    DESCRIPTOR              TP    CIT   RT
       E01    IT=INTER INSTITUTIONAL
              PROGRAM DEVELOPMENT.....        1
       E02    IT=INTER ITEM CORRELATION
              COEFFICIENTS .... ................   1
       E03    IT=INTER NATION
              SIMULATION ........................        2
       E04    IT=INTER-AMERICAN TESTS
              OF GENERAL ABILITY.... .........       1
       E05    IT=INTER-UNIVERSITY
              PROJECT ONE .................... ...       3
       E06   –IT=INTERACTION ................    282   9
       E07    IT=INTERACTION ANALYSIS......      2    1
       E08    IT=INTERACTION ANALYSIS
              SCALE ................. ........  ...........   1
       E09    IT=INTERACTION OF
              MATTER AND ENERGY..............        1
       E10    IT=INTERACTION PROCESS..... ..        1
```

FIGURE 3. *Display of alphabetically near terms to "INTERACTION."*

subject interest. If categories are narrow, the number of catalog entries becomes unwieldly to use. In the traditional catalog, there is no way of combining categories at search time to provide broader or more specific categories.

In designing DIALOG, it was desired not only to provide the user a means of reviewing the citations within a particular category, but also to allow him to define dynamically his own categories by logically combining the results of several individual categories. This function was provided in the COMBINE command. With COMBINE the searcher can combine any number of citation sets in any logical manner. Continuing the above example, assume the user is interested in the interactive use of computers in information retrieval. He might go through the following steps:

	Terminal output		
Command entered	Set No.	No. in set	Description of set ($+$=or,*=and, —=not)
SELECT "COMPUTERS"	1	558	COMPUTERS
SELECT "INFORMATION RETRIEVAL"	2	441	INFORMATION RETRIEVAL
COMBINE "1*2"	3	72	1*2
SELECT "INTERACTION"	4	282	INTERACTION
SELECT "MAN MACHINE SYSTEMS"	5	93	MAN-MACHINE SYSTEMS
COMBINE "3*(4+5)"	6	17	1*2*(4+5)

In the above illustration, the user combined concepts of "COMPUTERS" and "INFORMATION RETRIEVAL" into a single category containing 72 items. He

```
          EXPAND IT=INTERACTION
REF       DESCRIPTOR                    TP   CIT   RT
R01   -IT=INTERACTION  ..........            282    9
R02   IT=INSTRUCTIONAL
          INTERACTION .  ...   ........  I     2    1
R03   IT=RELATIONSHIP..............  . 3    80   30
R04   IT=AUDIENCE
          PARTICIPATION ..... ........ .. .4    14    3
R05   IT=INTERACTION PROCESS
          ANALYSIS  ........ ..     .......4   332   12
R06   IT=INTERGROUP RELATIONS.4   172    8
R07   IT=INTERMODE
          DIFFERENCES  ............. ... . .4    22    5
R08   IT=INTERPERSONAL
          COMPETENCE .............     4   188   21
R09   IT=MAN MACHINE SYSTEMS 4    93   12
R10   IT=STATISTICAL ANALYSIS.. 4   768   24
```

FIGURE 4. *Display of related terms of "INTERACTION."*

decided that he could be more specific, and so he combined this result with a new concept made up of categories "INTERACTION" or "MAN MACHINE SYSTEMS" which were obtained from the display shown as Figure 4. This example can be developed as the cumulation of a series of very simple steps.

Scanning the titles of entries under a particular subject category in the traditional card catalog allows the user to select specific citations of interest. Frequently, however, other subject entry points for a particular item are not included on the catalog card, which denies the user the information he needs to explore other related areas of interest which might be suggested by the citation.

The DISPLAY command in DIALOG was designed to allow the user to review intermediate results. Of several formats available, that most frequently used provides a display of the entire citation including all assigned descriptors and a descriptive abstract if available (see Figure 5). Supplying the full citation not only enables the user to evaluate the relevancy of his search to that point, but it also shows him alternative descriptors he can explore or can include (using the COMBINE command) with other previously developed categories. Figure 6 shows the associated abstract that may also be displayed.

When the card catalog user finds relevant citations, he copies down their call numbers for use in obtaining the associated documents. If he wishes to develop a bibliography for future use or publication, he is relegated to copying manually the entire citation of each selected entry.

Two output commands are provided the DIALOG user which are identical except for the target device. PRINT outputs indicated sets of citations to the high-speed printer at the computer: TYPE similarly outputs to the low-speed terminal printer. Normally the user will output accession numbers to the local printer for use in obtaining hard copy, and he will use the high-speed printer at the computer for the output of extensive bibliographies.

ED064431   EM007609
AN INTERACTIVE INFORMATION RETRIEVAL SYSTEM;
CASE STUDIES ON THE USE OF DIALOG TO SEARCH
THE ERIC DOCUMENT FILE.
   TIMBIE, MICHELE; COOMBS, DON H.
   STANFORD UNIV., CALIF. ERIC CLEARINGHOUSE
   ON EDUCATIONAL MEDIA AND TECHNOLOGY
   RMQ66000
   DEC 69
   90P.
   EDRS PRICE MF-$0.50 HC-$4.60
/COMPUTERS/ *EVALUATION/ *INFORMATION RETRIE
VAL/ *INFORMATION SYSTEMS/ INFORMATION THEOR
Y/ INPUT OUTPUT DEVICES/INQUIRY TRAINING/ IN
TERACTION/RESEARCH/ *SEARCH STRATEGIES/

FIGURE 5. *Display of full citation.*

At present most library collections are not available in machine-readable form. Provision has been made in DIALOG for each citation to be associated with a second record. This record can be an abstract or it can be the entire text of a document.

Of more practical interest at the present is interface to automatic microfilm equipment. DIALOG has been used with several of these devices, any of which can contain full document text.

In practice, DIALOG provides the user an easy-to-use command language that extends rather than replaces the concept of the traditional card catalog. DIALOG extends this concept by providing a means of combining subject/categories and by providing the clerical facility for storing, cumulating, and printing desired citations in a variety of formats.

The initial application of DIALOG occurred early in 1967 when a DIALOG terminal was installed at the NASA Ames Research Center, Moffett Field, California. The system was used to conduct on-line searches of the NASA document citation collection which at that time numbered some 300,000 records. This data base was stored in a mass storage device at the Lockheed Palo Alto Research Laboratory, and communication was conducted over a telephone line. During this first application, DIALOG was used principally by engineers and scientists directly. During the second phase of the NASA application the terminal was relocated to NASA Headquarters in Washington, D.C. for 12 months. By this time the file had grown to 450,000 citations, the largest bibliographic collection of document citations searchable in an on-line, interactive mode. DIALOG was used principally by librarians during this second phase. Usage differences between the first and second phases were analyzed in a final report submitted to NASA (1).

Lockheed has recently completed a contract with NASA to develop and install a version of DIALOG known as NASA/RECON (Remote Console). NASA/RECON is currently in daily operation on a NASA computer servicing twenty-three terminals

ED034431
THE FIRST INTERACTIVE (ON-LINE) COMPUTERIZED
USE OF THE ERIC FILES BY THE U.S. OFFICE OF ED-
UCATION IS REPORTED IN THE FORM OF AN EVAL-
UATION OF THE DIALOG SYSTEM CONDUCTED AT
THE ERIC CLEARINGHOUSE FOR EDUCATIONAL
MEDIA AND TECHNOLOGY. DESCRIPTIONS OF THE
PURPOSES OF THE STUDY OF THE DIALOG SYSTEM
(DEVELOPED BY LOCKHEED MISSILES AND SPACE
CO.), AND OF THE PROCEDURES INVOLVED IN CON-
DUCTING A SEARCH OF THE ERIC FILE USING DIA-
LOG ARE FOLLOWED BY INFORMATION ON THE NINE
PEOPLE, FROM VARIOUS AREAS OF EDUCATION, WHO
WERE ASKED TO HELP EVALUATE THE SYSTEM. THE
MAJOR PORTION OF THE REPORT, CONSISTING OF
NINE CASE STUDIES, IS BASED ON THE REACTIONS
OF THESE EVALUATORS (GATHERED IN DEBRIEFING
INTERVIEWS) TO ONE OR MORE DIALOG SEARCHES
WHICH THEY THEMSELVES CONDUCTED. IN ADDI-
TION, 19 EVALUATIONS (BASED ON QUESTIONNAIRES
FROM OTHER SYSTEM USERS) ARE PRESENTED.
THESE, ALONG WITH THE NINE ORIGINAL EVALUA-
TIONS, STRESS THE SPEED AND "HORIZON-WIDEN-
ING" EFFECT OF THE SYSTEM. A FINAL SECTION EX-
AMINES THE VARIETY OF USES FOR THE SYSTEM AT
THE CLEARINGHOUSE. THE PRE-DIALOG QUESTIONS,
THE DEBRIEFING OUTLINE, AND RECORDS OF THE
EVALUATORS' SEARCHES ARE APPENDED.
(SP/MT)

FIGURE 6. *Example of displayable abstract.*

located in NASA facilities across the country. Lockheed installed and maintains
another version of this system in Europe for the European Space Research Or-
ganization (ESRO). ESRO supports terminals in several European countries from
a central computer facility in Germany (2).

During the past 2 years Lockheed has supplied remote terminal retrieval services
to three Office of Education facilities with the Education Research Information
Center (ERIC) files (3), and four Atomic Energy Commission facilities with *Nuclear
Science Abstracts.*

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ROGER K. SUMMIT

DICTIONARIES

Dictionaries before 1800

The origin of dictionaries is not recorded, but it can be assumed that it is far beyond the first examples that are known to have existed. To some extent the history of the evolution of dictionaries is inseparable from that of encyclopedias, but since the latter is dealt with separately the present article is restricted to the area of dictionaries, and to encyclopaedic dictionaries that have had a definite influence on the development of dictionaries. The word "dictionary" is, for this purpose, taken to include any work whose systematically arranged contents explain the meaning of words and phrases in a language or group of languages and may, in addition, throw a light on their etymology, development, pronunciation, usage, and other linguistic attributes. The term "dictionary" has also, at times, been used somewhat loosely to describe compendia devoted to the explanation of trades, professions, and cultural topics: these are mostly ignored here.

At the beginning of the second century B.C., Aristophanes of Byzantium (c. 257–180 B.C.), librarian of the Alexandrine Library, is known to have been compiling a dictionary of Greek words, and curiosity concerning the origin and meaning of words increased throughout the classical period. His successor, Aristarchus of Samothrace (fl. 153 B.C.), did much pioneer work in the area of Homeric language. About A.D. 100 Hsü Shên compiled the *Shu Wên Chieh Tzu*, the earliest Chinese dictionary (usually known as the *Shuo Wên*). It comprised nearly 10,000 characters arranged by radicals. In the first century of the Christian era, the tutor to the grandsons of Augustus, a grammarian named Marcus Verrius Flaccus (fl. 20 B.C.), compiled a considerable Latin dictionary which has not survived. Fortunately, a second-century grammarian, Sextus Pompeius Festus, drew on this for the bulk of his *De verborum significatu*, a twenty-volume work, of which only a multilated copy of the sections comprising the letters M through V is extant. Some idea of Festus' complete work can, however, be gained from the Lombard historian Paulus Diaconus' eighth century somewhat meagre epitome. Both works have been edited and reprinted (*1*).

Sometime during the fourth – sixth centuries the celebrated Hindu grammarian Amara-Siṃha compiled a dictionary of Sanskrit (*2*) which has remained a standard work throughout the succeeding centuries. This was followed by the *Anekārtha-Tilakah* of Mahīpa and the *Saddhaśabdārnava* of Sahajakîrti, valuable sources of Indo-Aryan lexicography (*3*). A Japanese priest called Shôjû compiled the *Shinsen Jikyô* in twelve books at the end of the ninth century. This was the first Japanese dictionary to contain Japanese words. The 20,000 Chinese characters were arranged by radicals.

In the tenth century Minamoto no Shitagô compiled the first Chinese–Japanese encyclopedic dictionary. This was the *Wamyô Ruïjûshô* (also known as the *Wamyôshô*). It was issued in twenty-four parts. The great tenth- or eleventh-century

Greek lexicon known by the name of *Suidas*, a compilation that included some 30,000 articles on language, literature, and history, drew heavily on the work of Hesychius of Alexandria, a fourth-century Greek grammarian, but incorporated much new material and also quoted copiously from the works of Greek writers. It is an early example of the encyclopedic dictionary and has been called the forerunner of the *Conversationslexikon*. Its main importance is its alphabetical arrangement—few books had previously adopted this system even for inset glossaries, and alphabetical order did not have the immediate appeal for contemporary scholars that it has today (*4*).

Throughout the early period glossaries and vocabularies had been compiled by the monastic scribes from the interlinear glosses in the Latin manuscripts they handled, and the first bilingual dictionaries were based on these. A twelfth-century example is the *Expositio[nes] vocabulorum*, a brief glossary of Anglo–Norman law terms that the Normans needed to have explained. It appeared frequently in various forms and, notably, the famous *Red book of the Exchequer* (or *Liber rubeus de scaccario*) (*5*).

At the beginning of the twelfth century, a Chinese–Japanese dictionary was compiled. This was the *Ruijū Myōgishō*. Its contents were classified by form and sound, and accents were shown. It was a distinct improvement on its predecessors. Research into the etymology of the Greek language is recorded in the *Etymologicon magnum* (deriving chiefly from the long lost *Lexicon* of Photius), a work originally compiled between 1100 and 1250, which was first printed at Venice in 1499 and was still being issued in the nineteenth century. The influential Oxford *Etymologicon magnum* of 1848 (*6*) was based on this. The *Speculum maius*, a vast conspectus of knowledge in the Middle Ages, was first completed in 1244 by Vincent of Beauvais (c. 1190–1264) and was continually revised up to the time of his death. In Book I of the second section, "Speculum doctrinale," Vincent included a glossary, probably the first to be included in an encyclopedia.

Sometime during this period the Japanese dictionary *Setsuyōshū* was compiled. It was a very popular work whose influence extended over at least four centuries. A fourteenth-century handbook, *Le livre des mestiers*, was compiled at Bruges: its text has been reprinted by the Early English Text Society (Extra series, No. 79) (*7*). About this time Pierre Bercheure (1290–1362), a friend of Petrarch, compiled an encyclopedia based on Bartholomaeus Anglicus' *De proprietatibus rerum*. The third part of his work was a "Dictionarius," an alphabetically arranged glossary of more than 3,000 words in the Bible, with moral expositions (*8*). The *Kagakushū*, a Chinese–Japanese dictionary possibly compiled by a Buddhist monk, was widely circulated during the fifteenth and sixteenth centuries.

The *Promptorium parvulorum* was compiled about 1440 by Galfridus Anglicus, better known as Geoffrey the Grammarian, a friar-preacher at Lynn. It is important as a record of fifteenth-century English, as an illustration of the East Anglian dialect of those times, and as an explanation of much debased Latin. Richard Pynson issued it in 1499, and it was thus the first English dictionary to be printed in Britain (*9*).

But the earliest printed dictionary of two modern languages was the *Vocabolista italiano-tedesco* which was originally printed in Venice in 1477 (Cop. 6304). Later it was expanded to include four or five languages—e.g., by the printer Friedrich Peypus who issued an edition in Nuremberg in 1529 under the title of *Quinque linguarum utilissimus vocabulista*. In 1553 Christoph Froschaver the younger of Zurich (1532–1585) added an English column and issued a pocket-size edition (*10*). Thus the first polyglot dictionary was already well established by the sixteenth century.

William Caxton (c. 1422–1491) spent many years on the Continent at a French-speaking court. About 1480 he issued a vocabulary in French and English (*11*). This was followed by an English–Latin vocabulary, *Catholicon anglicum*, in 1483 (*12*). *The Harley Latin–Old English glossary: ed. from B. M. MS. Harley 3376* (*13*), also dates from this period.

Elio Antonio de Nebrija (c. 1444–1522), one of the most brilliant scholars of the age, collaborated—at the request of Cardinal Cisneros—in the revision of the Greek and Latin texts of the Complutensian Bible. He was also responsible for the compilation of one of the earliest Spanish dictionaries, the *Dictionarium latino-hispanum*, 1492 (*14*). At this time Domenico Nani Mirabelli was compiling his *Polyanthea nova* which was issued in 1503 (15). This popular work may be said to have been the prototype of the *Conversationslexikon:* it is arranged alphabetically by subjects and is furnished with etymological derivations, complete with numerous illustrative quotations.

John Rastell (d. 1536), a London printer and lawyer, compiled the *Exposiciones terminorum legum anglorum,* 1527, in Norman-French and English, of which an English translation was published by his son in 1567 (*16*). This was reissued several times, and in the seventeenth century became known as *Les termes de la ley.*

Guillaume Budé (1468–1540), friend of Erasmus and of many other philosophers of the day, originally intended to devote his *Commentarii linguae graecae,* 1529, to the explanation of Greek legal terms, but the actual text ranged far beyond this limit and influenced such people as Rabelais and Turnèbe (*17*). The first printed Dutch dictionary appears to have been the *Vocabulaire* of Nöel de Berlaimont, a schoolmaster at Antwerp; it was issued there a year before its compiler's death in 1511 (*18*). It was on this work that Berlaimont based his polyglot dictionary, *New dialogues or colloquies,* which was eventually published in London in 1639 (*19*).

The members of a celebrated Parisian publishing firm were responsible for a number of important contributions to the development of dictionary making. Robert Estienne (1503–1559), in collaboration with Thierry de Beauvais, compiled a *Thesaurus linguae latinae,* 1531, that found instant favor and continued to be published during the next 200 years (*20*). His brother Charles (1504–1564), who had been responsible for the *editio princeps* of Appian in 1551, showed early evidence of his interest in encyclopedic-dictionary making with his *Dictionarium propriorum nominum,* 1544—earlier anonymous works of the same title had been appearing for at least the past 40 years—which was followed by his Greek/Latin/

French vocabulary *De re vestiaria, vascularia et navali*, 1553. In the same year he issued his *Dictionarium historicum, geographicum et poeticum*. Robert's son Henri (1528–1598), a classical scholar who traveled extensively collating manuscripts, issued his *Thesaurus graecae linguae*, 1572, after 12 years of continuous work *(21)*.

The interest in the Italian language in England goes back many centuries. William Thomas (executed 1554), Italian scholar and clerk of the council to Edward VI, wrote a book entitled *Principal rules of the Italian grammer* [*sic*] *with a dictionarie*, 1550 *(22)*. John Florio (c. 1553–1625), the translator of Montaigne, wrote *Queen Anna's new world of words*, 1611 *(23)*, a book full of obsolete English words and their Italian equivalents, and therefore a fruitful source for philological research in both languages.

Henri Estienne's dictionary had been preceded by the *Lexicon graecolatinum*, 1562 *(24)*, of Jean Crespin (1520–1572), the printer and Protestant historian, which may have been used for the English translation of the New Testament. Probably the earliest list of foreign words in the German language, *Ein teutscher Dictionarius*, 1571 *(25)*, was compiled by Simon Roth (fl. 1560). In England two French and English dictionaries were issued at this time: the anonymous *A dictionarie French and English*, 1571, and *The treasurie of the French tong*, 1580 *(26)*, compiled by Claude de Sainliens.

In 1574 Cornelis Kiliaan (1529–1607) issued his *Dictionarium teutonico-latinum*, a Dutch-Latin dictionary whose name was changed in the third edition (1599) to the *Etymologicum teutonicae linguae*, under which title it continued to be revised and reissued until 1777 *(27)*. In Italy attempts at dictionary making had been limited mostly to the construction of vocabularies of single authors such as Dante, Petrarch, and Ariosto, but in 1575 Francesco de Alunno (c. 1485–1556) issued an attempt at a comprehensive dictionary in his *Della fabrica del mondo* *(28)*, and Leonardo da Vinci made a similar attempt.

The early history of dictionary making in Russia is a mixture of two elements: the compilation of brief bilingual vocabularies compiled by foreign visitors and the adaptation of foreign dictionaries for use in Russia. Thus the famous *Dictionnaire moscovite* of Jehan Sauvage and the *Dictionnaire des moscovites* of André Thevet (c. 1503–1592) were both compiled about 1586 and are sufficiently similar to give rise to the theory that they may both be based on an original document by another writer. Both lists—which each comprise about 650 entries—have until recently remained in manuscript in the Bibliothèque nationale: Thevet's in his *Grand insulaire et pilotage*, 1586 (B.N. fr. 15452), and Sauvage's in the Collection Dupuy (No. 844, fol. 418–423), but both have now been published *(29)*.

In 1587 Alfonso Sánchez de la Ballesta (fl. 1585) issued his *Diccionario de vocablos castellanos* *(30)*, a considerable advance on Nebrija's pioneer work. Five years before the Accademia della Crusca had been founded, but it did not begin work on its *Vocabolario* until 1591, and the first edition was not published until 1612. Three more editions were published by 1738, but none during the latter part of the eighteenth century. *A dictionary in Spanish and English*, 1623, compiled by

the adventurous Richard Perceval (1550–1620), originally appeared as the *Bibliotheca hispánica*, 1591 (*31*), of which a second edition, edited and enlarged by the lexicographer John Minsheu, was issued in 1599.

The remainder of the sixteenth century was equally important in the history of dictionary making. Laurentii Zizanii (fl. 1592–1602) was responsible for the first published Russian dictionary, a 23-page vocabulary entitled *Leksys . . . synonima slavenorosskaia* (Vilna, 1596), which has been issued twice in recent years (*32*). Edmund Coote's *The English schoole-maister*, 1596, included a 20-page vocabulary of the English language, on which the earliest English dictionaries drew extensively. And Mark Ridley (1560–1624), who became chief physician to the Tsar Boris Godunov, left among his manuscripts a Russian-English vocabulary which he compiled about 1599.

The Seventeenth Century. In 1603 a group of Jesuit missionaries living in Nagasaki, headed by Joan Rodriguez, compiled the *Nippo Jisho/Vocabulario da lingoa de Iapan*. This was a Japanese dictionary comprising over 32,000 entries in Roman characters.

The first true English dictionary was published in 1604. Robert Cawdry, tutor to Sir James Harington, was a Rutland schoolmaster. With the aid of his son, Thomas, he compiled *A table alphabeticall*, which achieved four editions by 1617 (*33*). The honor of compiling the first French dictionary on modern lines is generally granted to Jean Nicot (1530–1600), seigneur de Villemain, who introduced the tobacco plant to Catherine de Médicis. It was published posthumously (*34*), and there is some cause to believe that Aimar Ranconet (1498–1559) may have played a larger part than Nicot acknowledges on the title page. In the same year Bernardo José Aldrete (1565–1645) issued his *Del origen y principio de la lengua castellana* (*35*).

The vice-chancellor of Cambridge University, John Cowell (1554–1611), compiled *The interpreter*, 1607 (*36*), in which he advanced the opinion that the English monarchy was an absolute monarchy. On March 26, 1610, denounced as insulting alike to king and commons, Cowell's dictionary was burnt by the public hangman. New editions continued to appear until 1727. In the field of Hebrew language studies, Johann Buxtorf (1564–1629), issued the first great lexicon in 1607 (*37*). And, at the age of 21, Bishop Agostinho Barbosa (1590–1649) issued in 1611 one of the earliest Portuguese dictionaries: *Dictionarium lusitanico-latinum (38)*. The famous grammarian Covarrubias y Orozco (fl. 1548–1572) issued his *Tesoro de la lengua castellana, o española* in the same year (*39*); this was the first great Spanish dictionary, and among its many notable features was the inclusion of proverbs and idioms. Randle Cotgrave (died c. 1634), Lord Burghley's secretary, compiled *A dictionarie of the French and English tongues*, 1611 (*40*), which set a new standard for bilingual dictionaries. Mei Ying-tso compiled the *Tzü Hui*, a Chinese dictionary, about 1615.

John Bullokar (c. 1580–1641), a doctor, compiled *An English expositor*, 1616 (*41*), which was almost twice the size of Cawdry's dictionary and indicated the field of knowledge in which the more specialized words were used. In 1618 Richard

James (1592–1638), librarian to Sir Robert Bruce Cotton, visited Russia; his manuscript Russian vocabulary (Bodleian: James 43) has now been reproduced in facsimile (42). The second volume of the *Encyclopedia*, 1630, compiled by the theologian Johann Heinrich Alsted (1588–1638), was devoted to the subject of philology and included glossaries. And in this year appeared the Sanskrit dictionary *Kośalpataru (43)* of Viśvanatha (fl. 1608–1649).

Johann Buxtorf's son Johann (1599–1664) compiled a *Lexicon chaldaicum et syriacum*, 1622 (44), the first scholarly approach to these languages. Henry Cockeram, a gentleman of fashion and a friend of John Webster and John Ford, compiled *The English dictionarie*, 1623 (45), which was remarkable both for being the first compilation to use the words "English dictionarie," and for its inclusion—in the third part—of entries for people, animals, and mythological characters. The monk and typographer Pamvo Berynda (d. 1632) compiled a *Leksykon slovenoros'kii* 1627 *(46)* which is often referred to as the *Leksykon slavenorosskii*. Chang Tzŭ-lieh compiled the *Chêng Tzŭ T'ung*, a Chinese dictionary, in 1627.

The first book to be published in the Albanian language was the *Dictionarium latino-epiroticum*, 1635, compiled by the missionary Franciscus Blanchus (1606–1643). It included 5,000 words and over 100 Albanian proverbs (47). In the same year Cardinal Richelieu instructed the newly founded Académie française to compile an authoritative dictionary of the French language. One of the earliest Scandinavian dictionaries, the *Lexicon latino-scondicum*, 1637 (48), was compiled by the Swedish royal interpreter Ericus Schroderus (1570–1647). The first work on American aborigine languages was carried out by the Puritan Roger Williams (c. 1600–1683) who settled among the Narraganset, founded the city of Providence in 1636, and wrote *A key into the language of America*, 1643 (49). In the same year Michael O'Clerigh or O'Clery (1575–1643) compiled *A new vocabulary* of the Gaelic language.

An early dictionary of Norwegian, *Den norske dictionarium eller glosebog (50)*, was compiled in 1646 by Christen Jensen (d. 1653). The first etymological dictionary of the French language was compiled by the lexicographer and founder of the Mercuriales, Gilles Ménage (1613–1692), in 1650 under the title *Dictionnaire étymologique (51)* and was an immediate success, being reprinted with additions many times during the next 50 years. A friend of Ben Jonson and Kenelm Digby, James Howell (c. 1594–1666), improved on Cotgrave's dictionary with *A French-English dictionary (52)* in the same year. And the first work on African languages was carried out at that time by a Capucin monk, Georges de Gheel (1617–1652), who subsequently suffered martyrdom at the hands of tribesmen (53).

In Indochina the Jesuit missionary Alexandre de Rhodes (1591–1660), in the face of persecution and cruelty, compiled his *Dictionarium annnamiticum, lusitanum et latinum (54)* as early as 1651. The Royalist Thomas Blount (1618–1679), a barrister and a considerable landowner, was a friend of Sir William Dugdale and of Anthony à Wood. Supporting his claims by quoting various authorities such as Holyoke, he introduced etymological derivations into his illustrated *Glossographia*, 1656. He later compiled the *Nomo-lexikon* (1670), a notable dictionary of legal

terms (55). A nephew of John Milton's, Edward Phillips (died c. 1696), was educated by his uncle, and was the compiler of the first folio English dictionary, *The new world of English words*, 1658, which was modeled on Charles Estienne's *Dictionarium historicum, geographicum, poeticum*, 1553, and included proper names and historical and mythological terms. Blount, who felt that Phillips had borrowed too freely from his own works, eventually issued *A world of errors discovered in the Interpreter of Hard Words, written against Sir Edward Phillips book entitled A New World*, 1673. One of the earliest English–Dutch dictionaries was compiled by Henry Hexham (c. 1585–c. 1650), who had campaigned most of his life in the Low Countries. His substantial dictionary, *A copious Englisg* [sic] *and Netherduytch dictionarie*, 1658–1660, was quickly followed by a second edition, 1672–1675 (56). The *Lexicon tetraglotton*, an English–French–Spanish–Italian dictionary to which Howell had contributed, appeared in 1659–1660.

In 1661 Hiob Ludolf (1624–1704), the greatest orientalist of the times, issued his *Lexicon aethiopico-latinum*—the first Ethiopian dictionary—from London where the necessary types were to be found at the printers who had issued the polyglot Bible (57). Elisha Coles (c. 1640–1680), a private tutor and a pioneer writer on stenography, compiled in 1676 *An English dictionary*, a work of c. 25,000 words. This ranged further than its predecessors and included dialect (identified by county of use), place names, and technical terms. This was the first general English dictionary to include slang. The standard dictionary of medieval Latin, compiled by Charles du Fresne, sieur du Cange (1610–1688), the *Glossarium mediae et infimae latinitatis*, 1678 (58), has—with revisions and additions—remained the principal work on the subject until the 1960s. His *Glossarium ad scriptores mediae et infimae graecitatis* was issued in 1688.

Pierre Richelet (1631–1698) was the first compiler of a French dictionary to express extensively his personal likes and dislikes, and many of his definitions were satirical or even scabrous. His *Dictionnaire françois* (59) was published clandestinely in 1679–1680. Richelet's dictionary was classified. In the specimen sheets (60) issued in 1684, Antoine Furetière (1619–1688), the eldest son of a secretary to the Chambre du roi, proposed alphabetical order for his own dictionary. After great difficulties with the Académie, Furetière died and his encyclopedic *Dictionnaire universel des arts et sciences* did not appear until 1690. Terms from both the arts and sciences were included, and the quality of the dictionary was such that it was plundered and plagiarized for almost a century.

About this time Sāhāji, king of Tanjore (fl. 1684–1712) compiled the *Sabdarathasamanvaya kośa* (61), an important contribution to the development of Sanskrit dictionary making. The anonymous *Gazophylacium anglicanum*, 1689, evidently found its title a handicap; its second edition, 1691, had the title *A new English dictionary* (62). Stephen Skinner (1623–1667), a Lincolnshire doctor, had left a manuscript of his *Etymologicon linguae anglicanae* (63); it was edited by his friend Thomas Henshaw and published in 1671. This was the first true English etymological dictionary. It comprised five vocabularies, including proper names and Old English words. The Quaker historian, Willem Sewel (1653–1720), compiled *A new diction-*

ary, English and Dutch, 1691 (*64*), of which no less than six editions had been issued by 1766. John Dunton (1659–1733), an industrious hack, compiled *The ladies dictionary*, 1694, an undistinguished work that is of interest only for its professed endeavor to be of service to women.

The dramatist and Academician Thomas Corneille (1625–1709) produced at the request of the Académie *Le dictionnaire des arts et des sciences*, 1694 (*65*). This was published as a supplement to the first edition of the Académie's great *Dictionnaire* (*66*), issued in the same year, as a rival to Furetière's dictionary. In this aim it had considerable success, for Corneille was thorough in his approach and consulted original works for his authority wherever possible.

The Eighteenth Century (to Johnson). The influence of dictionaries of one country on those of another had of course existed since the earliest times, but so far it had been intermittent and uncertain. With the publication of such dictionaries as those of the Académie, Furetière, and Richelet, new standards had been set and the lexicographers of the less advanced countries were spurred to compile dictionaries of a far better standard than they had hitherto been able to produce. More attention was therefore paid to accuracy, to careful examination of primary sources, and to the study of contemporary usage.

The first two dictionaries of the eighteenth century did not exemplify this: one of the protegés of Peter the Great, Ilya Fedorovich Kopievskii (c. 1650–1701), compiled a short *Nomenclator in lingua latina, germanica et russica*, 1700, but Ivan Maksimovich's *Latinorosskii slovar'*—which was only an adaptation of Knapius' *Thesaurus*—remained in manuscript. One of the earliest English and Portuguese dictionaries, *A compleat account of the Portugueze language . . . By A. J.* (*67*), was issued in 1701, the same year that saw the appearance of Pieter Marin's influential *Dictionnaire complet françois et hollandais* (*68*). *A new English dictionary. By J. K.*, 1702 (*69*), was almost certainly the work of John Kersey the philologist, son of John Kersey (1616–1690) the mathematician.

John Worlidge's 845 page *Dictionarium rusticum et urbanicum*, 1704, heralded the new trend toward interest in technical terms that is also reflected in the *Lexicon technicum*, 1704, of John Harris (c. 1666–1719). Harris, an improvident divine and scientist who was a Fellow (and, later, Vice-President) of the Royal Society, gave emphasis to practical and scientific subjects, at the expense of the humanities, in his *Lexicon* (*70*) which was excellently illustrated. Again, *Cocker's English dictionary* (*71*), the posthumous work of the mathematician and engraver Edward Cocker (1631–1676), though largely derivative, included words used in trade and in the armed forces. Also in 1704 the Jesuit Fathers of Trévoux issued their *Dictionnaire universel françois et latin* which was based—without acknowledgment—on Furetière's dictionary. This favorite work quickly became known as the "Dictionnaire de Trévoux" and achieved six editions in less than 70 years. The great linguist and philosopher, Christian Reineccius (1668–1752), who compiled a quadrilingual New Testament, issued the *Janua hebräeäe linguäe Veteris Testamenti,* 1704, of which numerous subsequent editions have been published. And Theodor Polikarpovich Polikarpov-Orlov, also known as Fedor Polikarpov (d. 1731) published his trilingual

Leksikon treiazychnyi sirech rechenii slavenskikh ellinogrecheskikh i latinskikh sok-rovischche in 1704. [A later attempt by Johann Kaspar von Taubert (1717–1771), compiled while he was at the Russian Academy about 1751, has remained in manuscript.]

Continuing his interest in technical terms, Georges Guillet de St. Georges (c. 1625–1705), the first historian of the Académie royale de peinture et sculpture, had compiled the influential *Les arts de l'homme d' epée; ou, Le dictionnaire du gentilhomme* in 1670; it was adapted as *The gentleman's dictionary*, 1705 (72), which became equally important as the original as a source-book. John Kersey's new edition of Phillips' *The new world of English words*, 1706, was heavily influenced by Furetière and Harris, and was not only larger but practically a new work. The anonymous *Glossographia anglicana nova*, 1707, was also influenced by Harris's *Lexicon* (the same publishers issued both works), and it included many scientific and technical terms. Basing his work on the *New World of English words*, John Kersey now compiled his own dictionary, the *Dictionarium anglo-britannicum*, 1708. This was a deliberately brief but well-designed work of some 35,000 words (73), intended to be portable. It fully demonstrates Kersey's right to be called the first true English lexicographer. It is known that about this time Joseph Addison was discussing his *Proposals for printing an English dictionary* (74), which was to have been a two-volume work illustrated with suitable quotations. Nothing came of this project, but it is evident that by now the essential content and purpose of dictionaries were topics of general discussion in Britain, particularly since the issue of several outstanding French dictionaries had made the British uncomfortably aware of the comparative poverty of their own country in this respect.

Raphael Bluteau (1638–1734) compiled a *Vocabulario portuguez, e latino*, with a *Diccionario castellano, y portuguez* (75) as an appendix, which was issued by the Jesuits of Coimbra during 1712–1721. The *Glossarium sueo-gothicum*, compiled by Haqvin Spegel (1645–1741), who subsequently became archbishop of Uppsala, was also issued in 1712. In 1713 the Spanish Academy was founded at Madrid, one of its chief aims being the compilation of an authoritative dictionary that would set an example and a standard for future writers. In China, Chang Yü-shu and a number of others were instructed by the emperor K'ang-Hsi to compile a dictionary within 5 years. The *K'ang Hsi Tzŭ Tien* was completed in 1716 and published in a Palace block-print edition. Almost all later Chinese dictionaries have been based on this. It comprised some 50,000 characters arranged by radicals.

In 1718 the Académie française issued the second edition of their dictionary, in which the contents were arranged for the first time in alphabetical order. The notable lexicographer Nathaniel Bailey (d. 1742) compiled *An universal etymological English dictionary* (76) in 1721. This comprised some 40,000 words and was so popular that it achieved thirty editions in the next 81 years. It was the first dictionary to attempt to include all the words in the English language, including obsolete terms. The anonymous *Neues vollkomenes und nach alphabetischer Ordnung wohleingerichtetes Wörterbuch* (77), which was issued in two parts in 1722, was one of the first attempts at a general dictionary of the German language. John Stevens' *A new*

dictionary, Spanish and English, and English and Spanish (78) was published in the year of his death, 1726, and was a considerable triumph, being the largest Spanish/English dictionary published to that time. The Spanish Academy's great dictionary first began appearing in that year *(79)*. Following the principles laid down by the Italian Academy, the Spanish lexicographers searched the works of the greatest Spanish authors of the past, listing obsolete as well as current words, and illustrating their use by copious quotations and proverbs. Only proven etymologies were given, and some technical terms in science and the humanities were included. It is of particular importance, since all later editions abandoned the extensive use of quotation, and the size of the work was reduced to one volume.

Johann Georg Wachter's *Glossarium germanicum*, 1727 *(80)*, was one of the earliest dictionaries to include bibliographical footnotes. Nathaniel Bailey's second work, *The universal etymological English dictionary*, 1727 *(81)*, was supplementary to his 1721 dictionary and, in the 1731 edition, introduced stress marks. Influenced by the example of Guillet de St. Georges, it paid special attention to the language of seamanship, the armed forces, horseriding, etc., and in succeeding editions enlarged the number of its entries by adding an increasing profusion of technical and other words not in general use. By 1776 it had reached its seventh edition. In 1728 Ephraim Chambers (c. 1680–1740) issued his *Cyclopaedia*, the first true British encyclopedia, which influenced the contents of later dictionaries. On his dictionaries of 1721 and 1727, Nathaniel Bailey based his *Dictionarium britannicum*, 1730 *(82)*, which included much new material. Bailey was the first to employ specialist experts as collaborators and thus demonstrated that the making of a comprehensive dictionary was already beyond the scope of any one man. And his ready use of woodcut illustrations emphasized how much more could be economically conveyed in a visual fashion. Hugh MacCurtin (c. 1680–1755) and Conor O'Begley compiled *The English-Irish dictionary* in 1732. Thomas Dyche (died c. 1733), in collaboration with William Pardon, compiled *A new general English dictionary* in 1735 which was mainly remarkable for its emphasis on the importance of pronunciation and grammar.

One of the most influential of the early English dictionaries was the work of Robert Ainsworth (1660–1743): his *Thesaurus linguae latinae compendarius (83)* was first issued in 1736, and was still being published in many revised editions and abridgments in the nineteenth century. David Malcolme (d. 1748), the philologist, included in his *An essay on the antiquities of Great Britain and Ireland*, 1738, a proposal to publish a Gaelic dictionary based on the manuscript collections of Edward Lhuyd (1660–1709), the Celtic scholar. Unfortunately the dictionary was never issued, but Malcolme's essay served to stimulate later efforts such as *A Galick and English vocabulary*, 1741, compiled by Alexander M'Donald (c. 1700–c. 1780).

The manuscript of one of the earliest Norwegian dictionaries, *Een liden glose-bog*, 1740, compiled by Knud Leem (1697–1744), has survived and has been published *(84)*. The philologist Franciscus Junius (1589–1677) left the manuscript of his *Etymologicum anglicanum (85)* to the Bodleian. Edward Lye (1694–1767) edited it and issued it in 1743. This was one of the first lexicons to employ historical quotation in support of its explanations and the first to attempt to establish the etymologies

of words of one language in conjunction with their cognates in other languages. In 1747 Samuel Johnson (1709–1784) published his *Plan of a dictionary of the English language*, an historic document that set the policy of English lexicographers for many years to come. The immediate precursor of Johnson's dictionary was compiled by the mathematician and instrument-maker Benjamin Martin (1704–1782). His *Lingua britannica reformata*, 1749 (*86*), may have been influenced, and its issue accelerated, by the publication of Johnson's *Plan*, for it carefully differentiates between the various meanings of individual words, setting them out logically and providing them with definitions of a far higher standard than had previously been achieved. For its time this dictionary was outstanding, and the fact that it ran only to a second edition must be attributed to Johnson's overwhelming triumph rather than to any imperfections of its own.

Undertaken as a revised edition of Estienne, the *Index etymologicus latinitatis*, 1749, of Johann Matthias was in effect a new work. But most of the important research into the etymology of the Latin language did not take place until the next century. The "lover of Good English and Common Sense" on the title page of *The complete English dictionary*, 1753 (*87*), was in fact John Wesley (1703–1791). His dictionary was somewhat humorously named, for it comprised only some 4,600 entries and was chiefly designed to enable his followers to understand his own writings. As such it was extremely successful and achieved four editions by 1790.

Samuel Johnson. The publication in 1755 of Samuel Johnson's *Dictionary of the English language* (*88*) at last gave Britain a dictionary that could stand comparison with those productions of the French, Italian, and Spanish academies English scholars had so much admired. It was not that Johnson had given his fellow countrymen anything new in the way of dictionaries, but rather that he had done superbly well what others had only imperfectly attempted. His judgment and his good taste had brought forth a reference work where definitions were ably supported by apt quotations duly documented, and though—like any other great work—able contemporary scholars could reprehend it for its flaws, only the envious could fail to recognize the grand concept for which only a genius could have been responsible. Joseph Nicoll Scott (c. 1703–1769), successively dissenting minister and doctor, issued in the same year his revision of Nathaniel Bailey's *An universal etymological English dictionary* under the title of *A new universal etymological dictionary* (*89*). Issued in parts, and illustrated with full-page copper-plate engravings, this was a notable and scholarly dictionary of well over 60,000 entries. In spite of Johnson's success, this work was reissued three times during the next 17 years. The *Linguae britannicae vera pronunciatio* (*90*), issued in 1757 by James Buchanan (fl. 1753–1773), pointed out that "every word has not only the common Accent to denote the Emphasis of the Voice, but, in order to a just Pronunciation, every syllable is marked with a long or short Accent to determine its Quantity," and included a supplement of some 4,000 proper names. Accent and pronunciation were in fact to prove the main preoccupations, as is demonstrated by Daniel Fenning's *The Royal English dictionary*, 1761 (*91*), which covered similar territory.

Giral del Pino's *A dictionary, Spanish and English, and English and Spanish*, 1763

(92), attempted comprehensive treatment, incorporating technical and cant words, idiomatic phrases, and figurative and burlesque treatment. Pronunciations followed the recommendations of the Spanish academy. The great Birmingham printer John Baskerville (1706–1775), having issued his magnificent edition of the English Bible in 1763, sought to restore his finances by publishing a typographically distinguished duodecimo, *A vocabulary (93)*, in 1765. Its compilation has recently been attributed to Joseph Priestley. The Reverend John Entick (c. 1703–1773), a schoolmaster and editor of Littleton's *Latin dictionary* and Schrevellius' *Greek lexicon*—he later wrote a history of the American War of Independence—compiled *The new spelling dictionary*, 1765 (*94*). Entries were usually restricted to one line each, and proper names were included. About fifty editions were issued during the next 70 years.

In the late eighteenth century, Jacopo Facciolati (1682–1769), who had edited in 1715–1719 a new edition of Ambrose Calepino's *Lexicon undecim linguarum*, 1502, set his pupil and brother-professor Egidio Forcellini (1688–1768), to compile a totally new Latin dictionary. This Facciolati continued after Forcellini's death and took most of the credit for this substantial work which was to serve as the basis for so many later Latin dictionaries. It was posthumously published in 1771 as the *Totius lexicon latinatis (95)*. Edward Lye, who had edited Franciscus Junius' *Etymologicum anglicanum*, continued working on his own dictionary until his death, when his friend Owen Manning (1721–1801) edited the manuscript and published it as the *Dictionarium saxonico et gothico latinum (96)* in 1772. The influence of this work on contemporary Anglo-Saxon studies corresponded with the antiquarian spirit of the age, and was to have its finest results in dictionary making in the next century. By now the inclusion of geographical and biographical information was becoming a normal feature of English dictionaries. The Reverend Frederick Barlow (fl. 1772–1775) emphasized these adjuncts in the title page to his *The Complete English dictionary*, 1772, which, like many of its contemporaries, was issued in parts on subscription. This work constituted an early form of the modern encyclopedic dictionary, many of the entries including considerable information in addition to the normal dictionary definitions. In the same year the scoundrelly Grub-Street writer William Kenrick (c. 1725–1779) produced his *A new dictionary of the English language*, whose contents were largely filched from its predecessors.

Jens Christian Svabo (1746–1824) left a manuscript, dated 18 June 1773, entitled *Forsøg til en ordbog eller ordsamlingi det faerøeske sprog*, which is now being edited by Chr. Matras (Munksgaard, Copenhagen, 1966–). Two important Russian dictionaries appeared at this time: the *Tserkovnii slovar'*, 1773–1776 (*97*), of the priest Petr Alekseevich Alekseev, which was confined to Church Slavonic; and the *Slovar' russkogo iazyka*, compiled by Andrei Ivanovich Bogdanov (1693–1766), who was librarian to the Russian academy. Abraham Sahlstedt (1716–1776), "The most influential grammarian and lexicographer of the eighteenth-century" and author of the *Svensk grammatica*, 1769, which helped to set the standard for modern Swedish, issued a *Svensk ordbog* in 1773, which provided definitions of Swedish words in Latin.

One of the greatest sources for the older words in the German language and one

of the finest of the early German dictionaries was the work of Johann Christian Adelung (1732–1806), librarian to the Elector of Saxony. Adelung's aim was to purify the German language and to lay down sound laws concerning what words writers should and should not use. His *Versuch eines vollständigen grammatisch-kritischen Wörterbuches der hochdeutschen Mundart*, 1774–1786 (*98*), dealt thoroughly with problems of pronunciation, orthography, inflection, construction, and use. James Barclay's *A complete and universal English dictionary*, 1774, is chiefly remarkable for its plentiful use of synonyms; four editions were published before the end of the century.

The question of establishing a standard system of the pronunciation of the English language had been under discussion for some time. James Buchanan had published *An essay toward establishing a standard . . . of an elegant and uniform pronunciation* in 1766. Now, John Walker (1732–1807), a friend of Johnson and Burke, issued his prospectus on *A general idea of a pronouncing dictionary*, 1774. Being an actor, Walker was more conscious than most people of the factors involved in improving pronunciation. Accordingly, the next year he issued *A dictionary of the English language* (*99*) in which the words were arranged according to their terminations. And, in 1791 the publication of his *A critical pronouncing dictionary and expositor of the English language* was well received. Walker set out to show the sound of every syllable, and preferable pronunciations where two or more were in use. Though Buchanan's diacritic system was finally to triumph, Walker's authoritative guide had a profound influence on the dictionaries of the next 50 years or more, and his work was still being printed in the early years of the twentieth century.

Another and more famous actor, Thomas Sheridan (1719–1788), godson of Jonathan Swift, had written in 1762 *A dissertation . . . on difficulties in learning the English tongue, with a scheme for an English grammar and dictionary*. In 1780 he issued his own *A general dictionary of the English language* (*100*). This, together with Johnson's and Richardson's dictionaries, was used by the Philological Society when making their plans for what in the end was to be the *New English dictionary*. Sheridan's dictionary, by 1797, had reached four editions in London, and six in Philadelphia.

In 1784 Christian Frederik Bay (c. 1737–1809) issued his *A Compleat vocabulary, English and Danish* (*101*), a pioneer work on which all later English/Danish dictionaries have drawn extensively. In the same year Prokhor Zhdanov issued *a new dictionary, English and Russian* for the use of midshipmen at the Naval Academy at St. Petersburg. In the following year the Richmond Herald, Francis Grose (c. 1731–1791), compiled *A classical dictionary of the vulgar tongue* (*102*). Twice re-issued in the eighteenth century, it had two further editions in the next century under the title of *Lexicon balatronicum*, "a dictionary of buckish slang, university wit, and pickpocket elegance," the last edition, 1823, being edited by Pierce Egan. In 1787 Grose issued *A provincial glossary* (*103*), which was chiefly concerned with local proverbs and superstitions.

The first true general dictionary of the Russian language was the first edition of the dictionary of the Russian academy (*104*), which was issued in six volumes dur-

ing the years 1789–1794. Its contents were arranged in etymological order—a system abandoned in subsequent editions. The most influential of all Portuguese dictionaries was the *Diccionario da lingua portugueza*, 1789 (*105*), compiled by Antonio de Moraes e Silva (1755–1824), which was remarkable for its skillful choice of quotations as examples of the use of the more important words. The lasting success of this work is demonstrated by the fact that its tenth edition was issued in 1949–1959. This was followed by the first—and only—volume of the Portuguese academy's dictionary in 1793, which was largely the work of Pedro José da Fonseca (1737–1816).

The standard Danish dictionary was the work of a commission set up by the Danish academy. Although their work is by no means the largest of the national dictionaries, it took 100 years to produce, the *Dansk ordbog* (*106*) eventually appearing in the years 1793–1805. The philosopher and theologian, Johann August Eberhard (1739–1809), issued the first substantial work on German synonyms, the *Allgemeine Synonymik der sinnverwandten Wörter der hochdeutschen Sprache* in 1795–1802, which he immediately followed with his *Versuch eine allgemeinen teutschen Synonymik in einem kritisch-philosophischen Wörterbuch* (*107*). The *Griechisch-deutsches Wörterbuch*, 1797–1778, of Johann Gottlob Schneider (1750–1822), was to serve as the basis for Passow's great dictionary in the next century.

In 1798 a board of forty Chinese scholars—headed by Juan Yüan—issued the *Ching Chi Chuan Ku*, a dictionary of Chinese characters used in the classics. It was arranged by rhyme. The manuscript of a Portuguese dictionary left by Francisco Julio Caldas Aulete (1740–1800) was not published until 1881, but—in revised form—was reissued as a "Dicionário contemporâneo" as recently as 1958.

The first substantial Dutch dictionary, the *Nederduitsch taalkundig woordenboek*, compiled by Petrus Weiland (1754–1841) was issued in five parts during the years 1799–1810. And the anonymous *A vocabulary of such words in the English language as are of dubious or unsettled pronunciation*, 1797 (*108*), showed—like Stephen Jones' *Sheridan improved* the previous year—that the quality of the work of the pioneers was stimulating even greater efforts towards correct English speech.

The early dictionaries in each language were mainly concerned with increasing their coverage of the contemporary polite vocabulary—to which the admission of slang, technical terms, proper names, and foreign loan-words was only a matter of time. Interest in the origins of words is, of course, as old as the earliest dictionaries, but the modern type of etymological dictionary was slow to evolve and the principles on which such works must be based were only gradually comprehended. Similarly, the use of quotations to illustrate the use and changes in meaning of words was a late development, though commercial considerations concerning what was the maximum marketable size of dictionary may well have influenced this. The need for adequate documentation was appreciated only by the middle of the eighteenth century and was often ignored long after that time. The aid that illustrations could give was only occasionally appreciated, though examples were not wanting. By the end of the eighteenth century most of the major countries had a national dictionary or something approaching its equivalent—none, however, was really up-to-date for

none admitted all the words used by the people in everyday conversation. There was, therefore, a growing number of more specialized dictionaries designed to fill this gap. Appended is a list of the outstanding books and articles that throw more light on this vast and complex subject. (*109*).

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ROBERT L. COLLISON

Dictionaries after 1800

A dictionary is "A book dealing with the individual words of a language (or certain specified classes of them) . . ." (*1*). It is convenient to begin with this truncated statement because, by its lack of specificity, it points up the difficulty of composing a definition generally applicable to dictionaries after 1800. Perhaps most commonly dictionaries are thought of as books containing words, alphabetically arranged, with explanations of their meanings; and yet not all dictionaries are characterized by either an alphabetical arrangement or explanations of meanings. In lieu of a generic statement, therefore, it will be useful to consider instead the characteristics of modern dictionaries.

Dictionaries can be classified, then, according to *range, features in general,* and *features of entries;* and each of these classes can be further subdivided *(2).*

The range of a dictionary depends upon the volume and spread of its materials. In turn the volume and spread are dependent upon three factors: the *limits of the vocabulary,* the *number of languages involved,* and the *degree of concentration on lexical matters.*

The vocabulary contained in a dictionary may be limited, in the first place, in breadth; and perhaps the most obvious kind of limitation is chronological. For living and changing languages does the dictionary include only words currently in use, or does it also contain forms recorded in literary texts but no longer part of the active vocabulary? In the former case we may find, for example, dictionaries of current American English or even selected lists of most frequently used words (as in school dictionaries). In the latter case there are far-reaching historical compilations, such as the *Oxford English Dictionary,* or works restricted to one chronological period, such as a dictionary of Middle English. In practice, of course, no dictionary can hope to include the entire lexicon of a language (that is, the whole body of lexemes, or words), because earlier words may now be lost and new words enter the lexicon even while the lexicographer works. Every dictionary therefore tends to represent only a selection of lexemes from the chronological range.

Other limitations in the breadth of the vocabulary are imposed not so much by time as by space. For example, does a dictionary cover regional and social dialects of a language; does it include slang? There are, of course, dictionaries restricted entirely to slang or to one or another dialect. Another kind of limitation in breadth is determined by the inclusion or rejection of specialized terms, such as scientific words. Here again, in addition to the general dictionaries which aim, more or less, to include among their words the specialized terms of a language, we have compilations of such terms alone—as in dictionaries of mathematics or economics or the terms of literary criticism.

Range may also be limited in depth by the number of meanings given for each word, including contextual connotations. At one end of the scale are the simpler lists, such as school dictionaries, which often present only a single meaning for each word. At the other end are works like the *Oxford English Dictionary,* which offers the famous example of 24 folio pages devoted to the word *set.*

The second main factor upon which the range depends is the number of languages involved. A dictionary may be monolingual, bilingual, or multilingual (polyglot), as determined by the language or languages employed for definitions. As we shall see, with some exceptions the most authoritative modern dictionaries are large-scale monolingual works, in which the meanings are expressed in the language of the words being explained. On the other hand, a common understanding of what dictionaries are would probably include reference to the large class of bilingual dictionaries —for example, the familiar French–English or English–German or Spanish–Italian dictionary. Multilingual dictionaries nowadays are confined mainly to specialized terms, such as a dictionary of chemistry in four languages or of librarianship in twenty languages.

The final factor determining range is the degree of concentration upon lexical matters. Dictionaries may confine their attention to the lexemes of a language, or they may also incorporate encyclopedic information—biographical sketches, place names, notes on historical facts. A dictionary which tries to restrict itself only to lexical matters (*Webster's Third New International Dictionary* is an examplar) rigorously avoids proper names and the inclusion of elaborate explanations which go beyond the needs for simple definitions of words. On the other hand, an encyclopedic dictionary (as exemplified by Larousse's *Grand dictionnaire universel*) tends at the extreme to be virtually indistinguishable from an encyclopedia, properly speaking. It might be mentioned that most modern dictionaries seem to include some encyclopedic matters which sometimes are contained in appendices, such as lists of foreign words, rhyming words, place names, and colleges.

Where the characteristic of range is determined by the volume and spread of the material assembled for a given dictionary, the characteristic of features in general depends upon the lexicographer's approach to and handling of his material. In respect to general features we can distinguish three main factors: *time, arrangement,* and *tone.*

It was pointed out earlier that the words in a dictionary may be chosen from an extensive or more restricted segment of the time-axis of a language. In either case the treatment accorded to those words may be contemporaneous (synchronic) or historical (diachronic). A dictionary utilizing the former approach, in its explanations of words, tends to concentrate on current meanings; often when several definitions of a word are provided, the most common modern meaning is given first, and the other definitions are arranged without regard for the evolution of the meanings. In a pure historical dictionary, on the contrary, the historical succession of lexical meanings would be taken into account, and the evolution of those meanings would be clearly displayed. The diachronic approach also emphasizes etymology, that is, the pre-history of words, or their derivations before the times of their first recorded appearances in their earliest meaning situations; and one type of historical dictionary is the etymological dictionary, such as Wartburg's *Französisches etymologisches Wörterbuch.* In practice dictionaries ordinarily do not hold exclusively to either the synchronic or the diachronic approach, but instead present a mixture of the two.

Another general feature of dictionaries is arrangement, which may be alphabetical or semantic. Alphabetical arrangement indeed is so commonly considered the chief mark of a dictionary (together, perhaps, with the presence of definitions) that a recent work defines *dictionary* as "A reference book containing an explanatory alphabetical list of words" (3). Although it is true that most modern dictionaries of those languages which use alphabets (as opposed, for example, to Chinese and others that use ideograms) have been alphabetically arranged, even here there are variations. In some dictionaries the words are grouped under head-words (which themselves are in alphabetical order), so that an index or cross-references are necessary to locate any word that is not a head-word. Related to alphabetical dictionaries are the lists in reverse alphabetical order and, more tenuously related, rhyming dictionaries, which take stressed vowels, rather than initial letters of words, as the

basis of their arrangement. A second kind of arrangement, the semantic, is so infrequent in modern dictionaries as to be almost negligible. In a semantic dictionary the words are arranged according to bonds of meaning under main ideas; perhaps the most famous example in English is Roget's *Thesaurus*.

A final general feature of dictionaries is tone—detached or preceptive. A detached tone has as its goal the objective presentation of a vocabulary, with straightforward explanations of the meanings of words, whatever the social situations in which they normally appear. In particular, by this approach it is usually not relevant that a word is used more by persons of one social class than another. Generally we find that in the large modern historical dictionaries the handling of the materials is detached. On the other hand, preceptive, or didactic, dictionaries tend to have a social aim—to instruct readers in the words and uses ordinary among various social classes. Some preceptive dictionaries in fact may be considered manuals of usage, since their purpose is to show what is "correct" speech or prestige language and what is "improper" or "uneducated." In a detached dictionary of American English the word *ain't* may be glossed merely as "are not," "am not," and "is not"; in a preceptive work it will be noted that *ain't* is not used by the educated classes. Here again modern dictionaries often present a mixture of the detached and the preceptive; and even the description of a word as regional or dialectal may be taken by some as a prescription to avoid using it.

Turning now from the lexicographer's general approach to the range of his material, we must consider finally the components of the individual entries in dictionaries. It will be worthwhile to point to four major components—*definitions, documentation, exemplification,* and *etymology*—as well as several miscellaneous features, such as pronunciation and illustrations.

It was noted above that dictionaries vary in respect to their range in depth, depending upon the number of meanings recorded for each word. Whether this record is brief or extensive, however, the definitions or glosses themselves may vary widely in fullness and specificity. At one end of the continuum are brief explanations, even one-word synonyms for the words being defined. At the other end are profuse definitions which may go beyond the purely lexical into the area of encyclopedic information. It might be mentioned here that definitions, as well as alphabetical arrangement, are usually taken as the main distinguishing mark of dictionaries As one might expect, however, there are examples of dictionaries without definitions, such as the reverse dictionaries, which are usually simply lists of the words of a language.

Although documentation and exemplification go hand in hand, they can in fact appear independently of one another. Documentation identifies the provenance of words, whereas exemplification presents instances of usage. The documentation may be textual, where references are given to sources (often printed) in the literary language; dialectal, where notes identify the dialects in which the words appear; or geographical, where spatial locations are given for words. Usually such documentary notes are extended by examples of usage, taken either from the written language or from living dialect or regional speech. One of the major features of many modern historical dictionaries is their documentation and exemplification of the evolution of meanings for each word.

We have seen earlier that historical dictionaries tend to favor the inclusion of etymologies, but even dictionaries compiled from a synchronic viewpoint may contain etymologies. In fact, nowadays etymology is an ordinary feature of general language dictionaries; and like definitions, etymological notes vary in fullness from the briefest mentions to extensive discussions.

Finally, modern dictionaries are also characterized by miscellaneous features in their entries. Here we need only mention pronunciation, which may be indicated by phonetic transcription or transliteration, and functional illustrations, including drawings and photographs, which may be considered extensions of the definitions.

We have seen that dictionaries are repertories of lexemes usually presented in a systematic manner and with explanations of the lexical meanings. There are, however, numerous reference books which are entitled dictionaries but which have in common with dictionaries properly speaking only an alphabetical arrangement and explanations of discrete entries. In this class we find dictionaries of people, places, things, and ideas—for example, *Dictionary of National Biography, A Dictionary of Angels, Oxford Classical Dictionary, Harvard Dictionary of Music, Dictionary of Place-Names, Dictionary of Quotations, A Dictionary of Symbols,* and *A Dictionary of Hymnology.* None of these is a dictionary in the sense that we have been using, even though some of them do contain an admixture of material appropriate to a dictionary. This class of works should be distinguished from another class properly labeled dictionaries—the dictionaries and word-lists of various arts, sciences, and trades. Here the intent of the compiler is usually to select a corpus of words for treatment on the basis of their use in or relevance to one or another field of knowledge. In this class are *Dictionary of Education, A Dictionary of Geography, Black's Law Dictionary, A Dictionary of the Social Sciences, Mathematics Dictionary, Condensed Chemical Dictionary,* and others. Of course, the distinction between this class and the preceding one sometimes becomes tenuous, but it is useful to keep in mind that not everything called a dictionary is in fact a dictionary (4).

It is not surprising, perhaps, that the history of dictionaries since 1800 can be interpreted as having been shaped by many of the moving forces of history generally. Nationalism, the opening of other cultures to Western influence, and the growth of the scientific spirit have all had evident impact on dictionary-making during the last 170 years. Of course, such generalizations always falsify history, but the following comments are intended to note at least some of the tendencies which may be discerned in dictionaries after 1800.

At the beginning of the nineteenth century many of the foremost dictionaries were characterized by the preceptive approach in their handling of their vocabularies. The prominent English works and the academy dictionaries of France, Italy, Spain, and other countries took it as their goal to inculcate habits of correct or elegant speech and even proper pronunciation. For the most part this trend persisted through the early nineteenth century; and it was especially marked in countries such as the United States, where dictionaries were almost a part of education for nation-building. Indeed, the tendency continues today (perhaps in part because the influence of the achievements of the eighteenth and early nineteenth centuries gave rise to the common notion that a dictionary is necessarily preceptive). As recently as 1969 an

important new dictionary of English was published with a widely professed didactic aim (5).

By the mid-nineteenth century, however, we find the first stirrings of modern lexicography. In Germany the Grimm brothers, in France Littré, and in England the progenitors of what became the *Oxford English Dictionary* began work on their compilations, which came to serve as *exemples par excellence* for other countries and languages. The strength of these endeavors lay in their adherence to a detached description of language, with particular emphasis on the historical evolution of meanings, all derived through the soundest philological scholarship of the time. After these projects marked out the ground, other countries soon followed; and there began the series of scholarly dictionaries, frequently sponsored by national academies, which has also continued to the present day. It is interesting to note how many of these dictionaries were initiated in countries when a sense of nationhood became widespread. One might almost posit that the flowering of national consciousness gives rise to a demand for a dictionary of the indigenous language of a country.

By the late nineteenth century an increase in the number of dictionaries of different languages and dialects was coming about through another influence—the spread of European ideas into non-Western cultures. Both the needs of trade and the missionary impulse made it necessary that Europeans be able to converse with other peoples in their own languages, and bilingual dictionaries and vocabularies became a *sine qua non*. Africa was a paradigm of this movement; before the age of European explorations there were almost no dictionaries of African languages, but by 1900 there were a number of vocabularies and word-lists, especially for the areas in which trade, colonization, and missionary work were going on.

The influences and tendencies which we have been considering have continued in the present century, and have been joined by another, equally powerful—the growth of modern linguistics. Linguistics has emphasized the scientific and minute observation of language, especially spoken language with lexemes in real meaning situations; and the mass of detailed investigation of how language moves and acts, of what is meaningful and how meaning arises, has been of immeasurable benefit to lexicography. In particular, lexicography has come to take as its goal the scientific and detached presentation of a corpus of lexemes derived from a thorough study of living language.

Some of the most illustrious dictionaries of the nineteenth and twentieth centuries are noted in the following section, which is arranged by main families of languages. It should be pointed out that this section is not intended to list all the important dictionaries of the chief languages, but only those works which seem to be most significant examples of dictionary-making since 1800.

English. In the early nineteenth century, with the establishment of the United States, the impetus in the compiling of dictionaries passed from England to America. Noah Webster, the first great genius of American lexicography, in 1828 published his *An American Dictionary of the English Language* (New York, 2 Vols.). Webster was intent on demonstrating that American speech and usage were distinct from

British. More importantly, in the tradition of the New England educators, his purpose was didactic—to set forth the right and wrong ways of using American English —a purpose which still influences American concepts of what a dictionary should be. Two years after Webster's first dictionary there appeared *A Comprehensive Pronouncing and Explanatory Dictionary of the English Language* (Boston, 1830) by Joseph Worcester, who was to be Webster's chief rival among American lexicographers. For over half a century successive editions of Webster and Worcester vied for the American market, until Webster finally won out. In the twentieth century there were major revisions of Webster in 1909, 1934 (*Webster's New International Dictionary*, 2nd ed.), and 1961 (*Webster's Third New International Dictionary*). The latter revision, being the first to display fully the detached, descriptive attitude of modern linguistics, aroused an extraordinary storm of protest, since it had forsaken the didactic aims which seemed to have characterized Webster's dictionaries from the beginning. Among the other important American dictionaries during this period were the *Century Dictionary and Cyclopedia* and *Funk and Wagnall's New Standard Dictionary*. The *Century* was first issued in 1889–1891 and its last revision in 1911 (New York, 12 Vols.). An encyclopedic dictionary with extensive etymologies and exemplifications of words, it is considered by many the finest of American dictionaries (though it is now, of course, much out-of-date). *Funk and Wagnall's*, which appeared in its first edition in 1893 and in its last complete revision in 1913 (New York), has been a near rival to the Websters, in spite of its lack of recent thorough updating.

The American dictionaries, however, have been outshone by an English dictionary which may fairly be considered the greatest achievement so far of English-language lexicography—the *New English Dictionary on Historical Principles* (N.E.D.) or, as it is now titled, the *Oxford English Dictionary* (O.E.D.). After some 30 years of preparation the first volume of the O.E.D. was completed in 1888 under the editorship of James A. H. Murray (whence the less common designation of the work as Murray's Dictionary), and the set was finished in ten volumes in 1928, with a supplementary volume in 1933. The O.E.D. differs from all of its English-language predecessors in that it was the first dictionary to apply systematically the historical method to its vocabulary. In spite of shortcomings, the accurate records of variant spellings and of the evolution of meanings, the detailed documentation, and the extensive exemplification have made the O.E.D. pre-eminent among English dictionaries and widely influential among foreign-language works.

Following in the footsteps of the O.E.D. are four dictionaries which contain materials from periods or regions not fully covered in the O.E.D.: *Middle English Dictionary* by Hans Kurath (Ann Arbor, 1952–); William Craigie, *A Dictionary of the Older Scottish Tongue* (Chicago, 1937–; issued in parts, 1931–); *The Scottish National Dictionary* by William Grant (Edinburgh, 1931–); and William Craigie, *A Dictionary of American English on Historical Principles* (Chicago, 1938–1944, 4 Vols.; issued in parts, 1936–). More restricted than the preceding works are Mitford Mathews, *A Dictionary of Americanisms on Historical Principles* (Chicago, 1951, 2 Vols.), and *A Dictionary of Canadianisms on Historical Principles* (Toronto,

1967), which contain only words or expressions that originated respectively in the United States and in Canada.

German. German has the distinction of being the first European language in which one of the great historical dictionaries of modern times was initiated. In 1854 Jacob and Wilhelm Grimm published in Leipzig the first volume of their *Deutsches Wörterbuch,* and the work was finally completed in sixteen volumes in 1960. (Five years later appeared the first fascicle of a new edition—*Deutsches Wörterbuch,* Neubearbeitung, Leipzig, 1965–.) Like the O.E.D. the Grimms' dictionary is based on historical principles, with extensive etymologies, explanations of changing meanings, and illustrative quotations. Because the work was issued over so long a period, there are naturally variations from volume to volume in range and characteristics.

Complementary to the *Deutsches Wörterbuch* are Elisabeth Karg-Gasterstädt, *Althochdeutsches Wörterbuch* (Berlin, 1952–) for Old High German, and Wilhelm Müller, *Mittelhochdeutsches Wörterbuch* (Leipzig, 1854–1866, 3 Vols. in 4), and Matthias Lexer, *Mittelhochdeutsches Handwörterbuch* (Leipzig, 1872–1878, 3 Vols., including supplement) for Middle High German. Among important modern dictionaries of German are *Trübners deutsches Wörterbuch* (Berlin, 1939–1957, 8 Vols.; issued in parts, 1936–), which is perhaps the foremost of the recent dictionaries; Hermann Paul, *Deutsches Wörterbuch* (6th ed., Tübingen, 1968, a reprint of the 5th ed. of 1966, which was issued in parts, 1957–; 1st ed., Halle, 1897); *Wörterbuch der deutschen Gegenwartssprache* by Ruth Klappenbach (Berlin, 1961–; parts issued in various editions), a dictionary of present-day German; and Friedrich Kluge, *Etymologisches Wörterbuch der deutschen Sprache* (19th ed., Berlin, 1963; 1st ed., Strassburg, 1882–1883), the standard etymological dictionary. Bilingual dictionaries currently in favor include *Harrap's Standard German and English Dictionary* by Trevor Jones (London, 1963–); *Langenscheidt's New Muret-Sanders Encyclopedic Dictionary* (London, New York, 1962–); and Karl Wildhagen, *English–German, German–English Dictionary* (Wiesbaden, 1953–1956, 2 Vols.; American ed., Chicago, 1963, 1 Vol.).

Other Germanic Languages. The Germanic languages have been remarkably well-served by modern lexicography; nearly everyone of them has its large, scholarly, and historical dictionary, either completed or in progress. Here we can only note the major works.

For Dutch there is the monumental *Woordenboek der Nederlandsche taal* (The Hague, 1882–), and for the older language, Eelco Verwijs, *Middelnederlandsch woordenboek* (The Hague, 1885–1952, 11 Vols.). Afrikaans has Pieter Schoonees, *Woordeboek van die afrikaanse taal* (Pretoria, 1950–). Among the north Germanic countries we find for Norwegian, Trygve Knudsen, *Norsk riksmalsordbok* (Oslo, 1937–1957, 2 Vols. in 4; issued in parts, 1930–). For Danish there is a distinguished work—Danske Sprog- og Litteraturselskab, *Ordbog over det danske sprog* [2nd ed., Copenhagen, 1966–1970, 28 Vols.; 1st ed., 1919–1954 (Vol. 1 issued in 2 parts, 1918–1919)]—as well as Karl Otto Kalkar, *Ordbog til det aeldre danske sprog* (Copenhagen, 1881–1907, 4 Vols.; with Nachträge, 1908–1918, and Kildefortegnelse og forkortelses-liste, 1925) for Old Danish. And for Swedish we have

three authoritative sets: the outstanding Svenska Akademien, *Ordbok öfver svenska språket* (Lund, 1898–); Olof Östergren, *Nusvensk ordbok* (Stockholm, 1919–; issued in parts, 1915–), which covers modern Swedish; and Knut Söderwall, *Ordbok öfver svenska medeltids-språket* (Lund, 1884–1918, 2 Vols. in 3; with supplement, 1925–), covering medieval Swedish.

Among Celtic dictionaries at present there are three large-scale works which follow the historical principles of the *Oxford English Dictionary*: for Irish, the Royal Irish Academy, *Dictionary of the Irish Language* (Dublin, 1913–) and the Academy's *Contributions to a Dictionary of the Irish Language* (Dublin, 1939–), which complement one another; and for Welsh, *Geiriadur prifysgol cymru* (Cardiff, 1950–).

For the Romance languages in general there is a dictionary of seminal importance: Wilhelm Meyer-Lübke, *Romanisches etymologisches Wörterbuch* (Heidelberg, 1911–1920), of which the third edition is the latest (Heidelberg, 1935; issued in parts, 1930–).

Italian. Like the Académie Française, the Accademia della Crusca at Florence throughout the nineteenth century set standards of good taste in usage with the various editions of its dictionary. The fifth edition of the *Vocabolario degli Accademici della Crusca* was published in Florence from 1863 to 1923, but never progressed beyond the letter *O* in Vol. 11; and attempts at a superseding work were unsuccessful because of the upheavals of World War II. It was only recently that a comprehensive and up-to-date historical dictionary began to appear—Salvatore Battaglia, *Grande dizionario della lingua italiana* (Turin, 1961–).

In the 1950s was published the most important etymological dictionary of Italian to date—Carlo Battisti, *Dizionario etimologico italiano* (Florence, 1950–1957, 5 Vols.). And in the 1960s appeared the first volume of Barbara Reynolds, *The Cambridge Italian Dictionary* (Cambridge, 1962–), which gives promise of becoming the foremost bilingual dictionary for Italian and English.

French. In the nineteenth century and even into the twentieth the various editions of the *Dictionnaire* of the Académie Française continued to establish norms for the written language; the most recent edition of this work is the 8th (Paris, 1932–1935, 2 Vols.; issued in parts, 1931–). In the last half of the nineteenth century, however, appeared the first important modern dictionary of French—Émile Littré, *Dictionnaire de la langue française* (Paris, 1863–1872, 2 Vols. in 4; with supplement, 1877), of which the latest edition appeared in 1956–1958 in 7 Vols. Like the *Oxford English Dictionary* and *Deutsches Wörterbuch*, Littré's *Dictionnaire* displays the historical evolution of French by extensive definitions and quotations. Although it is not as comprehensive as the other two works, it is unquestionably one of the greatest dictionaries produced by one man, and it deeply influenced French lexicography. At about the same time when Littré was producing his dictionary, Pierre Larousse published the other major French dictionary of the nineteenth century—*Grand dictionnaire universel du XIXe siècle* (Paris, 1866–1890, 15 Vols. plus 2 supplementary volumes; issued in parts, 1864–). Larousse's work would better be described as an encyclopedia, but it too had a far-reaching influence on French dictionaries.

In the present century the chief large historical dictionary of French has been

Paul Robert, *Dictionnaire alphabétique et analogique de la langue française* (Paris, 1953–1964, 6 Vols.; issued in parts, 1951–). For older French there are three noteworthy works: Frédéric Godefroy, *Dictionnaire de l'ancienne langue française* (Paris, 1880–1902, 10 Vols.), which covers the ninth through the fifteenth centuries; Adolf Tobler, *Tobler-Lommatzch, Altfranzösisches Wörterbuch* (Berlin, 1925–; issued in parts, 1915–), for the language of the twelfth through fourteenth centuries; and Edmond Huguet, *Dictionnaire de la langue française du seizième siècle* (Paris, 1925–1967, 7 Vols.), for the sixteenth century. The French language is also distinguished by what is probably the greatest of all etymological dictionaries and certainly one of the most magnificent achievements of modern lexicography—Walther von Wartburg, *Französisches etymologisches Wörterbuch* (Bonn, 1928–; issued in parts, 1922–).

Among bilingual dictionaries those in high esteem include *Harrap's Standard French and English Dictionary* (London, 1934–1939, 2 Vols.; with a number of later editions) and Karl Sachs, *Enzyklopädisches französisch-deutsches und deutsch-französisches Wörterbuch* (Berlin, 1869–1874, 2 Vols.; many later editions, most recently entitled *Sachs-Villatte enzyklopädisches . . . Wörterbuch*).

Hispanic. We have seen that France and Italy each had its academy dictionary which tried to inculcate the standards of the educated class in writing and speaking. In the same tradition the Academia Española at Madrid since 1726 has issued its *Diccionario de la lengua española*; the latest edition is the nineteenth (Madrid, 1970). Although the Academia dictionary may be considered the standard modern dictionary of Spanish, it is not a comprehensive historical work like those for the chief Germanic languages. An attempt at an historical dictionary was made in the 1930s with the Academia's *Diccionario histórico de la lengua española* (Madrid, 1933–1936, 2 Vols.), but the work was abandoned in the letter *C*. In 1960 a new dictionary also entitled *Diccionario histórico de la lengua española*, was begun by the Academia in Madrid. A different kind of historical dictionary is Samuel Gili y Gaya, *Tesoro lexicografico* (Madrid, 1960–; issued in parts, 1947–), which includes the definitions from all Spanish dictionaries published between 1492 and 1726.

The most complete of the Spanish etymological dictionaries is also a recent publication—Juan Corominas, *Diccionario critico etimologico de la lengua castellana* (Bern, 1954–1957, 4 Vols.). Among the highly regarded bilingual dictionaries, which are all of the "desk" variety, are Arturo Cuyás, *Appleton's New English-Spanish and Spanish-English Dictionary* (New York, 1903; with many later editions, most recently under the title *Appleton's New Cuyas English-Spanish and Spanish-English Dictionary*); Margaret Raventós, *A Modern Spanish Dictionary* (London, 1953; with later impressions); and Mariano Velázquez de la Cadena, *Seoane's Neuman and Baretti . . .* (London, 1852; with many later editions, nowadays under the title *New Revised Velázquez Spanish and English Dictionary*).

For Portuguese the most important large dictionary is Antonio de Moraes e Silva, *Grande dicionário da língua portuguesa* (10th ed., Lisbon, 1949–1952, 12 Vols.). Like the academy dictionaries in other Romance languages, the *Grande dicionário* has appeared in new editions regularly since its first publication in 1789.

Other Romance Languages. For other Romance languages there are several large dictionaries in progress, which we can only mention here. In Rumania the academy dictionary is Academia Română, *Dicționarul limbii române* (Bucharest, 1913–1940, various parts of volumes 1 and 2 published; issued in parts, 1907–), which is now being continued by the dictionary of the Academia Republicii Populare Romîne, *Dicționarul limbii române (DLR)* (Bucharest, 1965–). For Romansh the authoritative work is Società Reto-Romantscha, *Dicziunari rumantsch grischun* (Chur, 1939–46–; issued in parts, 1938–).

Like the Germanic languages, the chief Slavic languages can display an impressive group of major dictionaries. It should be noted that many of these dictionaries have been sponsored or undertaken by national academies, and many have begun publication only recently.

South Slavic. For Old Slavic an impressive new work is underway: Československá Akademie Věd, *Slovník jazyka staroslověnského (Lexicon Linguae Palaeoslovenicae)* (Prague, 1958–).

In Bulgarian the modern academy dictionary is Bŭlgarska Akademiia na Naukite, *Rechnik na sŭvremenniia bŭlgarski knizhoven ezik* (Sofia, 1954–1959, 3 Vols.). Another important dictionary is Stefan Mladenov, *Bŭlgarski tŭlkoven rechnik* (Sofia, 1951–), although this work is not yet completed.

For Serbo-Croatian we find one of the great historical Slavic dictionaries—*Rječnik hrvatskoga ili srpskoga jezika* (Zagreb, 1880–), sponsored by the Jugoslavenska Akademija and still not finished after 90 years. A more modern but less comprehensive work is *Rječnik hrvatskosrpskoga književnog jezika* (Zagreb, 1967–).

What may eventually become the major dictionary of modern Slovenian began publication in 1970: Slovenska Akademija Znanosti in Umetnosti, *Slovar slovenskega kniznega jezika* (Ljubljana, 1970–). In the meanwhile the standard dictionary, although only a 1-volume work, is Slovenska Akademija Znanosti in Umetnosti, *Slovenski pravopis* (Ljubljana, 1962; less extensive edition, 1950).

East Slavic. Following in the footsteps of several smaller dictionaries issued during the twentieth century (some of them influenced by political considerations), the great academy dictionary of Russian was begun in 1950 and completed 15 years later. This work—Akademiia Nauk SSSR, *Slovar' sovremennogo russkogo literaturnogo iazyka* (Moscow, 1950–1965, 17 Vols.)—is a comprehensive historical dictionary of the Russian literary language, mainly of the nineteenth and twentieth centuries. Of etymological dictionaries the most thorough and up-to-date is probably Max Vasmer, *Russisches etymologisches Wörterbuch* (Heidelberg, 1953–1958, 3 Vols.; issued in parts, 1950–); an important new etymological dictionary in progress is Nikolai Shanskiĭ, *Etymologicheskiĭ slovar' russkogo iazyka* (Moscow, 1963–). Among bilingual dictionaries the following are in favor: Aleksandr Smirnitskii, *Russko–angliĭskiĭ slovar'* (Moscow, 1948; many later editions, including American editions); Vladimir Müller, *Russko–angliiskii slovar'* (Moscow, 1930; later editions, including American editions); and Vladimir Müller, *Anglo–ruskiĭ slovar'* (Moscow, 1928; many later editions, including American ones).

For the other chief East Slavic language, Ukrainian, the Akademiia Nauk URSR,

Ukrainsko-russkiĭ slovar' (Kiev, 1953–1963, 6 Vols.) is the standard dictionary, although it is a bilingual work. This work will probably be supplanted by a new dictionary: Akademiĭa Nauk URSR, *Slovnyk Ukraïns'koï movy* (Kiev, 1970–).

West Slavic. The major West Slavic languages—Czech, Slovak, and Polish—all boast prominent dictionaries either completed or in process. The large academy dictionary of Czech is Česká Akademie Věd, *Příruční slovník jazyka českého* (Prague, 1935/37–1957, 8 Vols. in 9). Based on this dictionary, but containing more up-to-date words and meanings, is Československá Akademie Věd, *Slovník spisoveného jazyka českého* (Prague, 1958–; also issued in University, Alabama, 1966–). For Old Czech a notable dictionary in process, also issued by the Czech Academy, is *Staročesky slovník* (Prague, 1968–), a continuation of Jan Gebaur, *Slovník starocesky* (2nd ed., Prague, 1970, 2 Vols.; 1st ed., 1901–1916).

The chief dictionaries of Slovak in part parallel those of Czech. The major academy dictionary is Slovenská Akadémia Vied, *Slovník slovenského jazyka* (Bratislava, 1959–1968, 6 Vols.). And an authoritative dictionary attempting to include current words and meanings is Anton Jánosik *Slovník spisovného jazyka slovenského* (Turciansky Svaty Martin, 1946–).

For Polish there is a wealth of dictionaries; some of the most significant are now in various stages of publication. Perhaps the best of the older works is *Słownik jezyka polskiego* by Jan Karlowicz (Warsaw, 1900–1927, 8 Vols.). The authoritative academy dictionary is currently in process: Polska Akademia Nauk, *Słownik jezyka polskiego* (Warsaw, 1958–). There are two superior dictionaries for older Polish—Polska Akademia Nauk, *Słownik staropolski* (Warsaw, 1953–), and Polska Akademia Nauk, *Słownik polszczyzny XVI wieku* (Warsaw, 1966–), In respect to etymology, the standard work, when completed, will no doubt be Franciszek Slawski, *Słownik etymologiczny jezyka polskiego* (Cracow, 1952–).

Latin. From the beginnings dictionary-makers have paid especial attention to Latin; and as the previous article (Dictionaries before 1800) shows, some of the most outstanding dictionaries of Latin were compiled before the nineteenth century. At the end of the century, however, the publishing firm of Teubner began to issue what is unquestionably the greatest dictionary of classical Latin and one of the most monumental endeavors of modern lexicography—*Thesaurus linguae latinae* (Leipzig, 1900–). Work on the *Thesaurus* has of course been slowed by two wars and by the division of scholarly activities between West and East Germany, so that after 70 years the dictionary had reached only the letter *O*. Like the other great historical dictionaries, the strength of the *Thesaurus* is in its inclusive range and its detailed documentation and exemplification.

In regard to bilingual dictionaries of classical Latin, the standard one probably is Ethan Andrews, *Harper's Latin Dictionary* (New York, 1879; English edition, Oxford, 1879, under the title *A Latin Dictionary*), of which the earliest edition had appeared under the title *A Copious and Critical Latin-English Lexicon* (New York, 1850) and of which many later impressions have been issued. This work is also known as Lewis and Short—the names of the authors of the last major revision. A new work which may eventually replace Lewis and Short as the prime bilingual dictionary is the *Oxford Latin Dictionary* (Oxford, 1968–).

For medieval Latin the standard dictionary has been Charles Du Cange, *Glossarium mediae et infimae latinitatis* (Niort, 1883–1887, 10 Vols.; 1st ed., Paris, 1678). Now, however, two comprehensive new works are in process: *Novum glossarium mediae latinitatis* (Copenhagen, 1957–) and *Mittellateinisches Wörterbuch* (Munich, 1959–). A useful shorter dictionary, also in process, is Jan Niermeyer, *Mediae latinitatis lexicon minus* (Leiden, 1954–).

Greek. It was noted in the previous article in this encyclopedia that Henri Estienne's 1572 Greek dictionary is pre-eminent in the history of classical lexicography. And in fact Stephanus, as the work is known, retains a place of honor even today. The last revision is Henri Estienne, *Thesaurus graecae linguae* (Paris, 1831–1865, 8 Vols. in 9). Recently an attempt to begin a major new dictionary has been made with Bruno Snell, *Lexikon des friihgriechischen Epos* (Göttingen, 1955–), the first of a series of dictionaries covering different chronological periods.

Another important work for Greek studies is a bilingual dictionary—Henry Liddell, *A Greek-English Lexicon* (Oxford, 1843), known as Liddell and Scott. The latest edition of this is the ninth (Oxford, 1925–1940; with supplement, 1968).

It is surprising, perhaps, that at present there may be said to be few major dictionaries of the various Indo-Iranian languages. Nevertheless, several outstanding works are worthy of mention here.

For Sanskrit the authoritative dictionary is Otto von Böhtlingk, *Sanskrit-Wörterbuch* (St. Petersburg, 1855–1875, 7 Vols.), known as the St. Petersburg Dictionary; an English translation and revision of this was announced for publication in New Delhi in 1970. A useful shorter version of the St. Petersburg Dictionary is Otto von Böhtlingk, *Sanskrit-Wörterbuch in kürzerer Fassung* (St. Petersburg, 1879–1889, 7 Vols., usually bound in 4, 3, or 1; with Nachträge, Leipzig, 1928). There is also an eminent dictionary of Pali—Vilhelm Trenckner, *A Critical Pali Dictionary* (Copenhagen, 1924–).

For Persian a major dictionary of the encyclopedic type is 'Ali Dihkhuda, *Loghat-nama* (Teheran, 1946–).

For the Ural-Altaic languages we may point to the outstanding dictionaries of the three main tongues—Finnish, Hungarian, and Turkish.

The standard dictionary of modern Finnish is Suomalaisen Kirjallisuuden Seura, *Nykysuomen sanakirja* (2nd ed., Porvoo, 1957–1962, 6 Vols., reprinted in 3 Vols., 1967; 1st ed., Helsinki, 1951–1961).

In regard to Hungarian two noteworthy works may be mentioned. The comprehensive academy dictionary of modern Hungarian is Magyar Tudományos Akadémia, *A magyar nyelv értelmező szótára* (Budapest, 1959–1962, 7 Vols.). For older Hungarian the major historical dictionary is Gábor Szarvas, *Magyar nyelvtörténeti szótár a legrégibb nyelvemlékektöl a nyelvújításig* (Budapest, 1890–1893, 3 Vols.).

Although it is only a one-volume work, the standard Turkish dictionary is Mehmet Agakay, *Türkçe süzlük* (5th ed., Ankara, 1969; 1st ed., by Türk Dil Kurumu, Istanbul, 1945). For an etymological and historical treatment of Turkish, one may turn to Hüseyin Kadri, *Türk lûgati* (Istanbul, 1927–1945, 4 Vols.).

Of the Hamito-Semitic Languages, mention must be made of the major dictionaries of four languages—Assyrian, Hebrew, Arabic, and Egyptian.

For Assyrian we have the estimable dictionary underway at the University of Chicago—Chicago University Oriental Institute, *The Assyrian Dictionary* (Chicago, 1956–). For Hebrew there is a monumental work—Eliezer Ben-Yehudah, *Milon ha-lashon ha-'ivrit (Thesaurus totius hebraitatis et veteris et recentioris)* ("Complete international centennial edition," New York, 1960, 8 Vols.; first issued in Berlin and Jerusalem, 1908–1959, in 16 Vols.).

The Deutsche Morgenländische Gesellschaft, *Wörterbuch der Klassichen arabischen Sprache* (Wiesbaden, 1957–), bids fair to become, when finished, the standard dictionary of classical Arabic. Also in progress is Régis Blachère, *Dictionnaire arabe-français-anglais* (Paris, 1964–), which covers the literary language, including modern Arabic. Until these works are completed, recourse may be had to Edward Lane, *An Arabic-English Lexicon* (London and Edinburgh, 1863–1893, 1 Vol. in 8 parts). For Egyptian a most comprehensive work is Adolph Erman, *Wörterbuch der aegyptischen Sprache* (Leipzig and Berlin, 1926–1963, 7 Vols.; with Die Belegstellen, 1935–1953, 5 Vols.).

For the East Asian Languages, probably the most complete and up-to-date dictionary of Chinese is *Chung wen Ta Tz'ū Tien* (Taipei, 1962–). A useful dictionary of phrases is *Tz'ū hai* by Shu Hsin-ch'êng (Shanghai, 1937, 2 Vols.; many later editions, including tentative revised edition, Peking, 1961). *Tz'ū hai* is a work of the encyclopedic kind, and a whole volume has been devoted to elucidating its uses (6). A pre-eminent dictionary of characters is *Chung-hua ta tsū tien* by Hsü Yüan-kao (Shanghai, 1915; many later editions).

The standard large encyclopedic dictionary of Japanese is *Dai jiten* (Tokyo, 1934–1936, 26 Vols.). Another notable dictionary, particularly for its etymological and historical approach, is Funihiko Otsuki, *Dai genkai* (Tokyo, 1932–1937, 5 Vols.). And there is a monumental Chinese–Japanese dictionary—Tetsuji Morohashi, *Dai Kan-Wa jiten* (Tokyo, 1955–1960, 13 Vols.).

In the foregoing sections we have been considering those dictionaries that, for the most part, seem to be the most distinguished products of the art of lexicography since 1800. There are, of course, many more examples that might be mentioned; for example, our discussion includes only thirty-six languages, whereas Zaunmüller's 1958 bibliography lists about 5,600 dictionaries of more than 500 languages and dialects. Only lack of space prevents discussion of the distinguished dictionaries of Burmese, Catalan, Estonian, Icelandic, Lappish, Lithuanian, Sinhalese, Tamil, Yiddish, and other languages; and lack of space alone keeps us from pointing out other valuable dictionaries of the languages covered here—for example, the etymological dictionaries of Bulgarian, Danish, Dutch, Finnish, Hungarian, Latin, Portuguese, Swedish, and Ukrainian. *A fortiori* it has not been possible to consider large groups of languages, such as those of Africa and Oceana, where lexicography has only recently begun to make considerable headway.

The following bibliography, however, lists the significant general bibliographies of dictionaries; and one can refer to these bibliographies for more detailed information on the dictionaries since 1800.

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3. William Morris, ed., *The American Heritage Dictionary of the English Language,* American Heritage, New York, 1969, p. 366.

4. Gert Zischka, *Index Lexicorum,* Verlag Brüder Hollinek, Vienna, 1959, which is often considered a bibliography of dictionaries (as its title implies), in fact contains few listings for dictionaries properly described.

5. Ref. *3.*

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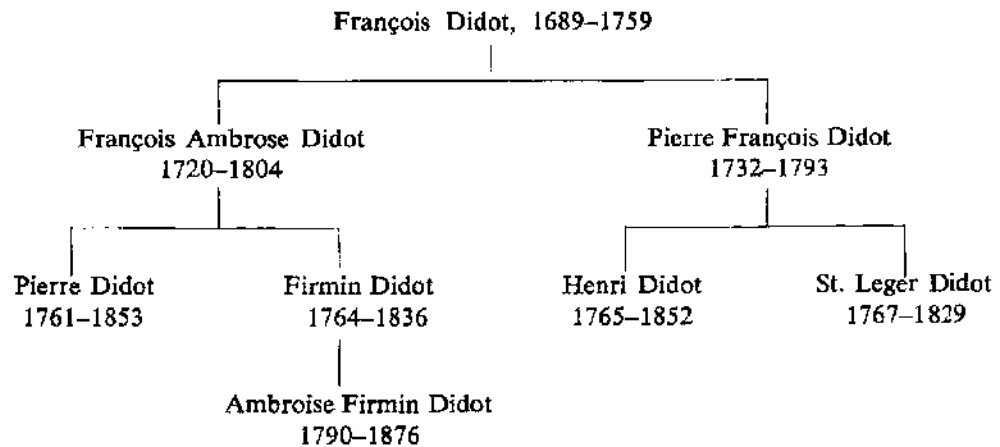
K. L. STUBBS

DIDOT FAMILY

The family of Didot (see Figure 1) were the most important and successful printers in France during the eighteenth and early nineteenth centuries. François Didot, first of the Didot family of printers to appear in the history of printing, began in Paris as a bookseller and latter added a press to his shop.

He had two sons, both of whom were important in the development of printing in France. During their lifetime the firm of Didot expanded to include printing, publishing, type-founding, and paper-making.

The elder son, François Ambroise Didot, in the 1770s designed several italic and roman type faces similar to those produced by John Baskerville in England and used by Baskerville in his *Virgil* of 1757. These were transitional typefaces and prefigured modern face types. F. A. Didot was instrumental in modifying and implementing the point system of type measurement first proposed by Fournier in 1737 and, as a result, the Didot point "became the standard for Continental Europe" *(2)*. He and/or his associate at the Imprimerie Royale, Anisson, invented a *presse à un coup*, a technical innovation which made it possible to print a sheet with one pull of the press *(3,4)*. This press, apparently an enormously strengthened wood press, was in use at the Imprimerie Royale by 1784.

François Didot, 1689-1759

François Ambrose Didot
1720-1804

Pierre François Didot
1732-1793

Pierre Didot
1761-1853

Firmin Didot
1764-1836

Henri Didot
1765-1852

St. Leger Didot
1767-1829

Ambroise Firmin Didot
1790-1876

FIGURE 1. *The Didot Family (1).*

The second son, Pierre François Didot, was also a printer and did some excellent work. He is better known today as the founder of the paper mill at Essonnes. It was at this mill, then owned by the son of Pierre François, St. Leger, where Nicholas-Louis Robert, in 1798, began development of a web paper-making machine, later perfected by Fourdrinier in England.

Both sons of François Didot were associated with the Royal family of France. François Ambroise was printer to the Counte d'Artois, afterwards Charles IX. The younger son, Pierre François, was printer to Monsieur who later became Louis XVIII (5).

The two sons of F. A. Didot were pre-eminent in the development of the classical style of printing in France. The "classical style" of printing implies not only the use of modern face types but leaded lines, large margins, and emphasis upon these elements and the type face for beauty of design rather than upon ornamentation.

The elder son of F. A. Didot, Pierre, became a printer, continuing the Didot firm. In 1784 the first modern face type, according to Johnson's criteria for modern face, was produced at the F. A. Didot foundry and used in the 1784 edition of Tasso's *Gerusalemme Liberata.* This type face may have been cut by Firmin Didot (6). The modern face produced by the Didot firm "remained the standard letter in France, and for the mass of books is still the letter in use today" (7).

With the later type faces designed by Firmin Didot the characteristics of modern face, flat serifs, sharply contrasted thick and thin lines, and vertical shading, became greatly exaggerated and the later Didot modern face types have since been strongly criticized because of their adverse influence on the development of the nineteenth century book.

The influence of the Didot firm on their European contemporaries was not expressed solely in terms of type design. Accompanying and necessary to the change in type design was a concurrent change in paper manufacture. During this period, *papier-velin,* wove paper, was introduced into France by the Didot firm. Wove paper, i.e., paper without chain and line marks, was invented in England by Basker-

ville and was made under his directions for use with his transitional types. The use of the smoother wove paper was necessary to produce a sharp impression from modern face type. Probably at this time the Didot firm also imported another innovation of Baskerville's, that of plate finished paper, a process in which the freshly printed and still damp sheets are pressed against heated copper plates in order to produce a glossy surface (8).

Firmin Didot introduced into France a method of stereotyping and expanded his activities to include printing, publishing, and papermaking. He succeeded in surviving the various political crises of his period. After his death in 1836, "his descendants enlarged their surname to Firmin-Didot to perpetuate a member so full of worth and honors" (9).

All of these innovations introduced by the Didot firm had considerable influence upon European printing, particularly upon Bodini of Italy. However, the influence of the Didots was much greater than that of Bodoni, and "The Didots became the model of printers all over the Continent" (9).

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MARTHA L. MANHEIMER

DIRECT ACCESS

Direct access storage devices are connected with computers to provide auxiliary memory. A direct access device is by definition one on which each physical record has a discrete location and a unique address. Examples of direct access devices are magnetic disks, drums, and data cells. In contrast, magnetic tape is an example of a serial access device and core memory is an example of a random access device.

In computer terminology a logical record is a collection of data concerning a single subject. For example, a catalog card as used in the library sense is a logical record. A group of logical records on related subjects is termed a file or equivalently a data set. For example, a library card catalog is a file. When data representing a logical record are recorded from computer memory onto a storage device, such as a magnetic disk, a physical record is said to be written. For economical utilization of a storage device a physical record often contains several logical records. In summary, logical records are written onto storage devices in physical records.

The most widely used direct access devices are magnetic disks. Physically, magnetic disks are disk shaped, made of metal, and coated on both sides with a layer of magnetic oxide. It may be helpful to think of them as similar to phonograph discs. To provide an illustrative example, an IBM 2311 Disk Device is described. The magnetic disks utilized in the 2311 are 14 inches in diameter. Six of these disks are mounted on a vertical shaft in a package called a disk pack. Figure 1 displays the important features of a 2311 disk pack. The top surface of the top disk and the bottom surface of the bottom disk are not used for recording surfaces. Hence, there are ten possible recording surfaces.

Each recording surface is divided into 200 tracks plus 3 spare tracks. A track is defined as one circumference of the recording surface. Tracks are concentric circles for recording data. In contrast, the grooves of a phonograph disc form a continuous spiral. Each track has a maximum capacity of 3,625 characters. As used here, a character may be thought of as an upper or lower case letter, a numeral, or a
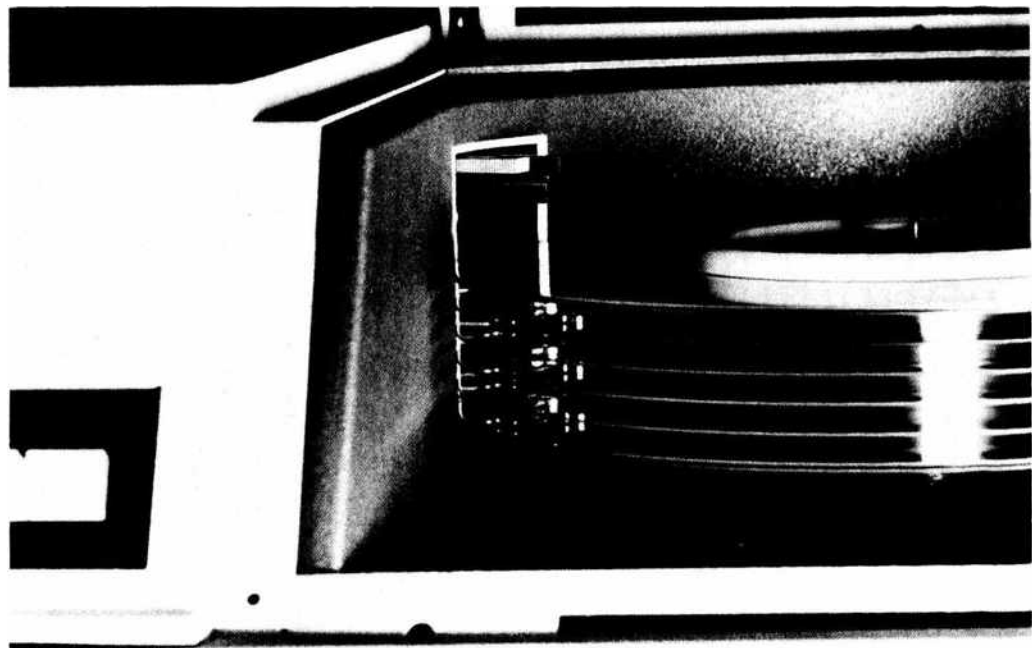

FIGURE 1. *2311 access mechanism. (Reproduced by permission of International Business Machines Corp.)*

special symbol such as a comma, period, or dollar sign. In IBM terminology the machine memory unit which contains the numerical representation of a character is called a byte. For the purposes of this article, character and byte are used interchangeably.

Each disk pack, which contains ten recording surfaces, has a capacity of

$$10 \text{ [surfaces/pack]} \times 200 \text{ [tracks/surface]} \times 3,625 \text{ [bytes/track]} =$$
$$7,250,000 \text{ [bytes/surface]}$$

An access arm records (reads) data onto (from) a track. An access arm may be thought of as analogous to a phonograph's pickup arm. A disk access arm moves horizontally to 203 different positions corresponding to the 200 plus 3 spare tracks on a recording surface. A disk access mechanism consists of a group of access arms that move together as a unit. The combtype mechanism has one read/write head for each recording surface. Thus the 2311 has ten read/write heads.

A cylinder is the amount of data accessible with one positioning of the access mechanism. In the case of a 2311, a cylinder contains 10 [tracks/cylinder] $\times$ 3,625 [bytes/track] $=$ 36,250 [bytes/track]. The concept of a cylinder is important because a significant portion of the time required to access and transfer data is spent in seeking the proper cylinder.

The time to access and transfer data from a disk is calculated by summing the following four times: access motion, head selection, rotational delay, and data transfer. Access motion time is essentially a function of the number of cylinders moved. To move to a particular cylinder on the 2311 requires a minimum of 25 milliseconds (1000 milliseconds $=$ 1 second) and a maximum of 135 milliseconds depending on the previous position of the access mechanism. Average time for intercylinder movement is 75 milliseconds. Electronic switching time required to select the correct read/write head is negligible. Rotational delay time is the amount of time required for the correct position on the track to come under the read/write head. On the 2311 this time ranges between 0 and 25 milliseconds, where the latter is the time for a complete rotation of the disk. Average rotational delay time is 12.5 milliseconds. Data transfer time is a function of the rotation speed and the density (the number of bytes per inch) at which the data is recorded. For the 2311 the data transfer rate is 156,000 characters per second. In other words, the time required to transfer one character is 0.0064103 milliseconds.

To this point, track capacity has been expressed in terms of the maximum number of characters or bytes per track. Actually, a portion of each track is reserved to record data useful to the computer system. This data includes the track address, record numbers, physical record lengths, gaps between physical records, and cyclic check or error detection bytes which protect the integrity of the data.

An Index Point indicates the physical beginning of each track. Following the Index Point there is a Home Address Area. This area consists of seven bytes used as follows: a flag (one byte), which indicates whether the track is operative or defective; the cylinder number (two bytes); the read/write head number (two bytes);
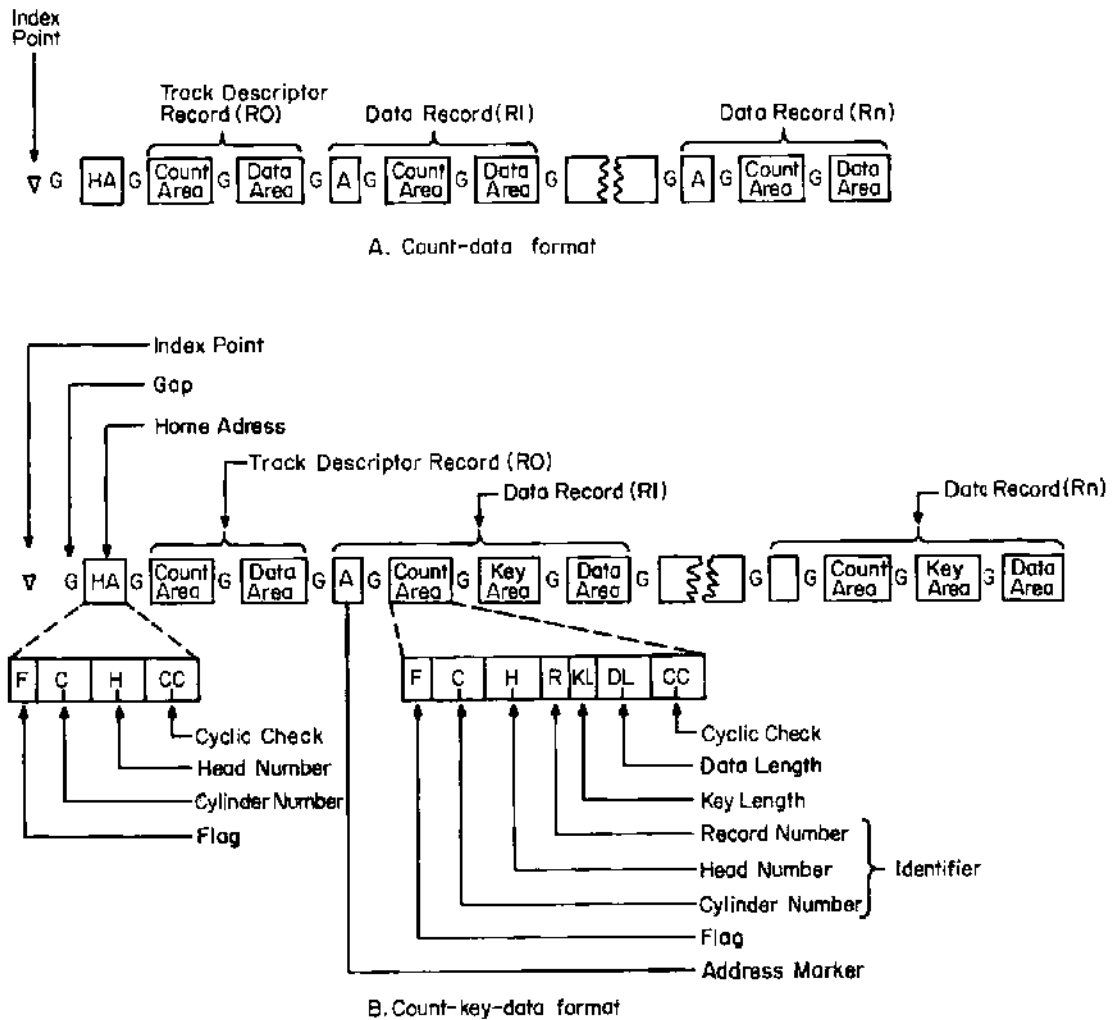
FIGURE 2. Track formats. (Reproduced by permission of International Business Machines Corp.)

and cyclic check (two bytes). The four bytes composed of the cylinder number and the read/write head number are collectively referred to as the track address.

Following the Home Address Area is the Track Descriptor Record, which is used by the computer programming system to store data about the track. The Track Descriptor Record, often referred to as R0, contains a Count Area and a Data Area. The Count Area is an eleven byte area which contains a flag (one byte), which indicates whether the track is operative or defective; the track address (four bytes); the record number within the track (one byte in binary notation); the key length (one byte in binary notation); the data length (two bytes in binary notation); and cyclic check (two bytes). A byte, which contains eight bits, can represent any integer between 0 and $2^8 - 1 = 255$ in binary notation. Two bytes in binary notation can
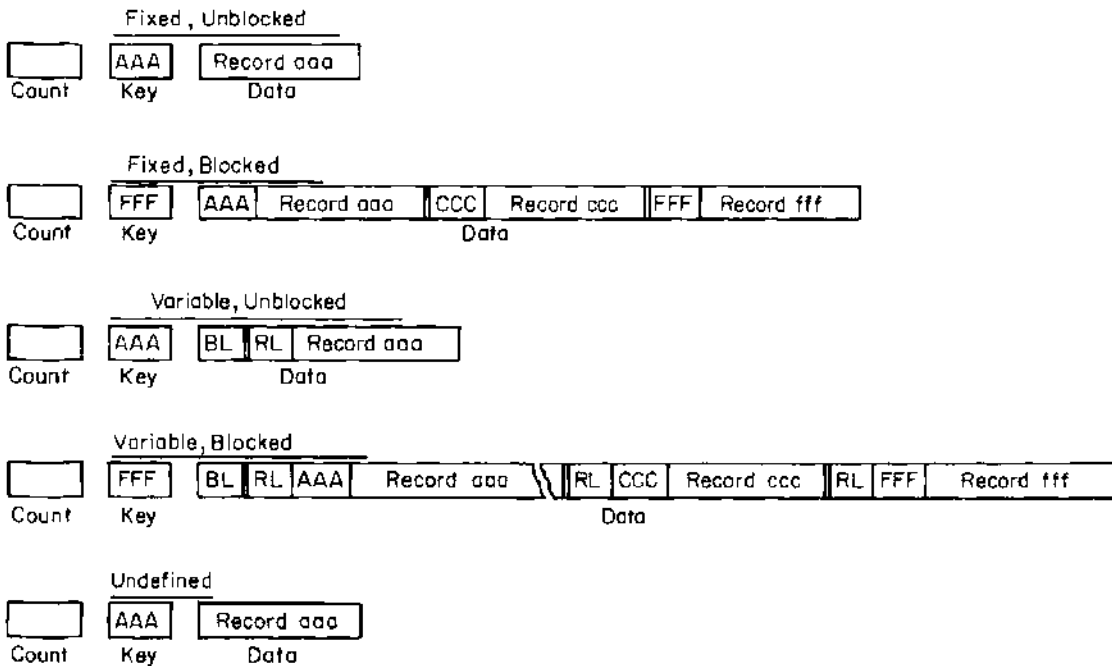
Fixed , Unblocked

Count		AAA		Record aaa	
Count		Key		Data	

Fixed, Blocked

Count		FFF		AAA	Record aaa	CCC	Record ccc	FFF	Record fff
Count		Key					Data		

Variable, Unblocked

Count		AAA		BL	RL	Record aaa
Count		Key			Data	

Variable, Blocked

Count		FFF		BL	RL	AAA	Record aaa	RL	CCC	Record ccc	RL	FFF	Record fff
Count		Key							Data				

Undefined

Count		AAA		Record aaa	
Count		Key		Data	

FIGURE 3. *Record formats. (Reproduced by permission of International Business Machines Corp.)*

represent any integer between 0 and $2^{16} - 1 = 65{,}535$. In the case of R0 the record number is zero and the data length is always eight bytes. The Data Area is eight bytes plus two cyclic check bytes. The remainder of the track contains one or more records structured in Count-Data format or Count-Key-Data format (see Figure 2).

Records of the Count Data format consist of an Address Marker, a Count Area, and a Data Area. The Address Marker is a two byte area which is written to indicate the beginning of a user record. The Count Area consists of eleven bytes and is structured as described for the Track Descriptor Record. The Data Area contains user data plus the cyclic check bytes.

Records of the Count-Key-Data format consist of an Address Marker, a Count Area, a Key Area, and a Data Area. The Key Area, which can range between 1 and 255 bytes, contains the key identifier for the user record. The precise number of bytes used for the key is recorded in the key length portion of the Count Data area. In a library application the key might be the main entry or the classification number.

The user record formats may be one of ten formats. The five record formats shown in Figure 3 are of the Count-Key-Data type. The other five formats are of the Count-Data type, i.e., without the Key Area. In the fixed, unblocked format all records in the file have the same length. The Data Area contains one logical record. In the fixed, blocked format all records in the file have the same length. However, the Data Area contains a block of more than one logical record. All blocks are of the same length except perhaps the last one which may be shorter. If the Key Area is

used, it contains the key from the highest numeric record contained in the block. Individual keys are associated with each logical record. In the variable, unblocked format the records in the file may have varying lengths. The first four bytes of the Data Area contain the block length (BL). It indicates the number of bytes in the Data Area including itself. The next four bytes of the Data Area contain the physical record length (RL) including itself. The remainder of the Data Area contains the logical record. In the variable, blocked format records in the file may be of varying lengths. The Data Area contains a block of more than one logical record. If the Key Area is used, it contains the key from the highest numeric record contained in the block. An undefined format is included to permit handling of records not in one of the previous formats.

For the 2311 the number of bytes used for the Address Marker, Count Area, Cyclic Checks, and gaps amount to sixty-one bytes for each physical record except the last one. In calculating the number of bytes for each physical record the following formulas may be used:

A. Data records except for the last record.
   a. With Key Area:

$$\text{bytes required} = 81 + \frac{537 \, (KL + DL)}{512}$$

   where KL = key length and DL = data length
   b. Without Key Area:

$$\text{bytes required} = 61 + \frac{537 \, (DL)}{512}$$

B. Last data record:
   a. With Key Area:

$$\text{bytes required} = 20 + KL + DL$$

   b. Without Key Area:

$$\text{bytes required} = DL$$

In using these formulas the remainder is dropped in the division calculations.

To calculate the number of data records per track the following formula may be used:

$$\text{data records per track} = 1 + \left(\frac{CAP - LDR}{REC} \right)$$

where CAP = byte capacity for each track, LDR = bytes required for the last data record, and REC = bytes required for each data record except the last.

Many factors contribute to the efficient use of a disk device. The more important include the organization of the file; the frequency and number of search requests; and the frequency and number of additions to, deletions from, and revisions of the user data records. A detailed explanation of direct access storage devices may be found in Ref. *1*.

The structure and organization of an IBM 2311 Disk Device has been explained. However, the technical terminology and considerations apply equally well to most direct access storage devices associated with computers. Certainly not all disks are organized in the same way as the 2311. Control Data Corporation's 7638 Disk Storage Subsystem, which has a different organization, is described in Ref. 2. The 3330 Disk Storage associated with IBM's System/370 has a similar structure and organization as described in Ref. 3.

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K. L. MONTGOMERY

DISCIPLINE IN LIBRARIES AND INFORMATION CENTERS

Discipline is a problem which librarians in various situations must face. For the problems of maintaining order in a public library, or keeping a group of unruly teenagers from completely disrupting a high school library, or attempting to keep the loss of books through thievery at a minimum in a college or university library, each librarian must determine the best means of handling his own problems of discipline. Little has been written on this subject and thus there has been little guidance to the individual on how to approach the various aspects of discipline as related to libraries. In most cases, the librarian has had to learn through trial and error how best to approach his own individual situation.

The seriousness of the problem may range from the rather simple one of keeping small children from running loose and disturbing other users to one of a gang of hoodlums who completely take over the library as a hang-out and terrorize staff and public, preventing the library from functioning. This latter situation has gone so far in some cases that entire branches of public libraries have had to be closed completely to the public. In some cases, uniformed guards have been employed to maintain order.

Although the days of large "Silence" signs in libraries where perfect decorum was maintained are a thing of the past, librarians must determine the acceptable range of behavior and what acts must be dealt with. Today it is a common sight in many college and university libraries to see barefooted students studying with their feet

up on desks. As the standards of dress and action change in our society, libraries have had to adjust to these changes.

One factor that must be taken into consideration is that it is much harder to solve a problem in the area of discipline once it arises than it is to avoid it before it occurs. Thus each library must determine what its standard of discipline will be and how it will deal with problems as they arise. The first step in this direction is to set a pattern of acceptable behavior and then clearly make those actions that are not within this acceptable pattern known to all library staff members, so that the same standards will be maintained at all times by all staff. The staff must also be informed as to what steps should be taken when they are not able to maintain this accepted discipline. The staff should know when to turn to a supervisor for help, when parents should be contacted to attempt to obtain their cooperation in the handling of difficult youngsters, and when the police or other outside help should be called.

One of the major dangers in this area is the tendency of many librarians to ignore a growing problem in the area of discipline, hoping it will go away by itself, until it has gotten completely out of hand and resulted in the regular library users abandoning the library through either fear or disgust. Of course, the opposite problem of overreaction on the part of the librarian can also create problems. The librarian who runs to the phone to call the police when two 7-year olds are arguing in the library or at other times when the problem can be easily solved will find that when a mentally deranged adult is threatening staff or public, or a gang of teenagers are threatening the staff with knives, slashing books, and destroying furniture, the police will be rather slow to respond.

For those libraries large enough to maintain a security staff, the problem of discipline can be minimized by having the security guard make frequent visits to the various areas of the library and by his being available at other times as needed. Normally a uniformed security guard can be more effective in this area than regular library staff. In smaller libraries without a uniformed guard, where such a position is not available, at times the library janitor can serve to maintain order.

One of the problems in many libraries is the lack of a male on the staff who can handle disciplinary problems. In some cases though, particularly in dealing with teenage boys, a male is not necessarily better equipped to handle problems. Frequently these youngsters, particularly those who are emotionally disturbed, find an adult male a challenge to their developing manhood and will react much worse to an adult male who is trying to maintain discipline than to a woman who is not a personal challenge.

Of course, the approach to discipline will vary considerably according to the locale of the individual library. In a small town or in a small college library, very often all readers are known to the librarian by name. In these cases, discipline is usually a minor problem. In the large city or institution, the anonymity of the individual results in a feeling that no one will know what has been done and therefore the individual feels free to act in a manner that he clearly knows is unacceptable to the community. Very often in such cases using the influences of various community organizations or agencies can be most helpful. The local church group, schools,

business man's group, friends of the library, or social welfare agencies, are useful community contacts for the librarian seeking financial support, or backing in problems of censorship, and also to put pressure on the individuals causing a discipline problem.

Another approach, more positive than that of maintaining discipline through use of guards and police, is to get the potential trouble makers so involved in constructive activities at the library that they will take personal pride in the institution and not only will not be the source of discipline problems but will come to the aid of the library when others attempt to create disturbances. This approach can be particularly effective with teenagers, since often an unruly teenager will more readily react to obvious displeasure on the part of his peers than he will to an adult librarian. Some of the methods used successfully by various libraries to get the readers involved have been film programs, little theater groups, concerts, book clubs, and art exhibits of local artists.

Another important factor in maintaining discipline is the general appearance and atmosphere of the library. A library where the floors are dirty, books are lying around in piles rather than neatly shelved, exhibit cases are empty or have dusty, dull exhibits, and no one seems to know where anything is, invites the potential trouble-maker to have no respect. It is not surprising that in such libraries individuals will not hesitate to cause a disturbance. Even the appearance of the staff is a factor. If the staff is well-groomed, friendly, and helpful, most patrons will react in a positive manner. An overbearing, uninterested, or even rude staff on the other hand will immediately become a target for the individual who is either seeking attention or has a grudge against society and considers the library as one more representative of society, very often a somewhat weak one which is therefore safe to attack.

In most cases, the librarian will be able to handle individuals with a little patience and understanding, unless the individual is quite disturbed: where it is a matter of a gang, it often becomes impossible for the librarian to handle the situation. In these cases, the librarian should attempt to get the leader of the gang interested in some activity that will channel his energy into something more constructive but if that is impossible, he must resort to keeping him out of the library through cooperation of parents, school principals, other agencies, or as a last resort, police.

One method used by some libraries has been the insistence that potentially disruptive readers who have created problems in the past have library cards before they can enter the library. These cards are collected as the person enters and returned only as he leaves and then only if he has behaved while in the library. The very fact that the card is held and therefore his name and address is known is in itself a calming factor.

Another problem of discipline that often particularly upsets librarians is that of the sexual deviate or individual who exposes himself either to other readers or to staff. Of course, the best way to avoid such incidents is to have a well-lit library without dead ends, out-of-the-way cubby holes, or poorly lighted stacks. If all areas of the library are visible from a charging or reference desk, these incidents can be kept to a minimum.

Another problem that arises is that of the totally unkempt man or woman, one clearly in need of a bath and offensive to other readers as well as staff. Although in most cases, unless the individual is creating a disturbance, it is best to leave him alone, in extreme cases it is acceptable to ask him to leave because of complaints by other readers. In those cases where the described individual is clearly under the influence of alcohol or narcotics, one is justified in asking him to leave the library.

The various problems of discipline must be handled by each individual library in the manner that best suits its community, budget, physical facilities, and staff capabilities. What will work in one library may be disastrous somewhere else. Of course an approach of understanding, common sense, and lack of rigidity is the best way to deal with this as with any other problem.

GERALD GOLD

DISCOUNTS ON BOOKS

Librarians have attempted to obtain discounts on the books and materials with which they stock their collections since the advent of the public or academic free library. The earliest examples of discounts within the book trade were those given by dealers at the Frankfurt Book-Fair in the mid-seventeenth century. They were brought about as the result of many unprofitable exchanges between dealers who created a system of fixed retail price with a discount schedule. These early discounts, however, were never high (*1*).

The organization of social libraries in the United States in the late eighteenth century resulted in book publishers and dealers offering special discounts to secure their trade (*2*). Edward Edwards, in his monumental *Memoirs of Libraries* published in 1859, noted that "in making purchases from second hand catalogs the discount usually allowed to libraries is 10%. If the purchases, however, be very extensive a somewhat larger discount may often be obtained. With regard to the purchase of new books whether English or foreign, . . . an average discount of 20% upon regular books (periodicals excepted) may be safely calculated on and is in ordinary cases as much as can fairly and honestly be afforded. As to sale books and "remainders" . . . discounts vary within an extreme range of 25% to perhaps 75%" (*3*).

By the first half of the nineteenth century it is evident that discounts to libraries had been well established, and by 1874 in their annual convention at Put-in-Bay, Ohio, the American Booksellers Association attempted to forbid supplying libraries with books at a discount greater than 20%. William Fredrick Poole took exception to this limitation and at the first meeting of the American Library Association (ALA) in 1876 introduced a resolution: "*Resolved:* that the discrimination against the libraries and the rules of the American Booksellers Association . . . is unjust and impolitic and is a rule which no librarian is bound to respect" (*4*).

From about this time until the present, publishers, dealers, and librarians have carried on discussions about the discounts which libraries should or should not receive. In 1901 the American Publishers Association and the American Booksellers Association agreed that retailers would promise to give no discounts on net books to ordinary buyers and to limit library discounts on net books to 10%. This restriction applied to each book covered for 1 year after publication. In 1902 this rule was amended to permit discounts up to 33% to libraries on trade fiction. Nonfiction still had the 10% limitation. In 1904 juveniles were included in the fiction rule.

The American Publishers Association, at a meeting on January 9, 1907, repealed all the existing rules and regulations of the association having any reference to the price of books. The association recommended existing discounts be continued but added that all agreements on discounts in the future would be made between the individual publisher and the dealer whom he supplied. This change came as a result of court decisions against price control. By 1912 a number of American publishers began to issue their new fiction on a net price basis with the restriction of library discounts to a maximum of 10%. The American Publishers Association was dissolved in 1915 because court decisions discouraged price fixing, and so fixed discounts disappeared. There were no further significant developments until the end of the National Recovery Administration (NRA) (5). The NRA codes in the 1930s again attempted to restrict discounts for libraries in their original form. However, librarians were successful in having libraries exempted from the provisions setting up discount maximums. The ALA publication by Oscar C. Orman, *Library Discount Control*, provides an interesting history of this period.

In 1939, at the midwinter meeting of the ALA, librarians were informed that several publishers intended to adopt a library discount maximum of 25%. By doing so the publishers hoped to solve the problem which had arisen of who shall sell to libraries—wholesalers or local retailers. They were expecting to bring more business to the local retailers. Representatives of libraries and the publishers met in New York City in January 1940 to discuss this latest discount rate. One of the results of the conference was the action taken by librarians to promote the passage of fair trade acts which included the provision that nonprofit-making libraries were exempt from the provisions designed to allow publishers to fix the price, including the discount price, of their copyrighted books. However, only four publishers put into effect the discount limitation of 25% and after some experience with the discount it was generally agreed that the 25% limitation was not bringing more business to retailers. Consequently, since 1940 publishers have not limited libraries to a maximum discount and most have been operating under an agreement that discounts are to be based on the cost of doing business and vary for each library according to the amount of money it spends for books. Most publishers have come to accept the assertion of librarians that libraries should receive discounts because of the educational service they perform for the public, the taste that they create for reading in the community, leading to a desire by the community to possess books, which in turn stimulates the trade in general.

There are two general types of discounts, long and short. The long discount in-

cludes general library or trade books and may run from 10 to more than 40% depending upon the publisher, dealer, or jobber. A trade book is published for sale to the general public through the bookselling trade, as distinguished from a textbook, a subscription book, or a book meant for limited public because of its high price, technical nature, or specialized appeal. Short discount titles include professional, scientific, and technical books, or elementary and high school textbooks, special reference books, paperback books, and college textbooks. The discounts for the latter may run from 5 to 15%.

Discounts are based on a number of factors. The publisher must attempt to establish in his own mind the salability of the book. Whether the market will be large or small depends on the nature of the material, e.g., scholarly works are often limited to a very small market and may therefore be assigned either a short discount or none at all. There are certain unvarying costs that will not change for a given book whatever the number of copies printed. For example: editorial preparation including editing, illustration, cover design, etc.; composition, i.e., typesetting, calligraphing, and platemaking, in other words, the preparatory stage of bookmaking up to the point when the press starts putting ink on the paper. Other factors to be considered are promotional costs and overhead. There are some costs which do vary, e.g., the number of books to be printed and the royalty payments to the author (6). The publisher must examine these before he can determine the appropriate discount. Discounts for libraries, educational institutions, and teachers will be less than those for bookdealers and jobbers.

The librarian should consider the source of supply when examining available discounts, e.g., a publisher will almost always give a better discount than a bookdealer or jobber. Recently publishers have been attempting to deal directly with libraries to the exclusion of the middleman. The most widespread device to attract libraries to the publisher is the "Library Service Plan." A typical plan will supply Library of Congress catalog cards at a nominal fee, give advance notice of scheduled books selected to fit the library's needs, send books on approval and 100% returnable if in suitable condition for resale, give personal service through its sales personnel plus, of course, the highest discounts. These programs are very attractive and are gaining acceptance, particularly among the larger libraries in the United States. However, it does place the publisher in competition with the bookseller and the jobber, and raises a question as to the motives behind this kind of a service, since it is in direct competition with the publishers' normal system of distribution, i.e., the book dealer and the jobber.

Another major source of supply is the wholesale jobber. His discount is not as high as the publisher's but this disadvantage is offset by placing a large number of orders with him, thereby reducing the overhead necessary to handle individual orders. A jobber may keep a large supply of books on hand in a warehouse or may operate out of an office and act as a clearing house between the publisher and the library. In both situations a wide variety of discounts are available, usually depending upon the quantity of business a library does. In recent years jobbers have innovated new programs and techniques which tend to make their programs very

TABLE 1

Comparison of Jobber and Publisher Discounts

List price ($)	Trade (long discount)		Text, technical, reference (short discount)	
	Jobber (%)	Publisher (%)	Jobber (%)	Publisher (%)
0.00–2.94	0	35	0	15
2.95–3.94	18	35	8	15
3.95–4.94	23	35	8	15
4.95 and up	28	35	8	15

attractive to libraries. Among these are services that will also provide Library of Congress cards with books, complete cataloging, and approval plans with the option of returning inappropriate books to the jobber with no penalty. The latter program is gaining widespread acceptance among large libraries and allows them to cut overhead considerably. For comparison note the discounts one jobber and one publisher give for single copy trade, text, technical and reference books on approval (Table 1). The publisher on the same plan may give up to a 40% discount on trade titles. These discounts vary from jobber to jobber and publisher to publisher. Note that postage and handling fees are often paid by the jobber and the publisher.

The third most popular source of supply is the book dealer. In the early years of this century the local book dealer accounted for the majority of library orders. In 1930 local dealers accounted for 42.6% of the funds spent for library materials, publishers 26.9%, and wholesaler jobbers only 28.6%. However in the 22 years between 1931 and 1953 the share of the library market for wholesalers increased tremendously to approximately 80% of the market (7). The consolidation of orders and consequent reduction in cost of ordering mentioned earlier that results in buying from a jobber undoubtedly accounted for this drastic shift. Dealers are not usually able to consistently give the high discount that the jobber can supply. However, there are services unique to local dealers which should be cultivated by librarians. Among these are the ability to supply hard-to-get items which are not available through the trade, and to initiate searches for out-of-print materials.

Dealers and publishers in Great Britain are prohibited from giving discounts to United States libraries because of the Net Book Agreement. This agreement was made in the United Kingdom by the members of the Publishers Association in 1957 whereby each member agreed to adopt certain standard conditions of sale for all books published by him which are defined as net books. "This term means, for purposes of the agreement, a book published at a price fixed by the publisher below which, subject to certain exceptions, it may not be sold to the public" (8). It is the latest in a series of agreements in effect in the United Kingdom since the turn of the century and its conditions are set below:

Standard Conditions of Sale of Net Books

(i) Except as provided in clauses (ii) to (iv) hereof and except as we may otherwise direct, net books shall not be sold or offered for sale or caused or permitted to be sold or offered for sale to the public at less than the net published prices.

(ii) A net book may be sold or offered for sale to the public at less than the net published price if (a) it has been held in stock by the bookseller for a period of more than twelve months from the date of the latest purchase by him of any copy thereof and (b) it has been offered to the publisher at cost price or at the proposed reduced price, whichever shall be the lower, and such offer has been refused by the publisher.

(iii) A net book may be sold or offered for sale to the public at less than the net published price if it is second-hand and six months have elapsed since its date of publication.

(iv) A net book may be sold at a discount to such libraries, book agents (including Service Unit libraries), quantity buyers and institutions as are from time to time authorized by the Council of the Publishers Association of such amount and on such conditions as are laid down in the instrument of authorization. Such amount and conditions shall not initially be less or less favourable than those prevailing at the date of this Agreement.

(v) For the purposes of clause (i) hereof a book shall be considered as sold at less than the net published price if the bookseller (a) offers or gives any consideration in cash to any purchaser except under license from the Council of The Publishers Association or (b) offers or gives any consideration in kind (e.g. card indexing, stamping, reinforced bindings, etc.) at less than the actual cost thereof to the bookseller.

(vi) For the purposes of this Agreement and of these Standard Conditions: Net *book* shall mean a book, pamphlet, map or other similar printed matter published at a net price. *Net price* and *net published price* shall mean the price fixed from time to time by the publisher below which the net book shall not be sold to the public. *Public* shall be deemed to include schools, libraries, institutions and other non-trading bodies. *Person* shall include any company, firm, corporation, club, institution, organization, association or other body.

(vii) The above conditions shall apply to all sales executed in the United Kingdom or the Republic of Ireland whether effected by wholesaler or retailer when the publisher's immediate trade customer, whether wholesaler or retailer, or the wholesaler's immediate trade customer, is in the United Kingdom or the Republic of Ireland.

We the undersigned several firms of publishers further agree to appoint and each of us does hereby appoint the Council of The Publishers Association to act as our agent in the collection of information concerning breaches of contract by persons selling or offering for sale net books, and in keeping each individual publisher informed of breaches in respect of such net books as are published by him and we further hereby undertake and agree that we will each enforce our contractual rights and our rights under the Restrictive Trade Practices Act, 1956, if called upon to do so by the Council of the Publishers Association, and provided that we shall be indemnified by The Publishers Association if so requested by us in respect of any costs of such action incurred by us or by the Council of The Publishers Association on our behalf (9).

Condition (iv) allows books to be sold to libraries in Great Britain at a discount of 10%, but clause (vii) prohibits discount sales to foreign libraries. Thus all books falling within the agreement are supplied to United States libraries at the publishers' list price. Some United Kingdom dealers will bear the cost of shipping and handling, which should be considered.

Some dealers in Belgium, France, Greece, Italy, and Spain will allow discounts, generally 10%, but often postal and handling charges will offset an advantage gained. Most dealers in West Germany, and Europe in general, will not give discounts because of a long-standing tradition against this type of pricing. On the other hand, arrangements can occasionally be worked out with these dealers whereby they will absorb the postal and handling costs.

Most publishers' discounts to libraries tend to fall within 10% for short discount materials and 20 to 25% for long discount on single title orders. The highest discounts presently are about 40%. Jobbers' discounts group around 10 and 20 to 25%, with the highest being 33⅓%. Note that some jobbers' discounts will increase with quantity. Bookstores usually give a 10% discount for in-print titles, but not for out-of-print materials. A broad sampling of publishers and jobbers revealed (1969) that these discounts will not change significantly in the near future.

It is axiomatic that librarians should always look for the best discount available in order to make the most of their budgets. However, there are other factors to consider that are equally as important. It has already been stated that the publisher will give the best discount. Nevertheless, if the librarian places all of his orders directly with the publisher, he will soon come to realize that the overhead required to implement such a policy outweighs any advantage gained by the higher discounts. The consolidation of orders with one supplier, though reducing the discount, is usually to the advantage of the library. Another important factor to be considered is service. A point made at the Pre-Conference Institution on Acquisitions, held prior to the ALA conference of 1969 at Atlantic City, is interesting and pertinent: "In the future librarians may come to recognize that for certain categories of material, service is just as important, and perhaps more so, than a discount. The value of many a book is reduced proportionately to the delay occurring between its release date and that moment the reader actually has it in his hands. Would we not be serving our users better if we waived the discount contingent upon the dealer's guarantee of delivery on or before the release date. The discount could then be applied and increased accordingly with each week, or any other convenient unit of time that passes after the release of a book. Libraries can and should insist on excellent service if they are willing to pay for it."

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<div align="right">John N. DePew</div>

DISCRIMINATING POWER

One of our outstanding documentalists has stated:*

> The English language has a vocabulary of some millions of words. Some are so common as to be valueless for indexing; most are so rare that they will be encountered once in a lifetime of reading. One of the major activities of documentalists, and librarians before them, has been concerned with the selection of a sub-set of words, somewhere between the rare and the common, which will be useful for indexing, and presumably retrieving documents.

"Discriminating power" is the ability of all or part of these subsets of words (1) assigned to, (2) derived from, or (3) in some cases the totality of words which form the text of, the document, to differentiate and separate:

> (a) Applicable documents that are pertinent for a particular inquiry, or that constitute a preformulated field or area of knowledge, from the remainder of the documents within the population searched.
> (b) Documents by the fields or areas of knowledge to which they relate, thus grouping the documents and forming, at least in part, an automatized classification by document content.
> (c) Documents by a single author from the remainder of documents within the population searched, by comparison of the texts of documents known to be the work of the author with the entire population of documents.

Discriminating power may be scalar, according to the minuteness of its differentiation and separation. In a sense, therefore, it is the linguistic analog of the optical term "resolving power."

These subsets of words may be individual words, or n-tuples of words; the n-tuples may be phrases, clauses, or even sentences. One or more of these subsets form the index for the document.

Librarians, of course, have utilized n-tuple subsets in their attempt to bibliographically control books and sets of books and journals. Through this process of subject cataloging (1), however, only the indexing of the major topic (or topics) covered in the work being indexed is attempted, i.e., the subject approach of the work as a whole is selected, but not the individual chapters, articles, or sections of the work. These subsets or subject headings are carefully constructed, with consideration given to the aims, purposes, organization, and size of each particular collection; when organized, they are supplemented by cross-reference headings that refer users to the accepted form. In addition, to aid in locating works by particular authors, an alphabetic file of authors' names will be included, either interfiled with the headings or in a separate list.

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*H. Wooster, "Reviewer's Comment" (on Theme Session, Topic 4, Symbolization, Transformation and Translation of Scientific Information, American Documentation Institute Annual Meeting, 1963), in *Proceedings, Part 3, ADI Annual Meeting, 1963*, American Documentation Institute, Washington, D.C. (renamed American Society for Information Science in 1968), p. 406.

The advent of the separate technical report, the use and production of which became important at the time of World War II, saw a new development for the indexing of such documents. Terms from the documents or descriptive of their context were chosen as indexing subsets, with or without any attempt at normalization or combination (*2,3*); the creation of a selected and defined terminology and the assignment of indexes therefrom were also advocated and used (*4,5*). Normalization included, e.g., the use of a single term for (1) both the single and plural forms of the same noun, or (2) any form of a verb, adjective, or noun from the same root, etc. (*6,7*). Combination of separate terms that had taken on special meanings, e.g., solid state, were "precoordinated" and used as a single term. Continued sophistication of this normalization process began to yield indexes that approached the librarian's subject headings (*8*), and thus the cycle became complete.

This selection process, historically manual in nature, has recently been automated by an algorithmic production of a statistical, concordancetype listing of the words in the document (or sometimes only in the abstract or title of the document) (*9*). Further sophistication of these listings utilizing normalizing, associative, and statistical processing—usually with the elimination of terms from either or both ends of the belltype, frequency distribution curve of the term occurrence—has allegedly improved the discriminating power of the listings (*6,7*). This elimination step almost invariably includes discarding the very common or frequently occurring words. Since this frequency shows no recognizable statistical pattern and hence allegedly fails to discriminate between the documents, at least one researcher suggests that the frequency pattern of the common words can also be used as a discriminating means (*10*).

Two other methods of increasing the ability of the subset terms have been used to increase their discrimination. The first of these is the use of a role (known by many other names, e.g., modulant) which modifies the term by some indication of its use in context; thus, for example, distinguishing between (1) a material as a starting material or a finished product, or (2) an article as being the actor or receiving the action (*11–13*). The second of these is the use of a link (also known by other names, e.g., interfix) which serves to divide the document (*12–14*). A link can be either physical or conceptual; the physical one divides the document into paragraphs, pages, or sections, and the conceptual one refers to some contextual unit not physically isolated in the document. Although both these methods sharpen the discriminating factor, roles affect the retrieval process as if the number of terms were increased (i.e., the same term with role 1 and with role 2 are processed as if they were two different terms), while links similarly act as if the number of documents were increased (i.e., a document with link 1 and link 2 is processed as though there were two different documents). This large increase of virtual terms and/or documents complicates the operation of a system by lengthening the time and increasing the cost of operation; at the same time it sharpens the retrieval process to the point of eliminating some pertinent documents that are excluded by the precisely modified terms of the request. To avoid this pitfall, users of these two modifications must be extremely careful in their choices of search strategies.

In addition to the normal assignment of indexing subsets already discussed, the statistical analysis of the entire text of the documents has led to at least two other somewhat related uses of the discriminating power of concordance listings (7). Manipulations of the results of these analyses have led to the grouping of documents according to similar configurations (6). In some cases, small sets of desired groupings have been manually chosen, and the remainder grouped by the configuration of the small groups. In this way, an algorithmic classification of documents and identification of the work of a particular author have resulted (15). This is closely related to the identification of documents by the frequency patterns of the common words, previously referred to (10). Some work on grouping has also been done without this comparison with desired groupings (16).

Although the power of discrimination may be scalar, it constitutes but one factor in the effectiveness of the use of a specific subset as an index. Other factors that affect the discriminating power of a particular index are (1) the consistency with which the indexing has been done, (2) the depth of the indexing, and (3) the strategy of the searching (which includes, *inter alia*, what portion or portions of the total index set is used). Since a mechanized system will always construct the same index with the same program, the use of mechanization eliminates the consistency problem noted in (1) above. Conversely, the logarithmic increase in the number of documents to be indexed will require increasing numbers of indexers if the process is manually continued. Whether some or all of the several mechanized indexing schemes now existent in operative or in research form will be utilized, or whether some entirely new approach will emerge, cannot be foreseen. One factor of research in mathematical linguistics, that of syntactic analysis (17), would seem to hold promise of help in increasing the discriminating power of index terms generated by mechanized systems.

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SIMON M. NEWMAN

DISCRIMINATION IN LIBRARIES AND INFORMATION CENTERS*

Discrimination in libraries and information centers refers to the unfavorable treatment of categories of persons on arbitrary grounds which has little or no relation to the actual behavior of the persons so treated. Discrimination in libraries has been applied to persons because of race, age, sex, and economic circumstances. Discriminatory modes are exclusion from services, limitations on services, lack of civility, maintenance of substandard services, and denial of employment by goverance or restrictions on preferred employment. The literature of discrimination in libraries has been devoted principally to public libraries and to exclusion from services. Some information exists on discrimination in school libraries and academic libraries.

* This article does not represent the official opinion and/or policy of the U.S. Office of Education, and errors and omission are solely the responsibility of the author.

Discrimination in these entities is subsumed, generally, under discrimination within their parent institutions. Public libraries have received the most attention for alleged discriminatory practices.

Public libraries which segregated their services under color of law first drew the attention of a small number of individual librarians. Their protests drew the concerted attention of the American Library Association in 1960. In 1961 the chairman of the Intellectual Freedom Committee of the American Library Association reported that discrimination had been a matter of concern to the committee since 1959. By 1961 the committee submitted to the Council of the Association an amendment, subsequently adopted, that affirmed the rights of an individual to the use of the library without reference to race, religion, national origins, or political views. The chairman of the committee, a Southern academic librarian, reported that prior to the action of the council many Southern libraries were ahead of officialdom in desegregating their facilities, and that professional condemnation of desgregation would halt a process that had been quietly underway.

In 1960 the Library Administration Division of the American Library Association dealt with the situation by commissioning a study of access to libraries to be performed by International Research Associates (INRA). The study's findings, reported in 1963, aroused a substantial controversy, led principally by chief library administrators, which effectively disarmed the impact of the report. The principal criticism of the report was of the methodology employed in alleging the presence of "indirect" or "de facto discrimination" through unequal provision of services. Chief administrators of Northern public libraries where the alleged practices existed denied the validity of the allegation. The dispute revolving around methodology effectively dampened consideration of, or any confidence in, the report per se.

Not all held the structure of the Access to Libraries study to be methodologically unsound. The sociologist Herbert Gans held ". . . the criticisms of the INRA study methods do not raise any serious questions about the validity of the findings, and the most serious one, concerning the sampling of tracts could have been avoided [by including an explanatory table] (*1*). Gans urged upon librarians the value of the report for its examination of restrictions by libraries on services to students and for the issue of unequal distribution of services as part of the urban problem. In retrospect, the attention that the investigators drew to de facto discrimination foreshadowed the issue of modes of access and relevance of services that would occupy the attention of all educational administrators within a few years. The Civil Rights Act of 1964 and Supreme Court decisions effectively ended de jure segregation in public libraries and inaugurated a continuing struggle over the elimination of discrimination in school libraries as an element in the public school system.

The most extensive information on equal educational opportunities, The Coleman Report of 1966 (*2*), held that the great majority of American children attended schools that were largely segregated by race. Negroes were the most segregated. Negro pupils, the Coleman Report held, had fewer of the facilities commonly related to educational achievement: less access to laboratories, fewer library books per pupil, and textbooks in insufficient supply.

Three years after the Coleman Report, there were 115 Southern school districts which through noncompliance with the Civil Rights Act of 1964 were disbarred from federal funds. A larger number were negotiating the issue or involved in legal process. Within the year, a small number of Northern school districts were brought to suit by the U.S. Department of Health, Education and Welfare charged with purposeful discrimination on the basis of race.

Academic institution have escaped the kind of scrutiny directed to racial discrimination that the public school system has sustained or that public libraries have encountered. The McGrath Study, "The Predominantly Negro Colleges and Universities in Transition" found, in agreement with the Colemen Report, that the predominantly Negro institutions attained only 50 to 60% of acceptable facility norms. The average Negro institution held from 30 to 60% of materials necessary for a basic academic collection. Personnel resources were limited. Only 35% of these college libraries met the American Library Association standards for the number and training of their personnel.

In all types of libraries, with the exception of school libraries, the issue of segregated facilities on a de jure basis had passed from the scene by the middle and late 1960s. Discrimination remained a problem as an institutional artifact rather than the public policy artifact it was when earlier expressed under color of law. The issue that aroused chief library administrators in the INRA Report of 1961 (allegations of de facto discrimination in the supply and quality of facilities) remained to be resolved. Librarians were troubled that whether the discrimination was based upon the status of race or economics, access to knowledge was severely inhibited for the most deprived segments of the community.

The problem of adequacy of service, first raised by the INRA report, was dealt with subsequently by the Special Committee on Freedom of Access to Libraries. In 1968 the committee made its report to the council at the Annual Conference of the American Library Association. The origin of the study was, in part, dissatisfaction with the INRA Report on Access. The special commission did not commission a study by an independent research organization this time, but conducted what was essentially an in-house study. The report has not aroused the interest that the previous report sustained despite the valuable insights contained within it, and it is severely limited by the low response rate. The Special Committee's Report is essentially an opinion survey of public librarians, library trustees, and some persons active in civil rights organizations. A weakening feature of this report and, for that matter, of all the other reports cited in this article, is the absence of any inquiry into the attitudes of the persons discriminated against. All of the surveys are institutionally oriented; thus testimony cited on discrimination is derived from the institution alleged to be practicing it.

The first and principal recommendation of the special committee's Report was for an inquiry into the location, size, and kinds of library facilities basic for effective service to members of minority groups. Sixty-four per cent of the respondents doubted that there were any features of public library service in the community that hampered use of the library by minority groups. Chief library administrators in

larger communities (those with over 50,000 population) were divided evenly on the question. However, 69% of the respondents felt the need for further research on the topic.

Of the respondents who felt there were features that hampered use of the library by minority or cultural groups, 27% mentioned outlet features (location of facilities, insufficient service, space limitation, and hours); 23% mentioned the collection and service features (inadequate materials, lack of easy readers, nonbook materials, middle class orientation of library, etc.); and 15.5% mentioned minority group attitudes (intimidating library atmosphere, unfamiliar institutional, lack of initiative motivation, awareness of library, difficulty of communication, etc.). Only 3.4% mentioned lack of funds as an inhibition.

Earlier surveys had not dealt with the employment of minorities. The 1968 Access Survey did not provide an inventory of minority employment but it did examine the opinion of the respondents on whether minority employment might be increased. Thirty per cent of the respondents opted for educational help to allow minorities entrance in public library employment. Of these, 14.8% favored on-the-job in-service training. Presumably this would be for clerical and technical aide positions. Five per cent chose scholarships and advanced study funds. Evidently three times as many of the respondents perceived minority personnel in positions below the rank of professional than as potentially professionally employed. Twenty-three per cent thought a change in the library's policies and attitudes would help, 17.5% favored more active recruitment, and 16% thought better education and qualifications on the part of minority group personnel would be effective.

Two other sources furnish some insights into minority group employment. In April 1969, the Library Administration Division of the American Library Association, in response to a recommendation in the 1968 Access Survey, conducted a sampling employment survey regarding minority groups. The survey of principal academic and public libraries and of all state libraries found 84% of the respondents had minority employees. Twenty-seven per cent of all employees were in professional positions while only 14% of minority employees were in professional positions. Employment of minority groups in the reporting units is highest for public libraries and lowest for academic libraries (Table 1).

Beyond the relatively high employment of minority persons in public libraries, there are serious questions of public policy indicated by Table 1. Presumably most

TABLE 1

Averages of Minority Group as a Per Cent of Staff ($\mathit{\mathcal{S}}$)

Type of library	Total % of library staff	% of Professional employees	% of Nonprofessional staff
State	9	4	11
Public	16	8	23
Systems	8	8	8
Academic	4	4	5

of the reporting agencies are units of state and local government. Thus, the modest employment of minorities in these agencies calls into question policies of equal opportunity in public employment.

In June 1969 the *Library Journal* reported that an inquiry directed to public libraries with 7 million blacks, Puerto Ricans, and Indians in their service areas found discouraging results. Only about 19 persons representing these groups have risen to potentially significant policy-making positions (4).

No study has been performed of the employment of women in libraries. Women constitute a majority of library employees but they have failed to attain preferred positions on their staffs in relation to their numbers. Preferred positions in twelve major cities for the largest public and academic library based on 1968 data were identified by the writer. In public libraries, women were underrepresented in the position of director by 77%, in that of assistant librarian by 47% and in that of department head or coordinator by 18%. There is a pattern of employment of fewer women as the policy-making component of positions increase. For academic libraries, the underrepresentation was: directors, 85%; assistant librarians, 62%; department heads or coordinators, 46%; and for librarians of departmental libraries and special collections, 27%.

The problem of discrimination in libraries as first confronted by the American Library Association has paralleled the civil-rights movement. De jure segregation has disappeared except for school districts in dispute. The issue of "de facto discrimination," although the phrase is no longer mentioned, remains in terms of quality of services and access to employment.

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HENRY T. DRENNAN

DISINFECTION OF BOOKS

A library, new or old, presents a picture of solidarity and gives a pleasant feeling of something which has gone on for a long while and will continue to do so. Not suspected are the enemies of these rows of seemingly everlasting volumes. But enemies do exist and come in many sizes and shapes. Foremost among them is man; followed by air, light, darkness, heat, moisture, insects, and fungi, each of which creates specific problems.

Man mistreats books not only by tearing or folding pages, but by careless handling, injudicious mending, or by allowing them to be placed in wet or infested places. Insects cause more damage to books then even the most disastrous fire, or the water that douses the fire. Climate, through humidity or lack of humidity, heat, or moisture, causes deterioration of the papers or covers of the books or admits fungi to a new home in the dampness of the atmosphere. Disease is sometimes thought to be a major foe to books. However, other than anthrax or smallpox, infection to man from disease-exposed books is negligible.

The problem which confronts libraries is how to prevent these foes from causing damage to our book heritage; or, if damage has begun, how to stop its progress. This is not a new problem.

The importance of insects as destroyers of books and manuscripts has been recognized for many centuries, and many manuscripts are known to have been completely lost because of them. Aristotle, writing in Athens about 335 B.C., mentions creatures in books which are similar to the grubs found in clothing. Horace, Ovid, and Pliny the Elder speak of "vandal moths" and the destruction caused by a "bookworm." Moses, speaking to Joshua, instructed him on the care and preservation of the books of the Pentateuch by anointing them with cedar oil and storing them in earthen vessels. Philippus of Thessalonica, in his satire on grammarians early in the first century A.D., compared studious persons with bookworms.

Although insect attacks on books and papers increase as the climate grows warmer and more humid, there is no section of the country entirely free from some of the pests. There are many insects which attack books. The most common are bookworms, termites, silverfish, cockroaches, and book lice (psocids).

The earliest "scientific" observations of "the worm" were published by R. Hooke in London in his *Micrographia* (1665) which was printed at the expense of the Royal Society. The author must have relied more on his imagination than on observed fact for, while it is fanciful and amusing, the account cannot be called scientific. Pierre Petit, in 1683, penned a long Latin poem to the bookworm's disparagement, calling it "invisum pecus," "bestia audax," and "pestis chartarum." Sketchy references are occasionally found in later literature, but nothing truly scientific appears until this century.

The seriousness of the bookworm problem in 1774 caused the Royal Society of Gottingen to offer a prize for a satisfactory solution. William Blades included a chapter on the bookworm in his *The Enemies of Books* published in 1888. A prize offered by the Paris International Library Congress in 1903 spurred C. V. Houlbert to make a serious study of the pest, and he published his findings in *Les insectes ennemis des livres*. Probably the most thorough and scientific recent study is an article titled "Book-worms" by E. A. Back in the *Annual Report of the Smithsonian Institution*, 1939.

Bookworms in the larval stage of a variety of beetles cause the most damage. Upon hatching, the larvae eat their way into the book, whose glue and starches nourish them. The well-fed larvae become beetles, lay eggs, and recommence the cycle.

Fumigation and poisoning are effective against both larvae and beetles. Naphthalene in the form of blocks or *para*-dichloridebenzene crystals give off fumes which

repel beetles. The fumes may be utilized by placing books infested with live book-worms into an airtight container (such as a garbage can sealed with tape). The books are fanned open to allow the fumes to penetrate throughout. They may be stacked one above another, so long as the fumes may drop through them. The crystals are placed in a shallow saucer (of screen wire or other porous material) atop the stack of books, and the container sealed. It must be kept sealed for at least 72 hours while the heavier-then-air fumes penetrate through all of the books. Unfortunately, *para*-dichloridebenzene crystals do not kill the eggs, and materials that have been infested should be examined periodically for the reappearance of the larvae. Only vacuum fumigation has been found to be successful against the eggs.

The modern method of adulteration of paper has one good result—a bookworm will not touch such paper. His instinct keeps him from eating the china-clay, bleaches, plaster of paris, sulfate of barytes, and other finishes used in paper manu-facture today. He will, however, still attack the glues and starches in the bindings.

Termites, at least the earth-dwelling ones, do not invade a modern building pro-vided there are no wooden surfaces in contact with the soil. Some termites cannot live without dampness and darkness, and therefore build themselves little mud "life-lines" on nonwooden surfaces. Other types can live in dryness. Termites are able to feed on wood and paper due to the presence of enzyme-producing parasites in their digestive systems.

Earth-dwelling termites lick each other's bodies, and eat their dead, and thus assist in their own destruction if sufficient chemicals are placed near their living areas.

Termites are such a problem in South Florida that the University of Miami in-cluded a special fumigation room in the plans of the Otto G. Richter Library. All new materials donated to the library, as well as any materials found infested, are placed in this room prior to any entrance to the building proper. The fumigation vault is an air-tight room with its only entrance a door which opens onto a loading platform at the rear of the library. Books in boxes and other materials to be fumigated are placed in the room and stored until the room is nearly filled. The door is closed and sealed with tape by a professional exterminator. A gas composed of 70% methyl chloride and 30% aqualonotril is used as the fumigant. The latter chemical is the more potent, but extreme care must be exercised with its use because it is highly flammable. Materials remain in this atmosphere for 48 hours.

Once termites gain access to a building, only fumigation can eliminate them. This should be carried out by a professional exterminator. In determiting a library, if hydrocyanic gas is used, the building needs to be sealed for 48 hours and then aired for an equal time period. If it is not feasible to close a building for 4 days, methyl bromide will do a less effective job in 24 hours. A temporary measure against termites is to move the wooden shelves away from walls and stand them in contain-ers of coal tar or creosote.

Silverfish are attracted to the highly-coated papers and photographs used in modern printing, the same papers which repel bookworms. This insect feeds on the glue, paste, and gelatin in the materials of the papers. Aerosol and spray-type in-

secticides are useful in silverfish control. Formerly the stand-by remedy was sodium fluoride mixed with wheat flour, which was inconvenient to use and, because it is both unsightly and highly hazardous to humans, should no longer be used. For display cases or closed shelves, tablets of *para*-dichloridebenzene, which may be placed inconspicuously, will repel silverfish and other insects as well.

Cockroaches favor starch, glue, and materials used in sizing of cloth book covers. These pests will eat through cloth and paper spines of books to get at these foods, though they rarely eat into the interior of the book. Insecticides used to control silverfish are also effective against cockroaches.

Book lice (psocids) are minute white or gray insects about the size of a pinhead, and may sometimes be found by the thousands in musty books. They appear in great numbers in late summer and fall, seeking warm, damp, dark places. Eating almost everything in musty books, they seem to prefer the microscopically small fungi in the paper rather than the cellulose, gelatin, or glue. They do little actual damage, but their presence is a warning that conditions exist that will attract other more dangerous pests.

Cockroaches in the beetle stage, bookworms, and silverfish can be effectively controlled by spraying the walls, woodwork, floors, ceilings, and interiors of closets and storage cabinets with a dieldrin solution, using one-half pint of 20% solution per gallon of water. This spray remains lethal for at least 2 years, and will kill any insect on contact. Other effective sprays are oil solutions of 5% DDT, 2% chlordane, 2% malathion, or 0.5% lindane, but because of the oil, these are less desirable to use with books. Insecticide powders containing 10% DDT, 5% chlordane, 4% malathion, or 1% lindane or dieldrin may be used when the powder can be safely dusted into cracks and is not liable to be inhaled.

Climate affects books by being either too dry or too damp. In most libraries in the United States the problem is more in cultivating humidity rather than in eliminating it. Central heating is sometimes harmful to books because of the low humidity which accompanies it. Dry heat drives the life out of papers and leather. Artificially created humidity will help correct this problem. Some libraries report using wet sponges in copper containers, while more modern buildings have a humidifier which adds water to the hot air of the furnaces. Air conditioners will also maintain the humidity if they are used constantly. Means is not important, but maintaining an average of 50 to 60% humidity is necessary.

Excessive humidity, which prevails in so many parts of the world, not only in the tropics but also in regions where mist and fog are common, is a definite factor in book deterioration. Too much dampness causes the loosening of glue and paste, thus weakening the paper and binding, and producing problems of mold and mildew. Humidity can be removed with artificial heat, the circulation of dry air, and by the use of electric dehumidifiers or air conditioners. In small enclosed storage areas, anhydrous calcium chloride hanging in wire baskets or placed in bowls will absorb moisture. This moisture must be removed from time-to-time by baking the material until dry.

Mold and mildew result directly from high temperature and high humidity. It

appears as a thin white fungus which feeds on the gelatinous sizing of books and paper. The best prevention is storage in a light, well-ventilated room. Use of a dehumidifier or air conditioning is also effective. Coating the bookcovers with a lacquer-based fungicide prevents the growth of molds on the sizings. It has been noted that green or yellow book cloths seem less conducive to mildew growths than those that are black, dark blue, or red. Mold and mildrew may be removed from paper with a cloth dampened with alcohol, but the danger of alcohol damage to material and/or color must be considered before using. Gamma radiation, high-frequency currents, and ultrasonic vibrations have all been used with some success to prevent microbiological deterioration of library materials. Important research into the problems of fungi has been carried out at the Institute of Book Pathology in Rome, and also in Moscow at various Soviet state collections.

Mildew is eliminated permanently only when the temperature is kept at 65–75°F and the humidity is between 50 and 60% with the air circulating freely. Lower temperatures are even better for the preservation of library materials. Mildew inhibitors include phenyl mercuric nitrate, pentachlorophenol, beta-naphthol, *para*-nitrophenol, thymol, and salicylanilide. When these are painted or sprayed on library materials, they will retard mildew growth.

Fumigation with thymol is both a preventive and a remedy for mold and mildew. Here again an airtight container is used. A saucer containing thymol crystals is placed over an electric light (100 watt). Heat from the light is sufficient to vaporize the crystals and the fumes will kill the mold. Length of treatment depends on the severity of the attack. Care must be used for thymol dissolves some inks and varnishes, and *para*-nitrophenol will leave stains.

Disease-laden air is occasionally blamed for damage to books. Studies, however, have shown that few cases of infection can be traced to books. Contamination by anthrax and smallpox are exceptions, and books exposed to these diseases should be burned. For other contagious diseases, books will be rendered harmless if exposed to fresh air and sunlight.

Insecticide poisoning can happen during application of, and subsequent contact with, chemical residues. Since different chemicals have different levels of toxicity, care should be used in choosing the insecticide.

Commonly used insecticides, fungicides, and repellents are:

Insecticides: Low toxicity:	Chlorbenzide, chlordane, DDD, DDT, dipterex gammexane, malathion, methoxychlor, mineral oils, pyrethrine, rotenone
Intermediate toxicity:	Aldrin, chlorthion, diazinon, dieldrin, heptachlor, lead arsenate, phenkoptone, toxaphene
High toxicity:	Demeton, dimefox, dinitrobutylphenol, dinitrocresol (DNC), endrin, fluoroacetamide, guthion, methylparathion, phosdrin, schradan, sulphodex, TEPP

Fungicides: Low toxicity: Antibiotics, copper compounds, dithio-
                                       carbamates, TMTD
              High toxicity: Concentrated organic mercury compounds
Repellents: Low toxicity: Naphtalene, *para*-dichlorbenzene

Some formulas for pesticides:*

General library insecticide and fungicide:

Hexachlorocyclohexane	0.05 ounces
Cresol	0.05 "
Mercury acetate	0.05 "
Alcohol	99.85 "

This is useful for the general sterilization of shelves, cabinets, file drawers, etc., but should not be used on paper because of its chlorine content.

A fungicide for impregnating paper by dipping:

Salicylanilide	0.5 ounces
Water	1.5 gallons

Dissolve salicylanilide in a small amount of water, then add the balance of the liquid.

A fungicide for spraying paper:

Salicylanilide	1 ounce
Trichloroethylene	76 "
Acetone	4 "

Mix the solvents, then add the salicylanilide. Use only in a well-ventilated working area.

A moth preventive spray:

Pyrethrum extract	2 ounces
(20% weight/volume pyrethrum)	
Sesame oil active	10 ounces
DDT Technical	4 "
(Not less than 70% DDT)	
Kerosene	5 gallons

There has been a great deal of research on the care and preservation of library materials, and more findings are appearing regularly. There is now a great need to put these findings to use, and to make valid our feeling of the permanence of the volumes on our library shelves.

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<div align="right">EMMIE S. HAYES
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DISSERTATION ABSTRACTS INTERNATIONAL

In 1938, Eugene B. Power, founder of University Microfilms in Ann Arbor, Michigan, wrote the following paragraph in the Introduction of the first volume of a new publication, *Microfilm Abstracts:*

> With the development of microfilm, however, another method of publication is possible, one which involves a different publishing philosophy and which offers an effective, satisfactory, and economical method of distributing copies of scholarly manuscripts to a limited market. Because microfilm is a straight-line cost profit, one copy can be produced as reasonably as a dozen or two dozen copies made at one time. Therefore, the only investment necessary is the cost of notification and the small cost of making the negative microfilm of the original manuscript, from which positive copies may be prepared from time to time as individual orders come in.

The first issue of Mr. Power's publication was distributed without charge and the doctoral dissertations presented in the first issue were submitted through the courtesy of five North American universities: Princeton, Toronto, Michigan, Nebraska, and Stanford. These schools were willing to cooperate in a test to determine whether or not this method of publication constituted an effective and satisfactory medium. This publication method involved a new principle in publishing—that of production upon demand and of limiting the investment in any given title to the processes of notification. It made possible a more effective use of the total funds available to a scholar than had ever before been possible. At the same time it released the individual scholar from the limitations which highly mechanized printing presses placed upon the distribution of his material. This was, in fact, a breakthrough! The

idea grew and propagated. More and more schools joined the service for the microfilming and publication of doctoral dissertations.

The original publication was entitled *Microfilm Abstracts,* beginning with Volume 1, No. 1 in 1938 and ending in 1951 with Issue No. 4 of Volume 11. In 1952, beginning with Issue No. 1 of Volume 12, the new name for this publication became *Dissertation Abstracts.*

When the name changed to *Dissertation Abstracts* in 1952, there were six issues a year, and as the dissertation program was enlarged, twelve issues a year were produced. In 1938, Volume 1 contained a single issue only. From Volumes 2 through 8 there were two issues per volume. Beginning with Volume 9 there were three issues for each volume, and Volume 10 in 1951 actually had four issues.

In 1957, Issue No. 13 was added to Volume 16. The name chosen was *Index to American Doctoral Dissertations.* It covered dissertations processed in the United States for the school year 1955–1956. This became the index for *Dissertation Abstracts,* Volume 16, Issue No. 13, and it also followed the publication formerly entitled *Doctoral Dissertations Accepted by American Universities, 1954–1955* (No. 22), edited by A. H. Trotier and M. Harman, published by H. W. Wilson, New York, 1955. This had always been compiled for The Association of Research Libraries.

It was considered that this could be the index to all of the authors whose abstracts were published in *Dissertation Abstracts* and it would also be a listing for all of the dissertations published in North America even though the abstract may not have been published in *Dissertation Abstracts.* This combination existed through the end of Volume 17 of *Dissertation Abstracts.*

Due to many timing problems it was impossible to retain this as an index and beginning with Volume 18, a change was made so that issues for *Dissertation Abstracts* did not begin in January and end in December of any one year. Publication followed the school term and Issue No. 1 in July of any year became the first issue for a volume year. To accommodate this change, Volume 18 contained only six issues.

In 1958, Volume 19 again had a thirteenth issue titled as the *Index to American Doctoral Dissertations.* However, it was clearly indicated that authors published in *Dissertation Abstracts* were not identified in this particular issue in any special way. It was no longer the index for *Dissertation Abstracts;* it again became only a listing of all doctoral dissertations completed in North America during a certain period of time. Accordingly, Volumes 19 through 21 *(Dissertation Abstracts)* have Author Indexes only.

An important change was made beginning with Volume 22 in 1961. At this time the Library of Congress took over the responsibility for the preparation of the Subject and Author Indexes placed at the end of each issue; and they also prepared a Cumulative Subject and Author Index for each volume year. As more dissertations were received, the publication was ultimately divided in two sections: *A,* Humanities and Social Sciences, and *B,* Physical Sciences and Engineering; beginning with Volume 27.

Beginning with Volume 30, Issue No. 1 the name was changed to *Dissertation Abstracts International* and all issues now contain a computer-produced Keyword Title Index along with an Author Index. With the advent of computer indexing the way became clear for the preparation of the present cumulative Retrospective Index for *Dissertation Abstracts International*. This covers materials published in Volumes 1–29, 1938–1969. In this way the accomplishments of the past are made available for the present.

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DISTRICT OF COLUMBIA LIBRARY ASSOCIATION

The District of Columbia Library Association (DCLA) is the association of the capital city of Washington, D.C., and is thus in the unique position of being a metropolitan-area association covering an area not within the jurisdiction of any state association, although its membership includes many librarians from the Maryland and Virginia state portions of the District of Columbia area. The membership of the association reflects the heavy concentration of librarians in the area, with a majority of the members being affiliated with federal libraries although a steadily-increasing percentage are from nonfederal institutions.

The committee of ten who proposed the founding of the Library Association of Washington City in 1894 apparently had in mind activities of primarily local interest, both social and professional, for the forty-four charter members; but in 75 years of growth the importance of the federal government to libraries and of libraries to government have resulted in an organization that offers special opportunities for national action to its members, and that has a history of accomplishments of importance to all United States librarians. In 1901 the name of the organization was changed to the District of Columbia Library Association, indicating the interest in the whole metropolitan area that has characterized its growth since that time. Membership at the end of the seventy-fifth year was just over 800.

The first major issue pursued by the association after its founding was the creation of a public library system in the District of Columbia. A campaign begun in 1894 by the association resulted in the founding of the District of Columbia Public Library in 1896. From its earliest days, DCLA has worked for the establishment and improvement of training courses for librarians, and was almost solely responsible for the initiation at Columbian (George Washington) University of a series of courses on librarianship. The faculty was headed by Ainsworth Spofford, Librarian of Congress and first president of the association.

DCLA's influence on civil service position standards for librarians has been termed the single most important contribution of the association to librarianship. From 1919 to 1923 DCLA campaigned for professional classification for librarians, pressing upon the Civil Service Commission the reasons for raising the standards from the clerical status proposed by the commission. The DCLA position was recognized in 1923 by the commission when its standards appeared with the professional status for librarians included for the first time. Since that time the Civil Service Commission has cooperated with DCLA by keeping in touch on classification changes, submitting drafts of standards revisions, and accepting many of the recommendations made by DCLA.

DCLA has also been influential in campaigning for the establishment of a federal relations office in Washington of the American Library Association, which it joined as a chapter in 1922 after having become an affiliate in 1914. DCLA was incorporated in 1927.

Publications of DCLA began with a *Handbook,* first issued in 1897. From this evolved the seven editions of the directory of *Library and Reference Facilities in the District of Columbia,* and most lately the *Directory and Handbook* (first edition 1969) of the combined membership of DCLA, the Washington chapter of the Special Libraries Association, and the Potomac Valley Chapter of the American Society for Information Science; the directory includes the latest list of the District of Columbia library and reference facilities.

D. C. Libraries, a quarterly professional journal, began publication in 1929. A membership newsletter, *Clips and Quotes,* started as an occasional paper in 1967, becoming monthly in 1969.

DCLA activities include general meetings in a flexible arrangement of four to eight per year, taking advantage of the concentration of membership in a small geographical area. Meetings include professional informational lectures, discussions, and panels; receptions for new members and eminent individual members, and other social gatherings; workshops; and an annual banquet. Special interest groups with a wide variety of bases conduct their own regular schedule of smaller meetings. DCLA capitalizes through joint meetings and special projects like the *Directory and Handbook* on the presence in the Washington area of several other library organizations. In its 75 years of life DCLA has included many eminent librarians in its membership and as officers and editors. It has become in many aspects the nongovernmental spokesman for the federal library community.

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ALICE D. BALL

DIVISIONAL PLAN OF LIBRARY ORGANIZATION

In library circles the divisional plan has come to mean different things to different people, though initially it was a building plan.

The traditional university library in the first half of the twentieth century reflected the various formats in which library materials were produced and were used. The bookstack housed ordinary volumes. The periodicals room housed and displayed

current issues of continuing publications in soft covers. The newspaper room was a logical extension of the periodicals room.

Library arrangements were also influenced by the ways in which books can be used. Handbooks and compendia of information were brought together conveniently at a reference desk. This desk became the center of the reference room which housed much-used sets of books. To reduce losses of books and to implement good housekeeping and quick service, the bookstacks were typically closed to the general public and an extensive paging service was instituted.

The convenience of special indexes and the complexities of publication and procurement, as well as use, determined the arrangements of the bulk of the publications of governmental agencies. In this the "documents" department had its origin. The determinant in the case of "documents" is the accident of imprint. The author or issuing agency must be governmental. Pamphlets, maps, microfilm, and manuscript materials presented special problems and received special and separate housing.

The convenience of the librarian, who must keep this wide range of materials in order, was well served, but what of the reader? As the collections grew in number and complexity and as the readers mutliplied, the university library became a building of many rooms and multi-tiered bookstacks on many floors. The traditional concepts became rather formidable. A breakthrough was sought in order that an informal relatonship might again be established between the reader and his library materials. The researcher is not primarily interested in the various formats in which information is recorded and stored, but in the information itself. To him a library should be self-evident. Branch libraries were in part an outgrowth of this quest for simplicity in using library materials.

University enrollments grew steadily following World War I and there were more and more undergraduate students on the campus. Their library needs grew tremendously. Some instructors wanted their students to read widely, especially in language and literature, in history and economics, and related subjects, and to place less reliance on the textbook and on specific assignments in 2-hour reserve books.

In the 1930s the idea developed that the central university library could be designed and developed to serve all purposes somewhat better. Why not select a collection of books especially for the use of undergraduate students and house them separately from the research collections? Why not give undergraduate students direct access to their books on open shelves? If libraries cannot afford the expense of staff and duplications of books in an elaborate system of departmental library rooms, why not group these collections, especially those of direct use to the undergraduates, in larger quarters in the central building? And so was born the concept of a humanities reading room which became known as the humanities division. Other divisions followed for the social studies, the fine arts, education, the biological sciences, the physical sciences, etc.

The origins of the divisional idea are not obscure and the plan did not suddenly develop as brand new. On the university campus legal studies had long been served in a separate law library, a law division if you will, invariably in the law building apart from the central library. Agriculture and medicine had long been served in

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their separate libraries, typically on separate campuses. And the large public libraries, e.g., Cleveland and Los Angeles, had well-developed divisional reading rooms long before these innovations appeared on university campuses.

To serve the divisional idea of grouping library book collections by broad areas of closely related subject matter, the central library transformed the traditional reference room into a series of almost equally large reading rooms to serve separately the humanities, the social sciences, and other divisional groupings. This the University of Colorado did in the 1930s in a new central library designed by Ralph Ellsworth. Brown University also took part in these early developments. And at the turn of the 1940s the University of Nebraska, in a new central library designed by Gilbert Doane, Robert Miller, and Stephen McCarthy, developed four large reading rooms and hence four library divisions: the humanities, the social studies, science and technology, and education.

The book collection in each divisional reading room was limited to the subject matter of the division, and included the important dictionaries, encyclopedias, and other reference materials, supplemented with current periodicals, pamphlets, vertical file materials, etc. A few general reference books and current periodicals were duplicated to round out each divisional collection and to serve increasing numbers of students. Just as it had in the traditional research library, the concentration or dispersion of the "documents" collection remained subject to local determination. Microfacsimile formats continued to require special curatorship, and likewise rare books, special collections, manuscripts, and archives. The central bookstack, relieved of the burden of the much-used undergraduate collection, became a haven for scholars.

The divisional plan library building, with its large reading rooms and central bookstack, proved to be a relatively short-lived development. Like the traditional building which preceded it, the divisional plan building also tended to be a building full of fixed internal commitments. The large reading rooms were surrounded by load-bearing walls which could not be extended as collections and enrollments grew.

In the 1940s the modular system of library construction became well established and is, apparently, here to stay. The central idea of a modular building consists of widely spaced interior steel columns for vertical support, instead of load-bearing walls. Typically there are strong floors throughout, capable of holding anywhere at any time any reasonable load of books, readers, or specialized equipment, and any combination or concentration of these. Typically, too, there will be excellent lighting distributed throughout to permit any combination of activities, or re-arrangement of activities anywhere and at any time. In a modular building the only fixed internal commitments, beyond the floors and columns, are such building necessities as stairways, elevators, and toilets. Beyond these elements, everything that goes into the building can be moved with a minimum of time, effort, and expense. Reading rooms, bookstacks, offices, and hallways do not become fixed building commitments, but are subject to re-arrangement or removal. Such a building does not become obsolete.

The translation of a divisional plan into a modular building is relatively easy and

can be subject to any number of local refinements. One common option consists in selecting one or more floors of the modular building to serve the humanities, with similar provision for the social studies, and for the sciences. Each of these large areas can then be developed to hold all the pertinent collections, with extensive accommodations for readers and library staff. The bookstack can be entirely open or any part of it can be closed. Readers can be given a wide variety of accommodations, such as single tables, group tables, open lounges, or closed carrels. Another common option consists in shelving the collections in one continuous sequence by classification numbers throughout a large part of the building, interspersing staff and service centers wherever they most logically seem to be called for.

The traditional university library building was partially revised by the divisional plan as described in this article to provide a better approach for the reader to books and research. Both traditional and divisional buildings were radically revised with the introduction of modular construction to permit all kinds of internal flexibility. A different solution to the problem of separating collections and services for undergraduates from those provided the scholar has emerged in the separate undergraduate library building, now common on several large university campuses. In this development the research collections, generously interspersed with individual study accommodations and a wide variety of special services, become the research library. The selection of a pattern of library development on each campus is likely to be determined by the number and distribution of students and faculty at various levels, relative emphases on teaching versus research, geographical factors, and the institution's fiancial ability to staff, maintain, and support a satisfactory library complex.

The divisional plan library opened the way for specialization in many ways in student–faculty relationships and in library processes. Each division recruited librarians with subject majors and in some instances with master's degrees in subjects appropriate to the division. Each division benefited from this special training. These librarians worked as bibliographers and reference assistants in subjects in which they already had a well-developed interest and some special training. They brought a degree of sophistication and enthusiasm to their work with students and faculty. It was logical to extend this subject interest generated in the divisions into other aspects of library work. Cataloging and classifying books for the division was assigned to the staff of the division, working under the direction of permanent senior catalogers. This experience in cataloging improved the quality of the reference work in the divisions. The catalog, in turn, became an instrument more responsive to the public need. This crossing of departmental lines in exploiting the talents of the divisional staff both in reference work and in cataloging became known as "the dual assignment."

The divisional plan in the library provided a new orientation to library services for the faculty. By limiting the span of library–faculty relationships to those subjects and instructional departments appropriate to each division, these relationships became more complete. The humanities librarians worked exclusively with the humanities faculty and its students. This limitation improved the quality of the relationship

in such matters as collection building, reference service, the use of reserve books, and such managerial problems as rush books, branch library service, and interlibrary loans. The appropriate division became the faculty member's home base in the library. Each division maintained its own reference desk and contributed staff on rotating assignments to the central information desk at the card catalog.

Initially the divisional plan was designed to make information more accessible to the reader. The large divisional reading room has, however, given way to the modular concept of wide open interior space uninhibited by fixed physical commitments. This has modified the physical aspect of the divisional plan with respect to the arrangement and distribution of the collections. The broad subject division, however, provided a frame of reference for recruiting and assigning a staff, for collection building, and for developing and improving student and faculty relationships with the library in all kinds of service problems, from reserve book lists to rush cataloging and to highly specialized reference service. These are permanent contributions to library organization and management.

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FRANK A. LUNDY

DOBRZHINSKY, YEVGENIY NARKISOVITCH

Yevgeniy Narkisovitch Dobrzhinsky, (1864–1938) was a well-known library scientist and bibliographer on the staff of the library of the Leningrad Polytechnical Institute. He authored the catalog of this library until 1917 as well as the *Yearbook of Russian Technical Bibliography* for 1907. He created the original classification tables by which the decimal principle was introduced in Russia. Of special value are the explanations and directions accompanying the classification. Dobrzhinsky's tables have been widely used in various types of libraries.

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OLGA AKHMANOVA

DOCUMENT AND FACT RETRIEVAL

The terms "document retrieval" and "fact retrieval" are sometimes used broadly to distinguish between information retrieval systems that ultimately provide to the user entire *documents* which hopefully contain information pertinent to a given question and those capable of producing a *specific answer* to a question. Often implicit, or even explicit, in this usage is a third group of systems, which may be labeled data retrieval systems, which handle only numerical information. If such a distinction is added, "fact retrieval" usually refers strictly to systems that retrieve specific answers from nonnumerical information (*1–3*). In general discussions, these distinctions are probably adequate, and individual variations in definition are clear in context. However, these definitions are not sufficiently precise to be useful in discussions of feasibility and desirability of alternative systems.

In the design of information retrieval systems, the question of whether a system will retrieve documents or facts is a very important design parameter, labeled level of sophistication of the system (*4*). In an actual design process, a conscientious designer should determine the most suitable level of sophistication by examining the alternative levels available and considering the factors that affect the choice among them and the ramifications of possible choices (*5*). The specification of level of sophistication by this method would involve choosing among a series of alternatives such as those listed below. (It should be noted that the selection of two or more compatible options is permissible; i.e., the designer may decide that the system should offer users a variety of levels from which to choose, depending upon the nature of each search.)

1. *Reference Retrieval.* A system operating at the lowest level of sophistication provides, in response to an inquiry, a list of references to documents that may be expected to pertain to the request. The requester then must find and examine the documents in order to answer his specific question.

2. *Document Retrieval.* The second level describes systems that store documents for direct access so that the pertinent documents themselves are provided to to the requester. It is important to note that at this level entire documents are retrieved in the form in which they were stored; the user must still examine the documents in order to answer his question.

3. *Data Retrieval.* Data in this context may be either
   (a) Numerical data, such as specific temperatures, ages, or other quantities, or
   (b) Nonnumeric but quantifiable items of information, such as specific colors or shapes.
   In either case, systems operating at this level of sophistication aim to extract from the store and provide to the user the precise data required to answer his question.

4. *Idea (Nondata) Retrieval.* This level of sophistication describes systems that attempt to provide information which is neither quantified nor quantifiable in direct response to a question. Such a system might respond to the question: "What did Eli Whitney invent?" by retrieving from stored information a statement such as: "Eli Whitney invented the cotton gin."

5. *Data Manipulation.* A system capable of data manipulation performs simple operations, such as counting or comparing, on stored unit facts without producing any new data or changing the form of the stored data in any way. For example, a data manipulation system might develop or discover statistical correlations between two sets of stored data without altering the stored data.

6. *Data Processing.* At this level of sophistication, a system performs mathematical operations on stored data so as to produce new data in response to a request. Such a system might extrapolate from stored data on yield strength of a given material at various temperatures to estimate the yield strength of the same material at a temperature for which no data are contained in the store.

7. *Idea Manipulation.* Idea manipulation is comparable to data manipulation; however, since ideas are subjective and qualitative rather than quantitative, the operations performed and the relationships derived must be intellectual rather than statistical. As in data manipulation systems, the operations performed at this level do not result in the creation of any new information.

8. *Idea Processing.* The highest level of sophistication describes a system capable of performing logical deductions based on ideas stored in the system. A system of this type could develop a logical decision on the basis of subjective information; thus, the system uses stored ideas to derive nonquantifiable concepts not previously in the store.

In terms of this list, the broad meaning of document retrieval usually includes both reference and document retrieval (Levels 1 and 2). Fact retrieval, used in its most general sense, includes all other types of retrieval (Levels 3 through 8). If data retrieval is considered distinct from fact retrieval, this term usually refers to all levels that handle numerical data and that do not retrieve documents or document references.

Returning to the system design process, the options actually open to a designer are limited to those levels of sophistication that would be logical and appropriate for the situation at hand. For example, a major determinant here is whether the scope of the proposed system includes only data, only ideas, or both. If only quantified or quantifiable information is to be included, appropriate options would be Levels 1, 2, 3, 5, and 6. If only ideas are to be included, Levels 1, 2, 4, 7, and 8 would be appropriate. If both are to be covered, all levels, of course, would be appropriate options.

With available options in mind, the designer considers what other system parameters or outside factors bear on his choice. User needs and preferences are significant considerations. The progression from lowest to highest level of sophistication involves increasing the system's effort and decreasing the user's effort required to derive an answer to the user's question. One significant factor is, therefore, to what extent the intended users might want the system to work for them. This factor, in turn, might well depend upon whether users will be required to pay for services and, if so, whether users are apt to consider their saved time and effort worth the price the system demands.

Another element of user preference may also be an important affecting factor. When a researcher finds for himself the sentence or table which answers his question in a retrieved (reliable) document, he can feel reasonably certain that the answer is correct. On the other hand, many users tend to doubt the accuracy of information if its source and context are not clear. And, indeed, there is a distinct danger, particularly in automatic retrieval systems, that information taken out of context will be misinterpreted and inaccurately applied.

In specifying the system's level of sophistication, designers must also be aware of the ramifications of alternative choices. What are some factors affected by the selection of a level of sophistication? As might be expected, a number of factors are affected by increasing the level of sophistication which, in turn, have a direct bearing on the cost of system operations. For example, the total amount of time required for input and output processing increases with level of sophistication because more effort is required to prepare more complex responses. In addition, as the level of sophistication increases, the system must store, move about, and maintain in searchable form more individual items of information or data. Whether the storage medium is manual or mechanized, general operating and housekeeping costs are bound to increase as a result. Finally, the higher levels of sophistication require increasing numbers of highly qualified staff, which obviously increases personnel costs.

Another important consideration for systems dealing with ideas is the degree of mechanization feasible in the current state of technology. All levels of sophistication, of course, are feasible and currently exist in manual and semiautomated systems. The increasing amount of intellectual effort required to retrieve, manipulate, and process either data or ideas can be provided by humans serving as part of the system. Thus, an information analysis center is, in effect, a system capable of operating at the highest level of sophistication. However, if a designer selects that level of sophistication, his options with respect to mechanization and staff will be

limited to those systems that maintain a staff of subject matter specialists to perform the analysis function.

The feasibility and reliability of automatic retrieval systems depend essentially upon the extent to which the file of stored information is or can be structured. Therefore, considered from a different viewpoint, if circumstances require a highly automated system operating at a high level of sophistication, the designer must then structure the file so that the necessary information can be identified and extracted, manipulated, or processed with a minimum of intellectual intervention.

Numerical data are by nature highly structured and therefore can be automatically manipulated or processed with reasonably reliable results. Nonnumerical but quantifiable facts are likewise no particular problem. Subjective, narrative information in natural language is not only unstructured but extremely difficult to structure. The seemingly endless rules of English grammar which confound the grade-school pupil are totally inadequate for eliminating ambiguities, even in grammatically correct expressions.

Researchers in the field of automatic language processing have developed a variety of approaches for coping with the problems of word meanings (semantics), sentence structure (syntactics), logical inference, and relevance. Although several experimental systems have been successful in answering limited sets of questions from restricted texts, estimates of their chances of extending this success to truly automatic processing of all information vary widely (6,7). Meanwhile, continuing progress in on-line systems offers a practical alternative to automatic deductive systems by allowing the user to interact directly with the file, providing intellectual input when it is required while using the machine for the routine operations.

At the present time, by far the large majority of operational information retrieval systems function at the lower levels of sophistication. A system which comprises an accurately indexed collection and which provides to a requester a reasonable number of citations or actual documents pertaining to his request is regarded as entirely adequate for most purposes. Technological advances and reduced costs of machine storage and handling have recently encouraged the installation of systems capable of automatic manipulation and processing of large files of highly structured information. Thus, the number of operational medium-level systems is increasing, and the trend may well continue.

The relatively few systems operating at higher levels of sophistication are doing so for very special reasons. In some cases, subject specialists at a single information center can measurably reduce manpower requirements in several user organizations and thereby justify the expense of the operation. In other instances, the basis would appear to be a conviction that the ultimate purpose served by the system (by virtue of its subject coverage, for example) demands a level of effort and financial commitment well above that which is normally warranted. With respect to automatic systems, a driving force is clearly the challenge of the unknown and the gamble. Some researchers hope to demonstrate the feasibility of automatic deductive question-answering techniques regardless of their ultimate practicality. Entrepreneurs are hoping that further drastic reductions in machine costs and rising manpower costs

will combine to tip the scale in favor of automation at higher levels of sophistication. But, barring circumstances such as these, subjectively measured cost/benefit ratios tend to favor systems in which the user does most of the work.

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DOCUMENT TRANSMISSION SYSTEMS

Introduction

The concept of rapid remote access to a store of information, via some sort of electronic system, has long held great fascination for practitioners in the fields of library and information science.

For years, librarians have expended much time and effort in developing methods of making the resources of different libraries readily available to each other. As the "information explosion" proceeds, the inability of even the largest library to amass all of the materials required by its clientele becomes increasingly apparent.

The foregoing is obvious, but less obvious is the fact that efficient document transmission systems, in themselves, do not provide the panacea to solve all the problems of accessibility to distant library holdings.

Viewed in the realistic context of the total process of putting information into the hands of the requester, document transmission will take care of only one phase of that process. That is the actual physical transfer of the information from its storage location to the location where it is to be read. The various phases of the *total* process include:

1. Determination of need.
2. Identification of a particular document required.
3. Adequate description of that item.
4. Determination of location of the item.
5. Processing the request.
6. Transmitting the request.
7. Processing the request at the source location.
8. Retrieving the item.
9. Transmitting the item.
10. Receiving the item.
11. Delivering the item to the requester.
12. Performing necessary administrative chores, such as bookkeeping, invoicing, transferring of funds, or other fiscal arrangements required by the transaction.

No document transmission system is, in itself, very effective until all of these functions are provided for.

Document transmission systems, as they develop, will play an increasingly vital role as one essential element in the total span of library and information services.

Background

Most of the electronic document transmission activities in libraries have employed relatively simple and low-cost hardware known as telefacsimile or facsimile transmission equipment (see Figure 1). Telefacsimile seemingly has the potential of giving rise to the greatest leap forward in speed of interlibrary transfers of printed pages since the late 1950s, when the combination of Xerox copies and air mail began to be widely used in interlibrary loan operations.

Facsimile transmission had been used for many years in applications other than libraries by the time the first library experiments were attempted, but for the most part these were commercial applications involving expensive, high-speed equipment. Newspapers, periodical publishers, users of weather maps, and various business firms (including some railroads) have been users of telefacsimile for decades.

The equipment manufacturers designed several lower-cost systems during the early 1960s, primarily for business applications. The designs were developed with the idea of economically transmitting letters, contracts, purchase orders, etc. The specifications as to resolution (lines per inch) and speed of transmission were appropriate for transmittal of a typewritten page, or several pages at a time, but with no intention of accommodating a typical library transaction involving 10 pages of a bound periodical printed in 6-point type.

Low-cost equipment is now manufactured by several firms, notably Xerox, Magnavox, Stewart-Warner, Graphic Sciences, and a few others (see Figure 2). Typically, a single voice-grade telephone line suffices for a communication link, and in some cases an ordinary desk-top telephone can be coupled directly to the machine when needed. In other cases a Data-Phone is required as an interface. A single page ($8\frac{1}{2} \times 11$ in.) ordinarily requires nearly 6 minutes to transmit. None of them

FIGURE 1. *A low-cost desk-top facsimile transceiver. This is an early model of the Xerox Telecopier. Note the acoustic coupler on the left, which provides the interface between the transceiver and the telephone handset.*

will transmit directly from a bound volume, hence copies (such as Xerox) must be made of the appropriate pages before transmission is possible. The Stewart-Warner (Datafax), also sold by Dictaphone, uses a wet copying process, while the Xerox Telecopier, and the very similar Magnavox, use a dry process, as does the Graphic Sciences equipment.

Although the equipment described above may be called low-cost, at 6 minutes per page long-distance telephone toll charges can get rather expensive for a 10-page periodical article.

Higher speed capabilities are now in the active development stage for equipment in this low price range, so there is considerable hope for reduced telephone line costs in the near future.

In 1965 the first objective analysis of telefacsimile as a means of "exchange of technical information between major centers" was published by the Houston Research Institute, Inc. (*1*). This study, financed by the National Science Foundation, concluded that "establishment of a facsimile transmittal system is not justified until after major improvements have been made in present library procedures for information storage and retrieval."

The negative conclusion was inevitable, one can now say with the benefit of hindsight, since it was reached after attempting to apply, theoretically, high-speed (hence
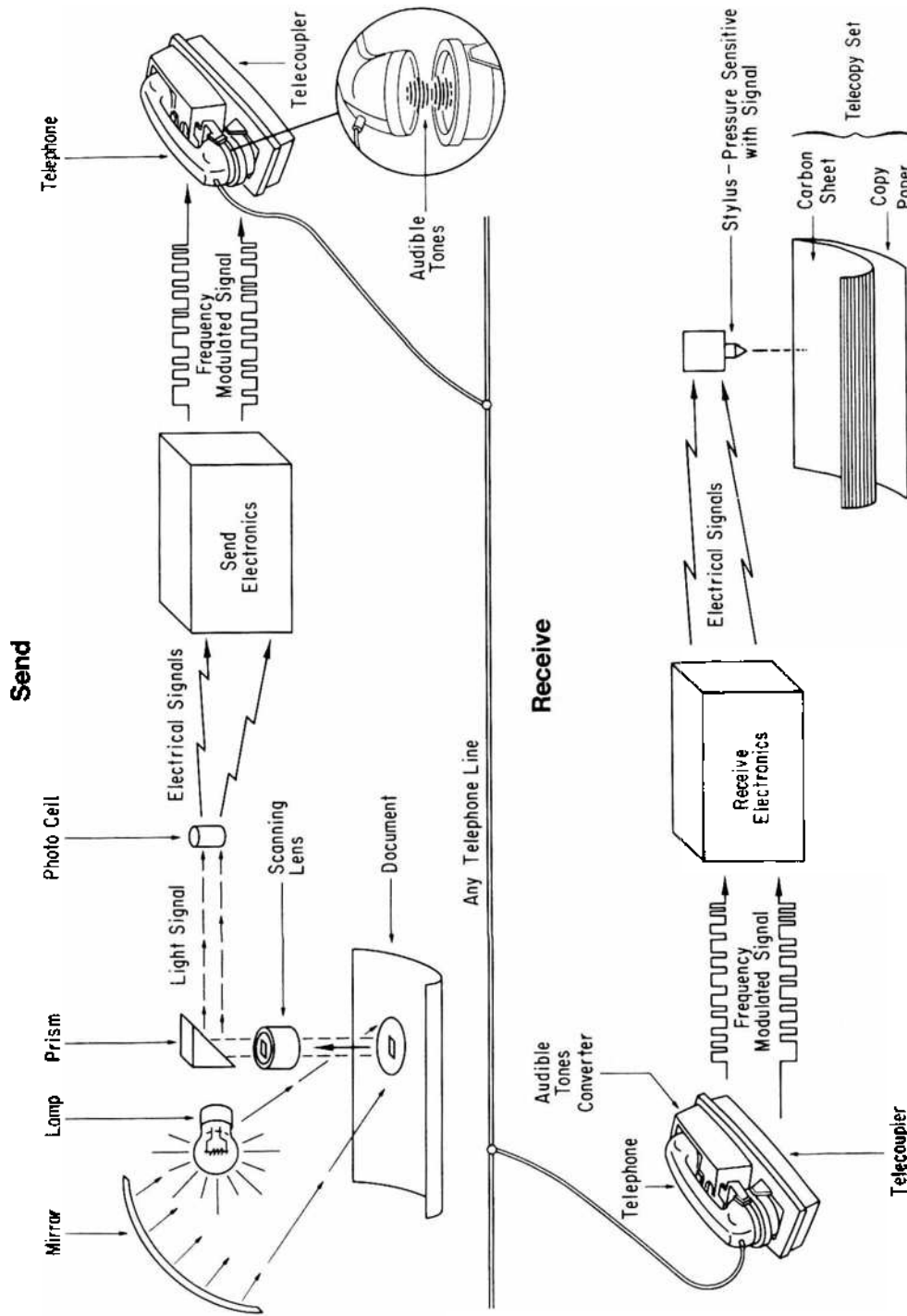
FIGURE 2. A schematic diagram illustrating the operating principles of one type of telefacsimile machine.

expensive) 48 kHz bandwidth transmission in the context of conventional inter-library loan operations. The contrast of the extremely rapid and costly transmission as compared with the traditional back-logged, batch-process handling of requests in interlibrary loan offices made the whole idea seem nonfeasible to the Houston researchers. It did not make sense to spend over 10 times as much money per transaction using telefacsimile, to save only a day or two over airmail time, when average total transaction time was 3 weeks. In fact, one infers that there might even be some question as to whether the extra cost of airmail over surface mail was justified.

The Houston researchers evidently did not assume that a document transmission system would probably be designed and installed only with a concomitant drastic redesign and streamlining of request-handling and information retrieval procedures.

Library Experiments with Telefacsimile

Actual experiments in libraries using facsimile transmission equipment began with a demonstration in 1948, when the novel *Gone with the Wind* (on microfilm) was transmitted to the Library of Congress from a Washington, D.C., hotel. This successful transmission required 2 minutes and 21 seconds, via microwave, using a cathode ray RCA system called Ultrafax. Luther Evans, then Librarian of Congress, made no mention of costs when he reported this experiment (2).

The Atomic Energy Commission subsequently tested a telefacsimile system for transmission of technical information, reported by Scott Adams, who eloquently advocated its adoption for the federal libraries in 1953 (3). Nothing came of it, however, except a sharp refutation of Mr. Adams's optimistic arguments by Dr. I. A. Warheit, who pointed out, among other things, that it is "extremely unrealistic to draw up operational costs based on the theoretical capacity of a machine" (4).

After a decade of no library activity in this field, a brief experience in library facsimile transmission occurred in 1963 at the Franklin Institute Library in Philadelphia, which was linked with a General Electric plant. G.E.'s attorneys began to worry about copyright violations, so the experiment was soon discontinued (5).

During the next few years a number of experiments were undertaken in various places. In 1965 David W. Heron, then Director of Libraries at the University of Nevada, Reno, obtained a grant from the Council on Library Resources to conduct a 30-day trial of a new device called the Xerox Magnavox Telecopier. This trial was conducted between the University of California campus at Davis and the University of Nevada campuses at Reno and Las Vegas, over distances ranging from 120 to 345 airline miles. This experiment was described in some detail, representing the first attempt at a realistic report of facsimile transmission costs and time factors, based on actual experience with interlibrary loan requests for periodical articles (6,7). This experiment resulted in the conclusion that the equipment was not then reliable enough for satisfactory use in libraries. Difficulties were also experienced with poor telephone line connections, resulting in some bizarre distortions of printed pages. However, a number of transmissions were completed successfully, with re-

spectable elapsed times, at fairly reasonable costs. [Improved models of this same equipment are now in daily use at Pennsylvania State University, demonstrating much improved reliability (14).]

At the same time another experiment, again funded by the Council on Library Resources, was being designed at the Institute for Library Research at Berkeley. This resulted in a much more ambitious effort, using LDX equipment (again by Xerox). The Berkeley and Davis campuses (65 airline miles apart) were linked via microwave and cable, involving rather spectacular dish antennae installed on the roofs of the two campus libraries. The channel used was a Telpak "A" (48 kHz), twelve times as broad (and expensive) as the single voice-grade telephone line used by the Telecopier mentioned above. Speed was much higher, as were costs, requiring a high volume of use to make the operation feasible. This experiment was well-designed and well-performed, and resulted in a long, detailed report containing some very interesting observations (8). Ralph Shoffner and Will Schieber, co-authors of the report, demonstrated the deleterious effect on elapsed performance times when requests come in "bunches." Even using the best high-speed equipment, at a near-optimum volume of use, completed transactions required an average of 9 working hours. This may be compared with the "blue-sky" approach of the optimistic type of information scientist or equipment promoter, who tend to speak in terms of "instant retrieval," or copies "available in a matter of minutes."

Another interesting observation in this report is the assessment of customer demand and satisfaction. A questionnaire revealed that most of the transactions completed could have been handled according to conventional, slower methods with no significant loss of utility; also that most users would not be willing to pay for the full cost of the rapid facsimile transmission service. However, some requesters who were in a hurry benefited considerably from the rapid service.

Shoffner and Schieber conclude that facsimile transmission should not be attempted as a general-use tool, but that it should be an important element in a "variable-response" system, to be used only for those requests which are designated RUSH. Low-cost, slower methods would continue to be used for less urgent requests.

The Hawaii State Library System, in fall 1966, installed a Stewart-Warner system to link libraries on several of the islands together. This was hopefully intended as a working system rather than an experiment, but was discontinued due to technical difficulties (9). Humidity and intermittent use were cited as two chief causes of the failure (10).

A major system was designed and installed in New York State in 1967, this one also using Stewart-Warner (Datafax) equipment for the most part. Funded by state appropriation, this system was part of a large-scale network of public library systems, centered in the New York State Library, but also included several academic libraries. All requests were transmitted directly to the State Library, where a switching device provided for channelling transmissions from one component of the system to another. This project involved sixteen libraries or public library systems, including NYPL, Cornell University, Columbia University, and 3 SUNY campuses.

As might be expected in a project of this magnitude, much useful knowledge was

gained and reported (*11*). Major problems encountered seemed to derive from the fact that so many libraries (and people) were involved, not all of whom were adequately oriented to the new system. Also, volume of use was low in relation to theoretical capacity of the system. Results were mixed, but included some startling cost figures and elapsed time reports. Costs of completed requests were over $50 each, and elapsed time to fill a request averaged more than 1 week. Material transmitted consisted mostly of periodical articles.

As with the Hawaii project, the New York State facsimile transmission project was originally intended to continue as an operating system, but was discontinued as unfeasible.

In South Carolina, a quite different project was under way. Using the Xerox Telecopier, the State Library used Title III Library Service and Construction Act funds to set up a low-volume operation involving requests from two county libraries. Excellent results were obtained technically, perhaps because most material transmitted was single-page typewritten reference or interlibrary loan requests. The 3-month experiment was terminated with a negative recommendation for continuance because the cost per request ($2.61!) was deemed excessive (*12*).

Several other minor installations, mostly experimental, have been made, and some are in operation as of this writing (April 1971).

Operating Systems

One especially noteworthy installation is at Pennsylvania State University. This is the only major operational document transmission system in academic library use that has been reported as successful, with intentions to continue indefinitely. Using regularly budgeted funds, this Xerox Telecopier network has been in continuous use since early 1967 (*13,14*).

The special reasons for the success of this system seem to stem from the relationship of one strong central library serving nineteen other campuses, each with only small library resources, mostly remote and isolated from the main library. Real needs arise on these campuses for access to the main library's resources, and facsimile transmission appears to be worth the extra cost in this situation. The Pennsylvania State University Agricultural and Biological Sciences Library also enjoys regular Telecopier access to the National Agricultural Library, which now has a machine.

It should be noted that all of the three major federal libraries have telefacsimile installations now, as Scott Adams so fervently advocated back in 1953 (*3*). However, use of this equipment (Xerox Telecopiers) is designated as "experimental" at the Library of Congress and the National Library of Medicine.

Among the few states where facsimile transmission is now being tried in libraries, California is probably the most active.

A recent survey produced by the California State Library lists twenty-two libraries (public or government) plus twelve business firms with special libraries, all equipped with one sort or another of telefacsimile equipment (*15*). Some of these units are

incompatible with some others, limiting the total resource-sharing capabilities of this heterogeneous group of thirty-four libraries.

A significant experiment with library facsimile transmission in California has been (and is being) conducted in the north, with BARC (Bay Area Reference Center), headquartered in San Francisco, and the North Bay Cooperative Library System, headquartered in Santa Rosa. The latter system has experimented with several types of equipment for various library uses, and now connects with BARC from two libraries only (Santa Rosa and Vallejo), solely for the transmission of answers to subject requests sent to BARC (16).

The first phase of the BARC experiment, working with NBCLS and the California State Library, emphasized broad use of the facsimile transmission equipment, for various kinds of requests, mainly to give personnel a familiarity with it and to encourage its use.

The second phase, now in progress, limits use of telefacsimile to "appropriate situations," emphasizing rapid response to urgent requests.

A future phase will involve emphasis on telefacsimile access to special or unique resources in the area, with the idea that such collections will be accessed frequently enough to generate an appropriate volume of use for the system.

The California State Library is now considering the addition of a Xerox Telecopier or Magnafax (mutually compatible machines), since many special libraries in the state are equipped with one or the other of these (17). Telefacsimile units in the public libraries in California are mostly Graphic Sciences, Inc., at this time.

Improvements Needed

The working systems described above have brought to light several basic deficiencies present in the lower-cost telefacsimile devices available at this time (see Figures 3–5).

Resolution (usually below 100 lines per inch) is inadequate to effectively reproduce type sizes below 8 point.

Speed (at nearly 6 minutes per page) is too slow, making a typical 10-page periodical article transmission quite expensive in terms of long-distance telephone line charges. (Improvements in this respect have been promised by several manufacturers.)

Labor costs and inconvenience are excessive, because most systems require an operator in attendance to manipulate both sending and receiving devices. Automatic features would greatly enhance the practicality of document transmission between libraries.

Reliability is evidently not a serious problem, being usually reported as satisfactory, except for difficulties experienced with poor-quality telephone line connections.

The necessity for making a copy of each page *before* it can be transmitted (since no equipment is available today which will scan directly from a bound volume) is a serious drawback for most library uses. The time required to make preliminary

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Annual epidemiological and vital statistics

World Health Organization.

Statistiques épidémiologiques et démographiques an-
nuelles. Annual epidemiological and vital statistics. 1939-
46—

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v. 28 cm.

Supersedes Rapport épidémiologique annuel, Annual epidemiologi-
cal report issued by the League of Nations, Secretariat, Health
Section.

1. Epidemics—Stat. 2. Vital statistics. 3. Medical statistics.
I. Title. II. Title: Annual epidemiological and vital statistics.

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Library of Congress   (595)

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Library of Congress   (595)

FIGURE 3. An example of copy transmitted for experimental purposes. This material (Library of Congress catalog cards) shows legible, but unclear, reproduction of 6-point type, transmitted from Reno, Nevada, to Davis, California, using a Xerox Telecopier and an ordinary telephone connection.

copy, the cost, and the loss of copy quality all contribute to a considerable loss in utility as compared to the obvious advantages of a scanner-transmitter which could work directly from bound volumes.

One company (Alden Electronic and Impulse Recording Co., Inc., Westboro, Massachusetts) has developed a proposal for development of a scanner-transmitter in a book copier configuration, but as yet no funding agency has supported this proposal (18).

FIGURE 4. *Distortions believed to have resulted from a poor telephone line connection. Transmission from Las Vegas to Reno via Xerox Telecopier.*

Current Professional Activities

In January 1967 the American Library Association (ALA) formed a Telefacsimile Committee, under the chairmanship of David W. Heron, as one of the activities of the Reproduction of Library Materials Section of the Resources and Technical Services Division. This committee has served as a clearinghouse of information regarding document transmission in libraries, sponsored a program meeting on telefacsimile at the 1968 ALA Conference in Kansas City, and another at the 1971 Dallas Conference.
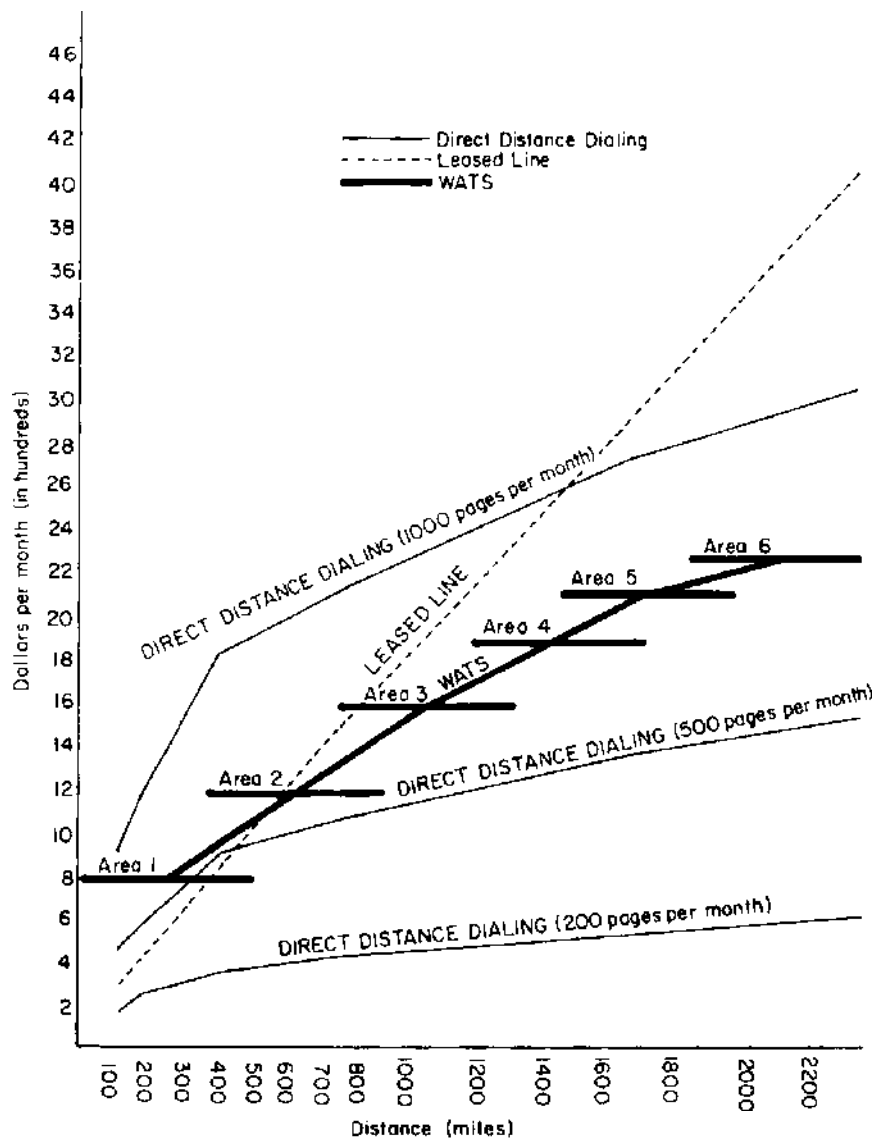
FIGURE 5. *An indication of the variations in telefacsimile costs, depending on distance, volume of use, and type of telephone line service.*

In January 1971 at the Los Angeles ALA midwinter meeting, a new committee was formed within the Information Science and Automation Division, under the chairmanship of Brigitte Kenney. Called the Telecommunications Committee, this group is concerning itself with the broader aspects of document transmission, plus other applications of electronic communications between libraries. Teletype, telephone, and television channels are within this committee's concern, plus telefacsimile as achieved by a close liaison with the RTSD/RLMS Telefacsimile Committee.

Neither of these committees has, as yet, accomplished much toward development of standards to be used by manufacturers, although there is at least one other com-

mittee working on one aspect of this (the Joint Microfilm Facsimile Standards Com-
mittee of the National Microfilm Association and the Electronic Industries Associa-
tion). There is some hope that sufficient progress will be made toward formulation
of desired specifications so that manufacturers may be brought toward design and
production equipment more suitable for library applications.

Prospects for the Future

There are many interesting possibilities for future systems of document transmis-
sion between libraries.

Project Intrex, at M.I.T., is an outstanding example of the most advanced efforts
toward design and implementation of sophisticated information organization and
retrieval systems. Document transmission is an important feature of this project,
which employs automatic retrieval of microforms, with remote access through com-
puter terminals and CRT displays (19).

Since the information generated by the scanning process can be transmitted and
stored in digital form as well as the analog signals employed by present-day facsimile
systems, there are many possible combinations of processes which might be ulti-
mately used in document storage and transmission systems, including computers,
microfilm, and television display with hard-copy printout capability.

A key element in document transmission, both in the immediate future and in
long-range planning, is the availability of transmission channels for library and other
educational purposes.

Even though the document transmission systems of the future cannot be accurately
described today, it is very likely that great demands will be placed on existing com-
munication channels of various bandwidths (capacities). A prudent approach to this
problem today would be for all librarians and information scientists concerned with
document transmission to take every opportunity at the local, regional, and national
levels to promote reservation, for educational library purposes, of an adequate seg-
ment of any new communication channels being developed. Both daytime and off-
hour capacity will evidently be in future demand. It appears the broad-band high-
speed channels, up to the capacity of a television link, will be eventually used heavily
between major urban centers for transmission of library materials.

At a conference held in December 1969 (Image Transmission Conference, Na-
tional Bureau of Standards, Gaithersburg, Maryland) numerous systems were de-
scribed, involving techniques promising tremendous future capabilities for informa-
tion transfer. Laser beams are proposed by CBS Laboratories and by Image Systems,
Inc., both of Stamford, Connecticut, as the ultra-high-speed communication link.
Digital image display was presented, and several complete document storage and
retrieval systems were described. One of the most promising systems presented
involves reception of printed pages on ordinary television sets, with the use of an
inexpensive ($350, by Sony) video-tape recorder for storage of documents received.

The current trend, projected into the near future, indicate that the present very
limited use of telefacsimile in libraries will gradually expand, quality and reliability

will continue to improve, speed will increase, unit costs will go down, equipment will become more automatic, and demand will increase as patrons become accustomed to the availability of rapid service. As the total store of information continues to grow at accelerating rates, rapid remote access from one location to another will become more and more important.

The more distant future, although difficult to predict, holds the promise of remarkable improvements in accessibility of library-stored information. The technology is already available, but must be applied to reduction of costs before any major breakthroughs may be anticipated.

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HAROLD G. MOREHOUSE

DOCUMENTATION DIVISION, SLA

When John Cotton Dana organized the society named "Special Libraries Association (SLA)," it was to answer an unfilled need for a forum for the particular problems and needs of libraries and librarians serving special purposes and limited clienteles. This association evolved to be one of the most significant professional society movements within librarianship and the further division within librarianship of the "special librarian" was born.

In like fashion, various individuals within the SLA, Dr. Mortimer Taube, Mr. Bernard Fry, Dr. I. A. Warheit, Mr. Walter A. Kee, and Mr. Philip Leslie, felt that there was a need for more understanding by SLA members of the field of "documentation." These men felt that this field was of increasing importance to SLA members. Consequently, it was through their activities that the Documentation Committee was founded in 1949 and that the Documentation Division itself was born in 1956.

Among all of the SLA Divisions, Documentation is one of the two divisions whose activities cut across all subject specializations. It carried out its activities as the Documentation Committee for 7 years, longer than any other division has functioned as a committee. It almost went out of existence three times before it was organized as a division. And finally, it received the required number of signatures on a petition twice before the division was actually formed (1).

Documentation Committee, 1949–1956. In 1949, SLA President Ruth Hooker appointed Dr. Mortimer Taube as Chairman of the first Documentation Committee. Two years later, this committee submitted a definition of *documentation* together with thirteen recommendations for future action. This definition, accepted June 22, 1951, read:

> Documentation is the art comprised of (a) document reproduction, (b) document distribution, and (c) document utilization (2).

The 7 years of committee activity served as the tangible expression of the intellectual interest among special librarians in the activities of the so-called "documentalists." However, it soon became apparent that various committee members saw three different roles for the committee. The first group felt that the committee should merely keep a weather-watch on new developments and report them to SLA membership. The second group was interested in fostering negotiations for a merger or restructuring or both between SLA and the American Documentation Institute (ADI). The third group was interested in the formation of a Documentation Division within SLA rather than merging with ADI.

With the definition of interest of the committee and the split into three directions of activity, it would seem that little of real benefit could be accomplished. This was

far from the case since some important study projects were undertaken. These were outgrowths of the original set of thirteen recommendations. Among these were:

(1) A study of the problem of standardized entry of periodicals, which was reported on in February 1951 and which encouraged further research in this area.

(2) A study on the identification and description of certain areas of special librarianship in the field of documentation and which was oriented toward comparing these areas with the functions described in the *Library Series* of the United States Civil Service Commission. The conclusion was that with certain revisions and additions, the series could cover special librarianship and documentation (*3*).

Certain committee members were active in the restructuring of the ADI to permit individuals to hold membership. This proved to be a significant development for the future, affecting negotiations and cooperation between ADI and SLA.

Despite these meaningful activities, some members of the committee felt they should cease to exist as a committee—to the extremes of either replacement by a Documentation Division or complete cessation of documentation-related activities within SLA. On June 15, 1955, a Round Table Meeting was held to determine the extent of interest among SLA members in documentation. As a result of the enthusiastic membership response, the Round Table Meeting concluded that the committee should be abolished and its activities replaced by those of a Documentation Division. An informal petition with fifty signatures was signed at this meeting calling for a Division (*4*).

Although this interest in documentation activity was high, it did not serve to assure a speedy, uncomplicated delivery of an infant Documentation Division. In 1956 the Documentation Committee stated,

More and more divisions with overlapping interests not only detract from and weaken a strong central SLA but also are a drain on its financial resources. The Committee recommends against the establishment of a Documentation Division for the following reasons, in addition to the foregoing basic one:

(1) Documentation is procedural in nature as opposed to substantive.
(2) It is of interest to all substantive groups.
(3) Because of overlapping interests there will inevitably be conflicts in programs at the annual meetings.
(4) Participation in documentation activities should not be denied because of additional required duties.

Therefore, the Committee recommends that a continuing Documentation Round Table rather than a Division be formed (*5*).

However, the SLA Executive Board did not accept these recommendations. Another committee plea for dissolution went unheeded and labor pains continued to be felt. On November 1, 1956, the SLA Executive Board voted to establish a Documentation Division after reviewing a petition to this effect signed by fifty-six members attending the Post-Convention Institute, June 8, 1955 in Detroit. At the same time the committee was formally dissolved.

It is apparent that all of the reasons that there should not have been a new division also were substantial reasons demonstrating the need for such a division. Much foresight was shown by this act of creation that November day. This can be seen from the following description of the Documentation Division today.

Documentation Division, 1957–. The first organizational meeting of the division was held in Boston on June 28, 1957. Walter A. Kee was elected first chairman and brought from the throes of the organizational effort the first activities as an embryonic division. The first Directory of Members emerged in May 1958. At the Annual Convention that same year bylaws were discussed and approved by the membership.

The early emphasis of the division was to provide SLA members a review of what is involved in documentation and to show that it is not an art or technique restricted to the fields of science and technology. Early programming at the annual convention during the first 2 years stressed microfilm use (then barely emerging) and techniques of retrieval and indexing systems (*1*).

From 1957 to 1964, under the careful nuturing of its chairmen, Dr. I. A. Warheit, Mr. Grieg Aspnes, and Mr. Philip Leslie, the division began to stress education of special librarians for the impact and mystique of new methods and machines being applied to documentation and library material control and dissemination. Library mechanization, particularly for the small library, together with basic systems and data processing techniques were stressed. On occasion this educational message assumed rather fervent overtones (*6*).

Certain changes in emphasis of interest began to occur in the period after 1964 to the present. A revitalization of interest in the basic premises of documentation occurred. It had become apparent to many division members and special librarians that documentation (or information science) and librarianship were quite similar. Today, in the recent literature, information science has replaced the term documentation in frequency of use. And, furthermore, the similarity between library and information science makes it difficult to tell them apart since all information storage, retrieval, and transfer is really based on foundations laid down for generations within the field of librarianship (*7*).

Under Chairman Grieg Aspnes, further progress on definition of the division purpose and goal was made. This quote below taken from the 1961–1962 Annual Report (*8*) codifies very well a basic role of the division to this very day.

> The Division has a great role to play in seeing both ways—toward the computer specialists, logicians, electronic engineers, semanticists, and all the others who are developing new tools for handling information; and toward the working librarian ("information specialist," if you wish) who has an audience to serve which is increasingly expecting and demanding more and better service.

To further illustrate the tenor of activities of the division in carrying out the above role, a few of the most significant activities are described in the following paragraphs.

In the period 1962 through 1964 at the Annual Conference of SLA, the Docu-

mentation Division sponsored a display suite in which various libraries participated to show their working library mechanization and indexing products and systems. These suites had an attendance which rivaled the commercial exhibitor displays.

In 1966, two all-day workshops, one on "Data Processing for Special Library Applications" and the other on "Information Retrieval Systems Evaluation," were given at the Annual Conference. These were among the best attended programs sponsored by the division in its entire existence.

Throughout the years of its activity, the division has jointly sponsored conference programs, handling most of the program structure, and has achieved technically high-quality programs which attracted large audiences.

Along with the activities of programs for the Annual Conference, there continued to be doubts as to the real role the division should play or even if there should continue to be a separate division devoted to any documentation activities. To catalyze thought for discussion of these roles in 1963–1964, chairman Philip Leslie commented,

> There is some possibility for dissolution of the Documentation Division on the grounds that it has outlived its usefulness. Of course, such a proposal may lead simply to a realignment of the Division's goals. (9).

This apocalyptic statement resulted in the establishment of a Functions Evaluation Committee at the following annual business meeting of the division. Its task was to study the purposes and goals of the division.

In March 1965 this committee (chaired by Mr. Michael Koch) published its report which contained a synopsis of comments from a questionnaire which had been sent to division members. The salient findings may be condensed to the following points:

(1) There is a distinct need for a separate Division, yet there is considerable diverse opinion about the exact goals, purposes, or roles that the Division should try to fill.

(2) Many members felt that the promotion of knowledge of documentation among librarians, the advancement of the state-of-the-art through activities of special librarians, the attempt to control the directions in which documentation is moving, and the struggle to gain acceptance for the librarian among the "documentalists" should be the basic goals of the Division.

(3) Many valuable suggestions for programs, publications, and projects with varying emphasis between information science and system topics were assembled for use in the future (10).

In addition to the activities of programming for the Annual Conference, the Division has been active in publications, special projects, and other programs under joint sponsorship with the American Federation of Information Processing Societies (AFIPS). A significant present special project is the joint sponsorship of programs for the 1969 Spring and Fall Joint Computer Conferences through the American Federation for Information Processing Society (AFIPS). A special committee held a preconference seminar on May 13, 1969 at the Spring Joint Conference entitled "Today's Systems for Today's Libraries." A similar program, but held as a postconference seminar, followed the 1969 Fall Joint Conference.

Today, the division continues to structure its activities to promote the knowledge of various techniques and methods concerning information science and systems design, planning, and evaluation among SLA members and others.

The Documentation Division is the seventeenth to be formed within SLA and now ranks second in membership size among all of SLA's Divisions. As a division, its functions are international in scope and are also carried out on a limited local level through Documentation Chapter Groups formed in Washington, D.C. (1961) and in New York (1964). The Division derives its financial support through an allotment from its member's SLA annual dues and its publication projects.

The officers of the division are elected each year by mail ballot prior to the Annual Conference of the Association. Their titles are Chairman, Chairman-elect, Secretary, and Treasurer. Secretary and Treasurer are elected for 2-year terms, expiring in alternate years. In addition, the following offices are filled by appointment of the Division Chairman: Membership, Public Relations, Archives, Elections, and Nominating Committee Chairmen, Bulletin Editor, Conference Local Representative, and special liason representatives to professional groups.

Division publication activity began with the creation of the quarterly journal *Documentation Progress,* which served as the written forum for members views, short articles on systems, and other news of interest to the division membership. After some publication difficulties, this journal reappeared in a new format and continued until 1967 when the division decided to cease its publication and join the science and technology oriented divisions in cosponsorship of *SCI-TECH News.* This publication now serves as the official organ for all Documentation Division member communications.

Individually, many division members are frequent contributors to the published literature in information science, special librarianship, and library mechanization.

Notable special projects have included National Science Foundation distribution to division members of the publication *Current Research and Development in Scientific Documentation,* distribution of technical literature and manuals on equipment and systems, publication of membership directories, publication of the *1967 Annual Conference Contributed Papers,* and joint sponsorship and publication of the study *The Use of Data Processing Equipment by Libraries and Information Centers.* This study (carried out by Creative Research Services, Inc.) resulted in a supplementary publication entitled *Directory of Libraries Planning to Automate.* Moreover, a comprehensive bibliography entitled "Indexing and Classification, a Selected and Annotated Bibliography" (compiled by Winifred F. Desmond and Lester A. Barrer) *(11)* was published on microfiche and distributed free to all division members.

MEMBERSHIP

When the Division was first formed, the membership (as of June 30, 1957) was 78. By December 1958 this had grown to 176. From the smallest of all of SLA's many divisions, Documentation Division now has a 1969 membership of 971, second only to the Science-Technology Division. Presently, the growth rate of the

Documentation Division has been and continues to be the most rapid of all of SLA's divisions.

The continued existence and rapid growth of the division shows that special librarians have an increased interest, need, and desire for understanding, practicing, and evolving the state-of-the-art in information science and the application of the newest technological discoveries to the process of information transfer. In concert with the intellectual aspects of documentation—semantics, logic, indexing techniques, and evaluation—special librarians through their membership in this division have created an effective way to assure their continued contribution to and utilization of current information science developments.

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AUDREY N. GROSCH

DOCUMENTATION RESEARCH AND TRAINING CENTRE (BANGALORE, INDIA)

Genesis and Development

The Documentation Research and Training Centre (DRTC) was established in January 1962 as a division of the Indian Statistical Institute (ISI). ISI is registered as a nonprofit distributing learned society under the Societies' Act XXI of 1860. In 1958 the Parliament of India enacted the ISI Act, recognizing the institute as an

institution of national importance and empowering it to confer higher degrees in statistics.

DRTC has developed as a result of social forces. Soon after independence the Government of India created the Indian Standards Institution (1947). In the same year its Documentation (Sectional) Committee was formed with Dr. S. R. Ranganathan as chairman. A proposal was made to the Union Ministry of Education for the establishment of a National Documentation Centre. The proposal was referred to a committee of professors which included Dr. Ranganathan. In 1949 the files were taken over by Dr. Shanti Swarup Bhatnagar. There was a keenly felt need for documentation service to support the work done in the national laboratories that were just then being established. In 1950, Dr. K. S. Krishnan, the then Director of the National Physical Laboratory, and Dr. Ranganathan were authorized to negotiate with UNESCO for aid in setting up a national documentation center. The establishment of the Indian National Scientific Documentation Centre (INSDOC) in September 1951 was the result.

By about 1955 some industries had been established. The research activities in the national laboratories had also begun to accelerate to a higher pitch. Specialist libraries to support research activities were being established in some of these institutions. Thus the time appeared to be ripe for the formation of a special libraries association to support specialist library activity and documentation. Thus was born the Indian Association of Special Libraries and Information Centres (IASLIC).

Professor P. C. Mahalanobis, member of the Planning Commission and director of ISI until recently, had all along been engaged in perspective planning. He sensed the dependence of the productivity of the industries and of research in the country on prompt and pinpointed documentation service. As early as 1956 he had requested Dr. Ranganathan, who was then living in Zurich, to come back to India and to establish a documentation training school in India. But Ranganathan felt that the time was not then ripe for it. By 1959 the Planning Commission took interest in documentation. Its Working Party of Scientists appointed Ranganathan as a one-man committee to make proposals for the development of the INSDOC during the Third-Plan Period.

One of Dr. Ranganathan's recommendations was for a sixfold increase in the output of INSDOC and the establishment of a training school for documentalists and research unit in INSDOC itself. However, in 1961 Prof. P. C. Mahalanobis renewed his request to Ranganathan to establish a documentation research and training center and proposed that the ISI take responsibility for it. By this time more industries had been established. Some of them had been writing to Ranganathan for bibliographies on different subjects. This indicated the increasing demand for documentation service. Therefore Prof. Mahalanobis's suggestion was accepted and by the middle of 1961 a memorandum for the organization of such a center was prepared and approved. The DRTC in Bangalore was thus established in January 1962. It began functioning formally as a school in April 1962. The initial planning of the work of the center was done by Ranganathan. He also took an active part in the teaching, research, and administration of the center during the first three years. Since then he had restricted himself to guiding research.

The DRTC has the following three objectives:

(1) To perform and to promote research in documentation and in library science in general.

(2) To train senior documentalists needed for service in the country and in the other developing countries.

(3) To provide consultant service in documentation.

Teaching Program

Research and training of specialists at the advanced level have to go hand in hand. Therefore research in documentation and the training of documentalists at an advanced level form an integral part of the program of DRTC. The teaching staff and the research scholars of the center are continuously engaged in research at various levels in various subjects. The former students of DRTC and the librarians in Bangalore actively participate in its research programs. This has not only contributed to the high productivity of research in the center, but has also helped to raise the level of research in the subject and to create a proper climate conducive to the development of the subject along scientific lines.

To make learning effective and to help the students absorb the research atmosphere, the students and research scholars are obliged to live in the hostel attached to DRTC.

The documentation course extends over a period of 20 months—from April 15 of one year to December 31 of the following year. During the first 12 months of formal training the students reside in DRTC. Each student is expected to complete a dissertation within 8 months immediately following the formal training. Residence in the DRTC hostel is not obligatory during this period.

The number of students admitted to the course does not usually exceed eight. This limitation in number is to ensure intimate contact between the teacher and the students—a prerequisite for efficiency in training, particularly at the advanced levels.

A candidate seeking admission to the course should ordinarily possess any one of the following minimum basic academic qualifications:

(1) Postgraduate diploma or a Bachelor's degree in Library Science, or an equivalent.

(2) Master's degree in any subject or a degree or a postgraduate diploma in Engineering, Technology, Agriculture, Animal Husbandry, or Medicine, and at least 2 years' working experience in a specialist library or documentation center.

Formal lectures are reduced to a minimum. They are used only occasionally to lift the students to a higher point of view, to widen their horizon, to arouse their curiosity, and to set the "ferment" in action. The teaching program includes class discussions, tutorial work, group discussions, colloquia, project work, clinical work,

intensive practice, and such other techniques that ensure an intimate participation of the students in whatever is taught and to bring to bear upon the problem systematic thinking, ability to expound ideas effectively, and ability to perform creative work. Small pieces of research work by the students are encouraged even during the course. Thus the student is helped to prepare himself to be continuously at the forefront of thought in the subject and be able to solve by himself, in a large measure, the new problems that may come up in his day-to-day work in the library.

Special emphasis is given to project work. Apart from the several assignments given to each student during the course, two major projects must be completed in partial fulfilment of the course. The first project consists of the preparation of a classified and adequately featured documentation list of about 500 current documents, selected from an approved set of periodicals bearing on a specific subject. For the purpose of classifying the documents selected for inclusion in the documentation list, each student has usually to design and develop a scheme for depth classification. This project work requires the use of most of the different documentation techniques learned by the student during the course.

After the completion of the 12 months' formal course, each student is required to prepare a trend report on a specific subject. It is to be based on a study of documents, such as articles in periodicals, technical reports, patents, specifications, etc., published during a given period of a specific subject. The subject is usually the one that is likely to be of interest to the organization in which the candidate is employed. This trend report is to be completed within 8 months after the formal course. As the student is expected to be at a service point during the preparation of the trend report, he will be able to consult with experts in the subject of his trend report, orient the report to the requirements of the specialist users, and test the helpfulness of the arrangement of ideas according to the classification scheme which he developed earlier during the formal course.

In order to provide experience in intensive reference service, the students do apprenticeship in a good industrial or research library in Bangalore for 1 or 2 months. Apart from doing reference service as if they were a part of the staff of the library of the organization concerned, each student is expected to maintain a full case record of the reference service rendered by him. These are subsequently discussed among the students and teachers, and presented at a colloquium for the purpose of evaluation of the method of approach, documents brought into use, etc., in rendering reference service.

Toward the end of the course the students would have gained a sound knowledge of the theory and practice of documentation. They are therefore required to observe and survey the working of one or two specialist libraries or documentation centers and prepare an evaluation report.

The library of DRTC has an adequate collection of documents on library science and documentation. The staff and students of DRTC make use of the specialist and other libraries in Bangalore. Documents can also be had on interlibrary loan from the Central Library in ISI, Calcutta.

Through cooperative arrangements with local institutions, DRTC staff and students have access to various kinds of reprography equipment, data processing

equipment, and electronic machinery such as computer. They also make use of such facilities available in ISI, Calcutta.

Special series of lectures are arranged by inviting experts from other institutions, particularly in subjects such as computer programming, statistical analysis, reprography, and translation service.

Syllabus

The syllabus of the documentation course is based on the syllabus developed and worked on by Ranganathan since 1948 in the Master of Library Science course at Delhi University. The University Grants Commission generally gave its approval to this syllabus. Necessary modifications have been introduced in the syllabus to suit the training of documentalists. The syllabus is revised from time to time on the basis of the experience gained and according to the requirements of the changing needs of documentation service. The syllabus currently in use is reproduced below.

UNIVERSE OF SUBJECTS: ITS DEVELOPMENT AND STRUCTURE

(1) The various subjects having knowledge as the field of study. Their interrelation.

(2) Primary senses. Association. Intellection. Imagination. Intuition.

(3) Sensory experience. Intellectual experience. Individual's Externalized and Socialized memory. Thought–Term relation. Nomenclature. Terminology. Fundamental terms and their standardization.

(4) Fact. Empirical law. Descriptive formulation. Fundamental law. Hypothesis. Normative principle. Interpretative explanation. Deduction. Empirical verification. Abstraction. Generalization. Concretization. Particularization. Spiral of Scientific Method.

(5) Positivistic, speculative, and authority-centered modes of thinking. Methods of pure sciences, applied sciences, humanities, and social sciences.

(6) Universe of subjects as mapped in schemes for library classification. Its demarcation into sections and subsections. Universe of subjects as a static continuum.

(7) Interrelation of sections. Modes of interrelation and cross section. Formation of new sections. Modes of formation. Fission. Denudation. Lamination. Loose assemblage. Fusion. Universe of subjects as a dynamic continuum.

DEPTH CLASSIFICATION (THEORY)

(1) General theory of classification and its canons. Theory of classification of subjects. Work in the idea plane, verbal plane, and notational plane. Canons for each of the planes. Basic class. Isolate. Facet analysis. Phase analysis. Focus. Simple, compound, and complex foci. Intersubject, intrafacet, and intra-array phase relation. Principles for helpful sequence. Facet syntax.

(2) The five fundamental categories and the facets corresponding to them. Rounds

and levels of manifestation of the fundamental categories. Postulates for idea plane. Principles for helpful sequence of any two facets.

(3) Array. Telescoping of arrays. Telescoping of facets. Common isolate—anteriorizing and posteriorizing. Quasicommon isolate. Special isolate. Quasi-isolate. Environmental isolate. Compound isolate. Special component. Principles for sequence of isolates in an array.

(4) Enumerative, nearly enumerative, almost faceted, fully faceted, rigidly faceted, and freely faceted classification. Analytico-synthetic classification. Enumeration of isolates. Formation of isolates by alphabetical, chronological, geographical, environment, or subject device. Zone and sector analysis. Abstract classification.

(5) Notational plane. Postulates for notational plane. Coextensive class number. Individualizing class number. Expressive class number. Mixed notation. Sector notation within an array. Group notation. Hierarchical and nonhierarchical notation.

(6) Macrosubject. Classification for book arrangement. Microsubject. Classification for documentation work. Depth classification. Other uses of library classification in a library. Use of classification in arranging materials other than documents. Classification and coding for machinery for finding documents.

(7) Evolution of classificatory technique. Comparative study of Bibliographic Classification, Colon Classification, Library of Congress Classification, and Universal Decimal Classification. Standards for the elements needed in classification schemes. Universal and special schemes of classification.

(8) Classificationist and design of classification. Classifier and assignment of class numbers.

DEPTH CLASSIFICATION (PRACTICE)

(1) Steps in classification.

(2) Classification of books, monographs, and articles by Colon Classification and Universal Decimal Classification.

LIBRARY CATALOGUE

(1) Canons for cataloging. Layout of a catalog code. Standards for the elements needed in catalog codes at the international, national, linguistic, and local levels.

(2) Classified catalog. Dictionary catalog. Kinds of entries. Specific entry. General entry. Main entry. Added entry.

(3) Choice of heading for main entry and book index entry for simple, multivolumed, and composite books, periodical publications and microdocuments.

(4) Rendering of personal, geographical, corporate, and series names and titles of books in headings of entries.

(5) Title section in main entry and in any other specific entry.

(6) Choice and rendering of headings in subject entries. Chain procedure. List of subject headings. Class index entry. *See* and *See also* subject entries. Cross reference index entry.

(7) Author analytical. Subject analytical.

(8) Comparative study of the latest editions of the *Classified Catalogue Code with Additional Rules for the Dictionary Catalogue*, the *ALA Code*, and the *Rules for the Dictionary Catalogue*.

(9) Alphabetization and its problems. Abbreviation of titles of periodical publications. Bibliographical references.

(10) Layout and additional rules for union catalog, abstracting and indexing periodicals and national bibliography.

(11) Canons of abstracting. Language: sentence form; kernel form; technical terms; popular terms. Use of standard fundamental constituent terms. Symbiosis between feature heading and abstract.

(12) Cataloging of nonconventional forms of documents.

DOCUMENTATION

(1) Book and document; macrosubject and microsubject; nascent ideas; generalist and specialist readers. Bibliography and documentation list. Commercial service. Bibliographical service. Abstracting service.

(2) Documentation work. On demand. In anticipation. On a specific subject. On all subjects. National and international coverage. Retrospective and current. Varieties of documentation list. Principles of selection for national and local documentation work.

(3) Documentation service: facet analysis in helping the reader in the exact enunciation of his subject of interest at the moment. Document search. Data search. Search for entities having several specified properties or values.

(4) Procurement of documents; from national and international sources.

(5) Types of document reproduction or reprography from the point of view of users and top management of documentation centres. Photostat. Enlargement. Microfilm. Microfiche. Microcard. Other kinds of reproduction. Storage and preservation. Reading apparatus. (Note: Engineering and technological aspects are excluded.)

(6) Translation service: full-time translators. Panel of translators. Full-time editors. Translation bank. Machine translation. (Note: Excluding engineering aspects and the actual work of translation.)

(7) Abstracting: abstracting personnel. Competence in subject field and depth classification. Use of author synopsis. Need for abstracting one and the same document in the abstracting media of several subjects. Abstract with slant. National and international coordination of abstracting service. Information about progress towards machine abstracting. (Note: Excluding engineering aspects.)

(8) Levels of organization for documentation. International, national, local. Role of FID and UNESCO as coordinating and promoting agencies. Network.

(9) Social factors making documentation necessary. Population pressure. Supplementing natural and near-natural commodities by artificial commodities made from unconsumable raw materials with the aid of technology. Reference service to

research workers. Conservation of the research potential of the world. Research-in-parallel. Research-in-series. Ploughback of nascent microideas into the minds of the research team. Technical report writing. Digest service to top management. Service of audiovisual documents to the foremen and the men at the bench. Management information system.

MANAGEMENT OF SPECIALIST LIBRARY

(1) Specialist libraries: libraries of industrial and commercial enterprises, newspaper offices, government departments, and research institutions.

(2) Kinds of specialist libraries: libraries of individual institutions. Central libraries at national and regional levels. Interlibrary cooperation. Service library. Distributing library.

(3) Place of library in the parent body. Correlation with the activities of the departments of the parent body. Relation with the staff of the departments of the parent body.

(4) Organization of the different types and kinds of specialist libraries. Scientific management and work study. Library finance. Housing of library, its functional layout and equipment.

(5) Classification and filing of fugitive materials, such as trade catalogs, directories, prospectuses, leaflets, and clippings. Help in the classification and arrangement of commodities.

(6) Library administration. Selection and acquisition of books and periodical publications. Accession work. Maintenance, circulation, and display of books, periodical publications, patents, standards, specifications, drawings, pamphlets, clippings, microfilms, instrument-recorded metadocuments and similar materials.

(7) Reference service. Utilization of international, national, and local sources and centers of information. Library bulletin.

(8) Bibliographical service. Abstracting service.

MECHANIZED DOCUMENT-FINDING SYSTEMS
AND ELEMENTS OF STATISTICAL ANALYSIS

Mechanized Document-Finding Systems

(1) Physical tools: punched card. Punching equipment. Sorter. Verifier. Reproducer. Collator. Tabulator. Electronic machine—computer: types, parts, characteristics. Peripheral equipment: Magnetic tape. Paper tape. Magnetic drum. Magnetic disk. Magnetic card. Film. Console typewriter. Printer. Visual display unit. Doc-finder.

(2) Punched card system: marginal punched card system. Aspect card system (Peek-a-boo). Coding. Document finding methods.

(3) Electronic machine-aided systems: doc-finder. System design. Mathematical aspects. Problem specification. System analysis. Flow charting. Input: production of machine-readable record. Catalog on tape, drum, disk—Creation, correction. Up-

dating. Query formulation. Coding. Conversion to machine-readable form. Search and finding of entries. Output: printout, transfer to punched card, magnetic tape, etc. Document finding by name of author, kernel terms, and other elements in a catalog entry. Arrangement of entries. Chain indexing. KWIC and KWOC indexing.

(4) Elements of programming. Programming languages, characteristics and use.

(5) Systems such as MEDLARS, CAS, INTREX, MARC, UDC mechanization. Selective Dissemination of Information (SDI).

(6) Managerial and economic aspects of the use of machine in document finding—local, national, international.

(7) Use of mechanical aids in library routines.

(8) Practical work and project.

Elements of Statistical Analysis

(1) Permutation and combination: permutation. Combination.

(2) Mathematical probability: additive. Multiplicative. Law of large numbers. Random variable and probability distribution.

(3) Frequency: normal curve. Other types of curves: Skew, ogive, etc. Histogram. Periodogram.

(4) Average: arithmetic mean. Median. Mode. Geometric mean. Standard deviation. Probable error. Margin of tolerance. Time series analysis. Trend.

(5) Correlation: line of regression. Correlation coefficient. Correlation surface.

(6) Sampling. random sample. Assorted sample. Reliability factor. Measure of reliability. Ranking.

(7) Design of experiment. Data and collection of data. Analysis. Presentation. Interpretation. Models.

(8) Additional ideas needed for doc-finder: system analysis. Linear programming.

(9) Elements of operations research. Work measurement.

(10) Librametry: Document selection and provision. Seepage and scatter. Pattern of occurrence of isolate ideas. Combination of isolate ideas. Modes of formation of subjects. Rate and mode of development of the universe of subjects. Choice of helpful sequence. Length of class number. Details in cataloging rules. Potency of entry element. Subject heading. Document circulation. Staff formula. Anthropometry in the design of library furniture. Space allocation and furniture layout in library.

DOCUMENTATION PROJECT

Preparation of a documentation list on an assigned subject on the basis of an adequate set of approved periodicals or any other documentation project that may be assigned to each trainee.

SURVEY OF CURRENT RESEARCH

Report on an assigned project carried out during the year in surveying the trends in current research.

Awards

There are several awards for professional attainments:

(1) Associateship in Documentation on the basis of examination and the in-term work.

(2) Associate Fellowship in Documentation on the basis of approved research work done in DRTC.

(3) Fellowship in Documentation for outstanding contributions and published works in the field of documentation.

Research

In the succeeding sections some of the subjects studied during the last 9 years are mentioned. Most of these continue to be the subject of research at DRTC.

Universe of Subjects: Its Structure and Development

The main objective of designing and developing a document finding system is to facilitate pinpointed, exhaustive, and expeditious search and selection of documents on subjects of interest to readers. Therefore the document finding system is influenced by the attributes of the universe of subjects embodied in documents. The principal attributes of the universe of subjects studied were: (1) its structure and (2) its development.

Mentioned below are some of the specific topics in which work has been carried out:

(1) Ideas such as "multi-dimensional," "tendency to become infinite," and "tendency to become continuum" as applied to the universe of subjects have been clarified.

(2) Formulation of helpful terminology regarding the different modes of formation of subjects. Recognition of new modes of formation of subjects. The following modes are now recognized: Lamination of kind 1, lamination of kind 2, loose assemblage of kind 1, loose assemblage of kind 2, loose assemblage of kind 3, fission, fusion, distillation. And at the document level: partial comprehension, subject-bundle.

(3) Frequency of incidence of different varieties of facets in different subjects—as embodied in documents and in readers' queries. Patterns of incidence of facets and changes in the pattern with subjects and with time in different subjects.

(4) Theory of strength of bond among components of compound and complex subjects.

(5) Method of division and interrelation among the resulting divisions of the universe of knowledge as viewed by philosophers and by subject specialists compared with the division of the universe of subjects and recognition of the interrelation among the resulting divisions from the library point of view.

(6) Consideration and application of the theory of organization and of general systems theory to the study of the structure and development of the universe of subjects.

(7) Studies on the rate, pattern, and mode of development of the universe of subjects. Formulation of methods for such studies.

(8) Impact of the attributes of the universe of subjects on the methodology of design and development of document finding systems in general and classification in particular.

Classification

The classification of subject consists essentially of:

(1) Recognizing the component ideas in the subject.

(2) Determining the appropriate degree of interrelation among the component ideas.

(3) Arranging and representing the component ideas in a linear sequence according to their mutual filiation as determined by the degree of interrelation among them and preferred by a majority of the specialists in the subject.

Viewed in this context, classification has an important and ubiquitous role in the design, development, and use of document finding systems. For example: (1) in classifying and arranging documents; (2) preparing library tools—such as designing and developing schemes for the classification of subjects, preparing subject headings, and preparing thesaurus for a subject; and in (3) reference service—as in specifying the subject of reader's query through reader–librarian–system trilogue, and classifying the subject of reader's query.

The efficiency of a document finding system therefore depends in large measure on the efficiency of the classification system used in it. Any improvement in the methodology of classification would effect improvements in the efficiency of the document finding system as a whole. Hence continuing research is being carried out at DRTC in refining the design and development of schemes for classification. A few of the highlights of the studies in this field in the last 9 years are mentioned below.

Idea Plane

(1) Towards the end of 1963 a piece of fundamental research pursued in DRTC led to the formulation and development of a helpful and versatile methodology for

designing freely faceted schemes for classification. This opened up considerable scope for applied and developmental research in classification. On the basis of the experience gained in designing and using schemes for the depth classification of diverse subjects, the methodology is being continuously improved upon in the three planes of work—namely, idea plane, verbal plane, and notational plane. The findings of these investigations till about 1966 have been incorporated in the *Prolegomena to Library Classification*, by S. R. Ranganathan (3rd ed., Asia Publishing House, Bombay, 1967); subsequent reports appear in the quarterly *Library Science with a Slant to Documentation* and the volume of papers and proceedings of the DRTC Annual Seminars.

(2) A cause and consequence of the developments in the theory and practice of freely faceted schemes for classification has been the clarification, proper understanding, and redefinition of some of the existing ideas—such as facet, whole and nonwhole, quasiisolate, and qualifier—and the development of new ones—such as compound isolate, speciator, and special component.

(3) Postulate of absolute syntax of ideas among the majority of intellectuals and the helpfulness of making the facet syntax of subjects parallel the absolute syntax.

(4) Recognizing that the facet syntax derived on the basis of the wall-picture principle approximates the absolute syntax, and that the other principles for facet sequence and those for sequence of array isolates are corollaries to and derivable from the wall-picture principle.

(5) Techniques—such as group strategy, correlation with fundamental categories, and correlation with the sequence of basic subjects—for deriving a helpful sequence among quasiisolates, speciators, and isolates.

(6) An isolate deemed to be a manifestation of the fundamental category matter may denote one of three varieties of ideas: material, property, or method.

(7) Methods for clear differentiation between property isolates and energy isolates.

(8) Formulation of criteria for comparison of the theoretical basis of schemes for classification.

(9) Formulation of rigorous terminology for the discipline.

Notational Plane

(1) Fuller exploitation of sector notation. Use of zero (0) as a sectorizing digit and extensive use of empty-, and empty–emptying digits for interpolation and extrapolation in the schedules of basic subjects, and of isolates, and consequent increase in the capacity of the notational plane to accommodate the developments in the universe of subjects.

(2) Release of the sector (S — a) for forming arrays of order 2 and later orders by introducing an indicator digit—double inverted comma (")—with anteriorizing quality for use with an anteriorizing common isolate normally representing "approach materials."

(3) Pattern of allocation of sectors and formulation of empirical principles for guiding such allocation in designing schemes for classification.

(4) Use of "0" (zero) with its conventional ordinal value less than "1" only, and "&" (ampersand) replacing zero as indicator digit in phase relation.

(5) Use of "=" (equal to sign) for combining special component in a compound isolate.

(6) Use of "+" (plus) for connecting the abbreviations derived by applying alphabetical device to the components in a multinomial.

(7) Present research in the notational plane includes: A single digit for interpolation at any point in an array. Extrapolation earlier to "a" and after "(". Indicator digit for partial comprehension. Indicator digit for quasi isolate. A separate indicator digit for each of the devices used in CC. A separate indicator digit for ideas denoting material, property, and method, respectively. Mnemonic use of the letters of the Roman alphabet.

Design of Schemes for Classification

(1) Use of the findings of investigation in classification in the revision of *Colon Classification* (6th ed., 1960) to prepare the 7th edition.

(2) Preparation of schedules of common property isolates and common energy isolates.

(3) Preparation of depth versions of colon classification for diverse subjects. A list of the depth schedules prepared for demonstration of the methodology of designing schemes for classification of subjects going with a basic subject is given in Table 1.

TABLE 1

Serial No.	Depth classification version of CC for	Host document	
		Author(s)	Locus[a]
1	Personal bibliography	S. R. Ranganathan and A. Neelameghan	DRTC. 3;1965;H
2	Library science	G. Bhattacharyya and M. Bhattacharyya	DRTC. 4;1966;N
3	Library classification	A. H. Kidwai	* 1968
4	Library cataloging	G. Bhattacharyya	DRTC. 5;1967;F
5	Book science	S. R. Ranganathan and A. Neelameghan	LS. 1;1964;F
6	Personnel management	P. D. Upadhyaya	* 1963
7	Sampling	Harjit Singh	* 1968
8	Statistical quality control	Harjit Singh	* 1968
9	Programing language	I. K. Ravichandra and K. Rawat	* 1971
10	Radiation physics	T. V. Subrahmanian	* 1963
11	Spectroscopy	H. C. Revannasiddappa	* 1969
12	Highway engineering	M. C. Ragavan	* 1963
13	Bridge engineering	M. R. Sabade	* 1966
14	Production engineering of Screw	Abdul Rahman, Afroze Fathima, and T. Ranganathan	LS. 1;1964;B

TABLE 1 (Continued)

Serial No.	Depth classification version of CC for	Host document	
		Author(s)	Locus'
15	Nut	Abdul Rahman, Afroze Fathima, and T. Ranganathan	LS. 1;1964;G
16	Gear	Abdul Rahman, Afroze Fathima, and T. Ranganathan	LS. 3;1966;B
17	Bearing	Abdul Rahman, Afroze Fathima, and T. Ranganathan	LS. 1;1964;M
18	Spring	Abdul Rahman, Afroze Fathima, and T. Ranganathan	DRTC. 3;1965;J
19	Lathe	M. A. Gopinath	LS. 8;1971;K
20	Motor vehicle	A. Neelemeghan, M. A. Gopinath, and P. H. Denton	LS. 4;1966;P
21	Air vehicle wing	A. Neelameghan and T. Ranganathan	LS. 7;1970;C
22	Aircraft	T. Ranganathan	* 1967
23	Missile	V. Anjaneyulu	DRTC. 3;1965;K
24	High vacuum pump	V. K. Malhotra	* 1968
25	Locomotive	A. Neelameghan and G. Bhattacharyya	LS. 3;1966;P
26	Air compressor	T. Jacob Thomas	* 1968
27	Furnace	A. K. Chakraborti	DRTC. 5;1967;G
28	Steam generator	A. Neelameghan and M. A. Gopinath	LS. 8;1971;E
29	Incandescent lamp	Harjit Singh and others	* 1968
30	Reciprocating internal combustion engine	S. R. Ranganathan, A. Neelameghan, and M. A. Gopinath	LS. 2;1965;B
31	Gas turbine engine	T. Ranganathan	DRTC. 2;1964;1-4
32	Chemical rocket engine	T. Ranganathan and Abdul Rahman	DRTC. 3;1965;M
33	Chemical rocket engine (revised)	K. N. Vasudeva Rao	DRTC. 4;1966;Q
34	Voltaic cell	P. V. S. Subrahmanian	* 1965
35	Electric motor	B. L. Gupta	* 1966
36	Electric generator	G. S. Raghavendra Rao	* 1968
37	Electron tube	V. V. Parthasarathy	DRTC. 3;1965;N
38	Semiconductor diode and transistor	R. A. Nagarathna	DRTC. 3;1965;P
39	Transistor	D. Gundu Rao	DRTC. 2;1964;1-5
40	Radio receiver	F. J. Devadason	* 1970
41	Radar	B. S. Ramananda	DRTC. 2;1964;1-6
42	Laser	B. S. Ramananda and V. Anjaneyulu	DRTC. 4;1966;R
43	Nuclear fission	M. K. Raghavendra	DRTC. 3;1965;N
44	Particle accelerator	A. B. Gupta	* 1966
45	Computer	V. Anjaneyulu	DRTC. 5;1967;H

TABLE 1 (Continued)

Serial No.	Depth classification version of CC for	Host document Author(s)	Host document Locus*
46	Corrosion	M. Chitnis	* 1963
47	Metallurgy	A. K. Chakraborti	* 1965
48	Technology of Food	A. Neelameghan and S. V. Sangameswaran	LS. 7;1970;L
49	Meat	M. V. Gopinath	* 1966
50	Refractory	A. K. Gupta	DRTC. 5;1967;K
51	Glass	A. Neelameghan	LS. 4;1967;L
52	Rubber	V. K. G. Nair	* 1965
53	Plastic	M. G. Bhide	* 1965
54	Ceramic	P. N. Bavadekar	* 1967
55	Man-made fiber	P. R. Shah and Chitra Krishnaswamy	DRTC. 6;1968;BE
56	Transistor	A. B. Marigowda	* 1970
57	Leather	D. B. Eswara Reddy	DRTC. 6;1968;BF
58	Cytology	P. G. Krishnamurthy	* 1966
59	Cytogenetics	Sayeeda Bano	* 1971
60	Petrology	M. Parameswaran	* 1970
61	Mining engineering	K. M. Sinha	* 1970
62	Tobacco cultivar	D. Ch. Raja Rao	DRTC. 3;1965;S
63	Coffee cultivar	M. G. Lakshmanaswamy	DRTC. 2;1964;1-7
64	Rubber cultivar	S. C. Goonetilleke	DRTC. 4;1968;S
65	Animal breeding	K. Chandrasekhara Sastri	* 1967
66	Human anatomy	S. Seetharama	* 1964
67	Disease (in medicine)	S. Seetharama	LS. 8;1971;R
68	Diagnostic radiology	S. R. Ranganathan, A. Neelameghan, and M. A. Gopinath	LS. 2;1965;G
69	Therapeutic radiology	S. R. Ranganathan, A. Neelameghan, and M. A. Gopinath	LS. 2;1965;G
70	Public health	R. Ahuja	* 1969
71	Drug, pharmacology	S. R. Ranganathan and A. Neelameghan	LS. 1;1964;L
72	Effect of nuclear radiation, pharmacology	S. C. Mukherjee	* 1965
73	Fountain pen production	P. N. Bavadekar, K. Chandrasekhara Sastry, C. C. Chellapa, and T. Ranganathan	* 1967
74	Subforms of Hindi poetry, drama, prose	N. K. Sharma	DRTC. 6;1968;BH
75	Psychology	M. P. Sinha	* 1970
76	Teaching technique	A. P. Shrivastava	* 1966
77	Teaching technique (revised)	S. G. Mahajan	* 1968
78	Foreign policy, history	R. P. Wasan	DRTC. 4;1966;T
79	Foreign policy, political science	R. P. Wasan	DRTC. 4;1966;T
80	Banking	A. Neelameghan	LS. 8;1971;B

TABLE 1 (Continued)

Serial No.	Depth classification version of CC for	Host document	
		Author(s)	Locus"
81	Investment	A. Neelameghan	LS. 8;1971;C
82	Taxation	A. Neelameghan	LS. 8;1971;F
83	International trade	A. Neelameghan	LS. 8;1971;L
84	Econometrics	N. Samba Murthy	* 1971
85	Transport economics	A. Neelameghan and M. A. Gopinath	LS. 8;1970;N
86	Sociology	B. P. Mukherjee	* 1970
87	Social work	B. S. Kumedan and R. S. Parkhi	DRTC. 5;1967;M

Key: DRTC. 3; 1965;H = Paper H in the volume of papers and proceedings of the DRTC Seminar (3) of 1965. LS. 1;1964;B = Paper B of Vol. 1 of *Library Science with a Slant to Documentation* published in 1964. * = Unpublished provisional schedule.

Cataloging

An important contribution of India to the theory and practice of cataloging is the *Classified Catalogue Code with Additional Rules for a Dictionary Catalogue* (CCC) by S. R. Ranganathan (Asia Publishing House, Bombay). The 5th edition (1964) is its latest published version. The rigorous teaching of the theory and practice of the subject by deriving each of the rules of the code for the choice, rendering, and recording of every section in each of the different varieties of entries on the basis of the canons of cataloging, laws of library science, and the general normative principles has helped to continuously improve upon the code, in particular the refinement of the terminology, and the theory and practice of cataloging in general.

A series of comparative studies of the different editions of CCC with those of the *Anglo-American Cataloguing Rules* in respect of terminology, conformity to the principle of unity of idea in drafting code, and standards for the choice, rendering, and recording in the different sections of the various entries, has been undertaken. The standards in the codes have been evaluated on the basis of the canons for cataloguing, the laws of library science, and the general normative principles. Reports of the following comparative studies have been published:

(1) Whole government as author.
(2) Principle of unity of idea in a cataloging code.
(3) Cataloging terminology.
(4) Conflict of authorship: person vs. person.
(5) Conflict of authorship: person vs. corporate body.
(6) Name of original author merged in title.

In the course of the investigations on the rendering of multiworded names in the heading of main entry, the purview of the canon of prepotence and the canon of sought heading were found to be too general to be of direct guidance in the formu-

lation of the rules for rendering of such names. The structure of different kinds of multiworded names and the nature of the words constituting them were examined. It was found that the potency for being recalled to memory (i.e., the recall value) of a multiworded name once encountered, is not equally distributed among all the words in the name. This concept of recall value was applied in determining the entry word of a multiworded name. The findings led to the formulation of a master canon—the canon of recall value.

An opinion survey, involving about 1,000 readers in 60 different libraries has been carried out to assess the helpfulness and extent of application of the canon of recall value.

The rules in the catalog codes for rendering multiword names are being examined from the angle of the canon of recall value and the findings of the opinion survey. The necessary modifications of the rules are being incorporated in CCC in preparing the 6th edition.

The helpfulness of chain procedure in the systematic derivation of subject headings is widely recognized. In 1964 it was shown that it is not necessary to derive the subject headings by a translation of the class number for the subject into the verbal plane. It was further established that the steps in classifying a subject according to the postulational method and those for formulating subject headings for it are identical and therefore could be guided by the same set of guiding principles for facet analysis. Thus the result of Step 5 of the postulational method gives the basis for deriving subject headings as well as for synthesizing the class number by using a scheme for classification.

The problems of homonym in subject headings formulated by using inflectional and noninflectional languages has been examined.

The unhelpfulness of subject headings with a large number of component terms, as it would be in the case of a microsubject, has been investigated and a solution worked out.

Various methods of rendering subject headings have been evaluated from the angle of their helpfulness to the user.

A cyclic permutation method of rendering postulate-based subject headings has been shown to secure for the dictionary catalog system some of the advantages of the classified part of a classified catalog.

A postulate-based facet analysis and representation of readers subject interest—for example, in reader profile record—has been recommended for increasing the efficiency and pinpointing the selection of documents.

Documentation

The different attributes of local, national, regional, and international indexing and abstracting services have been studied. The studies cover the following:

(1) Usefulness of particular indexing or abstracting periodical with respect to coverage of subject field, variety of documents, language of documents, country of

origin of documents, and time lapse between publication of original document and its inclusion in the indexing or abstracting periodical.

(2) Arrangement of entries and provision of indexes of various kinds, and their helpfulness in pinpointed, exhaustive, and expeditious search and selection of documents of interest to reader at the moment.

(3) The items of information and their sequence in an entry.

(4) Techniques used in providing slant in abstracting.

(5) Comparative study of different abstracting and indexing periodicals with respect to the attributes mentioned in categories (1) to (4).

(6) Expressiveness of subject in titles of articles and its implication to title-based indexing.

(7) Various methods of advance announcement of articles-to-be published by different periodicals and their respective advantages and limitations.

Studies in document citation include the following.

(1) Pattern of use of documents by subject specialists based on an analysis of the citations or references to documents.

(2) Scatter of information on a specific subject in a variety of documents.

(3) Pattern of seepage of information on a specific subject in periodicals dominantly devoted to other subjects.

(4) Obsolescence and utility factors of periodicals.

As a member of the Documentation Committee of the Indian Standards Institution, DRTC has contributed to the formulation of several Indian Standards in documentation and related subjects. The following is a selected list of subjects of such standards:

Guide for abbreviations of words in titles of periodicals using Roman alphabet.
Recommendations for bibliographical reference.
Guide for preparation of manuscript of an article in a learned periodical.
Guide for layout of learned periodicals.
Title page and back of title page of a book.

Computer-Aided Document Finding System

Since the middle of 1968 a series of feasibility studies have been made to develop a computer-aided document finding system based on a freely faceted classification. This work has led to the development of a program package for the design, development, and operation of a computer-aided system for document finding (SDF). The SDF can make use of a freely faceted depth version of colon classification. The system provides for the following to be done using computer:

(1) Retrospective search for entries of documents relevant to a reader's query in a catalog-on-tape.

(2) Selective dissemination of information.

(3) Selection of documents by name of subject, author, collaborator, series, etc., from the catalog-on-tape.

(4) Reader profile catalog in which the subject of interest to the reader may be in the form of class number only, or feature heading only, or class number and feature heading.

(5) Acceptance of reader's query about a subject in the form of kernel terms in random sequence.

(6) Replacement of nonstandard terms, if any, in the query, by standard terms in the classification schedules through a built-in thesaurus of a special kind.

(7) Rearrangement of the kernel terms of a subject in the facet structure sequence using schedules in which the kernel ideas are arranged in a special way.

(8) Synthesis of class number for subject of document or of query using colon classification.

(9) Translation of class number into kernel terms to form feature heading.

(10) Direct reader–computer "dialog."

(11) Alphabetical index to the subjects, based on chain procedure, in the output documentation list.

(12) Different formats of the main entry in the output.

(13) Output on-line printer, punched card, and magnetic tape.

(14) Updating the catalog-on-tape, the catalog of reader profile-on-tape, and the classification schedules-on-tape.

(15) Guidance by computer to help readers to use the system.

The programs have been prepared in Autocoder language for the IBM 1401 computer. Some of the programs have also been written in PLAN language for the ICL computer 1900 series. The design of the system is versatile enough for adaptation to suit variations of the SDF.

Authorial Work

Authorial work in the idea plane consists essentially of selecting the ideas for presentation, and organizing these ideas in a helpful sequence.

The organization and presentation of ideas in the text of a document—such as a book, article in a periodical, technical report, state-of-art report, trend report, and other varieties of review document—should facilitate the easy grasp of the ideas by the reader. For the purpose of documentation, similar help should also be given to the documentalist. This will facilitate the determination of the precise subject of document for classification, formulation of subject heading, abstracting, preparation of digest, review, etc. Worthwhile ideas may be inadequately understood and disseminated because of the lack of systematic helpful arrangement and presentation of ideas in the document.

A careful analysis of what is likely to be a helpful arrangement of ideas in a document disclosed that the very principles for helpful sequence used in arranging compound subjects and the components within a compound subject could be

effectively used in arranging the ideas in the text of a document. Therefore, based on the principles for helpful sequence used in designing schemes for library classification and in classifying subjects, a set of guiding principles for arranging and presenting ideas in a document has been formulated. Guiding principles have also been formulated for the verbal plane and for structuring the text into convenient units to preserve the level of unity of idea among the different structural elements. Experience in using these principles in authorial work—such as in writing articles and technical report—by subject specialists has demonstrated the helpfulness of the principles.

Librametry

"Elements of Statistical Calculus and Operations Research" was introduced as a subject in the documentation course 2 years ago with a view to give a statistical orientation to the thinking about library and documentation matters wherever helpful. A few studies using appropriate statistical methods have also been carried out. These studies include the following:

(1) Pattern of discovery and rediscovery in the field of antibiotics.

(2) Pattern of development in different subject fields and correlation of particular patterns with sociological and other factors.

(3) Frequency of single and multiple authorship in different subject fields and the implications of the findings.

(4) Changes in the pattern of frequency of incidence of different kinds of facets in subjects over a period of time.

(5) Sampling technique for verification of stock of reading materials.

Teaching Technique

An objective of the educational program of DRTC is to use sound teaching techniques—e.g., discussion, colloquia, seminar, tutorial, project work (individual and cooperative), clinical method, and case study method—in the teaching of the subjects in library science and documentation. The curriculum of the documentation course is so designed as to facilitate experimentation in adapting different methods and techniques of teaching and also of assessment of the work done by the students in the different subjects. A few case studies of class discussion and report on the experiments in teaching have been published in *Library Science with a Slant to Documentation* and in the volume of papers and proceedings of DRTC Annual Seminars.

Advisory Service

DRTC provides facility for scholars to work, under the guidance of the teaching staff, on some specific project for periods of 1–3 months. An average of three scholars have taken advantage of this facility annually since 1966.

At the request of an institution—e.g., an industry, research and development center, or academic body—DRTC may recommend solution for a documentation problem. This service may take one or a combination of the following forms: (1) Senior personnel from an institution requiring such help come to DRTC for advice, (2) DRTC staff may visit the institution and give advice on the spot, and (3) through correspondence. In many cases a comprehensive report is prepared for the guidance of the institution requiring help.

Seminar

To keep up continuing research and to exchange ideas with practicing documentalists and other research workers on subjects of current interest in the field, DRTC convenes an All-India Seminar in mid-December each year. About a hundred delegates participate in each year's seminar. The following are the subjects discussed in the seminars:

1963: Documentation Periodicals: Coverage, Arrangement, Scatter, Seepage, and Compilation.
1964: Document Retrieval. Classification.
1965: Depth Classification. Subject Heading.
1966: Universe of Knowledge. Depth Classification. Documentation List.
1967: Developments in Classification. Management of Reprography Service. Subject Headings and Feature Headings.
1968: Theory and Practice of Abstracting. Developments in Classification. Teaching Techniques in Documentation.
1969: Subject Analysis for Document Retrieval System. Quantification and Librametric Studies. Management of Translation Service.
1970: Library Cataloging: Rendering of Names of Corporate Bodies. Subject Analysis, with Special Reference to Social Sciences. Documentation Systems for Industry.
1971: Abstracting, Indexing, and Reviewing Periodicals. Pattern of Use of Documents by Specialists. Comparative Study of Schemes for Library Classification.

Since 1969 DRTC has been convening a Refresher Seminar every year in May. New entrants to the profession, or persons wishing to refresh their ideas in some branch of library science, normally participate in this seminar. The number of delegates is limited to about thirty. The discussions are based on a Working Paper prepared by the DRTC staff. Some practical work by the participants is also usually provided for. The following are the subjects discussed in the midyear seminars:

1969: *Colon Classification*, 7th edition.
1970: Cataloging: Canon of Recall Value.
1971: Reference Service.

The two annual seminars mentioned above form an integral part of the documentation course. The students of the course are encouraged to contribute papers

and participate in the discussions. They also take part in the organization and conduct of the seminar.

Publications

RESEARCH PAPERS

Since 1962 DRTC staff and students have published 8 books, 5 technical reports, and over 500 research papers.

PERIODICAL PUBLICATIONS

The papers and proceedings of each DRTC Seminar are brought out in the form of a mimeographed volume.

The DRTC is collaborating with the Sarada Ranganathan Endowment for Library Science in the publication of the quarterly *Library Science with a Slant to Documentation* (1964–).

Most of the research papers from DRTC are published in the two periodical publications mentioned above.

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A. NEELAMEGHAN

THE DOLPHIN

The first number of *The Dolphin: A Journal of the Making of Books* appeared in 1933; number two in 1935; and number three in 1938. Number four, 1940–1941, the last volume issued, appeared in three parts and was subtitled, "A Periodical for All People Who Find Pleasure in Fine Books." All volumes were published by the

Limited Editions Club. Number one was printed by the Aldus Press, numbers two and three by the Yale University Press, and number four by the American Book-Stratford Press. The title of the journal seems to have evolved from the device first used by Aldus Manutius in 1502.

The Dolphin was apparently the project of George Macy, director of the Limited Editions Club, although his name does not appear in the journal until volume four. In that volume he appears as publisher. Peter Beilenson, Paul S. Bennett, Carl Purington Rollins, and John T. Winterich are listed as the editors of this volume. No editors were indicated for volumes one and two.

There are several factors that may have contributed to the cessation of *The Dolphin*. The publishers, in a flyer accompanying the second number, stated that they were losing money in producing the journal. This apparently resulted from the high cost of producing the journal coupled with its limited circulation. It was usually issued in editions of 2,000 copies.

The Dolphin includes articles on a wide range of subjects selected to be of interest to the student or collector of books. Of particular interest are the articles on the design of the (then) contemporary fine book and the annual reviews of fine book production that were international in scope. The articles were written by some of the best informed bookmen of the day, e.g., "On Designing a Type Face" by Frederic W. Goudy (*1*), "Margins" by Alfred W. Pollard (*2*), "The Fitting of Type" by Joseph Blumenthal (*3*), and "The Aesthetics of the Illustrated Book" by Christopher Sandford (*4*) and should be of value to anyone interested in current book design.

The most used volume is volume three, subtitled "A History of the Printed Book." It remains one of the best one-volume overviews of the history of the book. It was edited by Lawrence C. Wroth although Hellmut Lehmann-Haupt "arranged for the writing and illustrating of the first three chapters" (*5*). This volume incorporates both a chronological and topical approach to the history of the book. Part one begins with "The Heritage of the Manuscript" by Hellmut Lehmann-Haupt (*6*), an article that shows the influence of the manuscript book on the typography and format of the printed book, and concludes with the article "Modern Fine Printing" by Ruth Grannis (*7*). The intervening chapters, each written by a specialist for that period, provide a century-by-century account of the development and spread of printing.

The second part of the volume consists of a topical approach to the history of the book and includes "The History of the Printing Press" by David T. Pottinger, "Papermaking" by Dard Hunter, and similar articles concerned with single aspects of the history of the book.

The Dolphin was a carefully designed and well-executed production. The problem of design posed by the large size of the journal (30.4 cm. high by 21.5 cm. wide) was successfully solved, usually by the use of a two-column type-page. This large size, however, made it possible to reproduce many examples of printing in full size instead of in reduced versions which are so often misleading for the student unfamiliar with the originals.
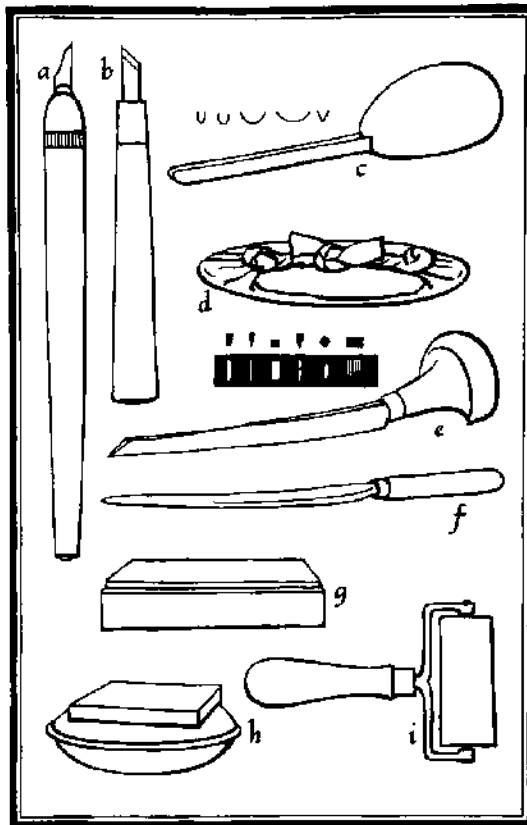

FIGURE 1. *Drawn by Warren Chappell for* The Dolphin, *volume two, published by The Limited Editions Club, copyright © 1935, 1963 by the George Macy Companies, Inc., New York.*

The many illustrations were carefully selected and reproduced when chosen from another source and well-designed when developed as originals for the journal (see Figure 1).

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MARTHA L. MANHEIMER

DOMINICAN REPUBLIC, LIBRARIES IN

The Dominican Republic is one of the oldest known areas in the Western Hemisphere. The island of which the republic is a part was discovered in December 1492 by Columbus. Haiti shares the western third of the island which is often called Hispaniola or, even at times, Santo Domingo. The capital, Santo Domingo, or Ciudad Trujillo during the Trujillo period, was founded in 1496 by Columbus' brother Bartholomew (1).

With an estimated population of slightly more than 4,000,000 in 1968 (2), and with about 55% of the population under 20 years of age (3), the Dominican Republic is one of the smaller countries of Latin America, with a land area of about 18,000 square miles, or twice the size of the state of New Hampshire. Like many countries, the Dominican Republic suffers from economic and social problems which have prevented the development of any semblance of an adequate educational program, which necessarily includes a positive library program.

In addition, when it is considered that the 1950 census included those over the age of 7 in the economically active workforce, and the 1960 census included those over 10 years (4), one can realize that many school-age children are not in school. The rate of illiteracy has been variously estimated at from 30–65%. For census purposes only, those over 10 years of age are considered in either the literate or non-literate category (5). In 1960 the school-age population, those between 5 and 29 years of age, attending school was approximately 21% of the population (4). In this case these include all students in post high-school programs whether they be university or specialized schools. For the 1969–1970 school year the per cent was almost the same, even though there were an estimated 818,000 students (6). The fact remains that about one-fourth of the total population between the ages of 5 and 29 has had no school instruction (7).

Apart from Santo Domingo where there are various ministry libraries as well as those of many private organizations, library collections are few and small, often of only a few hundred books.

The National Archives, which until 1962 was the legal depository for Dominican publications, is housed separately, but with a National Library building scheduled for completion in early 1970, it will be one of several collections housed there. The collection includes some cathedral records dating from 1509 and *The Archives of Higuey*, 1600–1899, as well as official documents from 1844, the date of the creation of the Dominican Republic. There are an estimated 600,000 documents in the collection.

The National Library, which was scheduled to be opened around mid-1970, has among its objectives the establishment of a bibliographic and cultural exchange with other countries. It will be housed in a four-story building with a total space of 108,-000 square feet. The book collection will be on the first floor and the reading rooms on the second and third floors. A conference room, with seating for 100 persons, will be on the fourth floor. In addition there will be a music room with listening

cubicles and a microfilm department where films will be produced. The users will also have equipment to read the microfilms. The cost of the building and the equipments was estimated at $1,183,000.

Since 1961 the National Autonomous University of Santo Domingo has been the officially designated national depository. However, in general, authors have been negligent in depositing books, making it virtually impossible to publish any kind of national bibliography.

Until 1962 there was but one university, The National Autonomous University of Santo Domingo, with about 11,500 students (1969) founded in 1538 and the oldest university in the New World (8). The other two universities are the Universidad Católica Madre y Maestra (1962) in Santiago, 1,700 students, and the Universidad Nacional Pedro Henriquez Uréna (1966) in Santo Domingo, 3,400 students (9); both are private universities.

The National Autonomous University Library is on two floors of a large building in which there also laboratories. The collection is centralized for the most part, with departmental collections for Engineering, Economics, Agronomy, Medicine, and Humanities. There is a general catalog for the books in the main library. There are open stacks. The library has about 188,000 books (8) and an estimated 750,000 volumes of periodicals, plus several thousand maps, clippings, photographs, etc. About 3,000 periodicals are currently received. The Dominican Collection of biographical, historical, political, economic, etc. material is of special value. Many of the works are scarce items, consisting of books, clippings, and pamphlets, and many are long out of print. The budget for the library for 1969–1970 was $144,500 and the staff consisted of the librarian and five professionals (all graduates of the Library School at Medellin) and 23 assistants.

As in several other Latin American countries, and especially since it is for the moment more or less the National Library as well as the official depositary, on an exchange basis, for United States official publication, the University Library serves as a public library.

The library of the Universidad Católica Madre y Maestra formerly occupied the third floor of a classroom building. A new library building was completed in 1971. There are about 19,000 books with a special collection of Dominican authors and books about the Dominican Republic. The library receives 225 periodicals and has 656 volumes of periodicals. In addition, it recently received a collection of several hundred books, periodicals, and manuscripts describing the Spanish colonial period in the West Indies, with emphasis on Santo Domingo and the Dominican Republic. Much of the material was copied from the Archives of the Indies. There are no faculty libraries at present but the collection used by the Law Faculty is shelved apart. The budget for 1969–1970 was $68,000; $25,000 for books and $40,000 for salaries. The library has a staff of twelve, with two professional librarians among them. As in so many countries, resources are limited in the university libraries. Lack of budget is obviously a factor, but another impediment is the scarcity of dollars for purchases abroad.

The Universidad Nacional Pedro Henriquez Uréna was founded only 3 years ago,

1966, (3,400 students) (9). The present collection is of about 8,000 volumes, plus approximately 250 periodicals, which is located, in isolation, in a wing of the university building, and the university has no immediate plans for a library building. The library is operated by the librarian (Dr. Mella) who does the acquisition and cataloging. He has three full-time employees and four part-time student assistants. No budget information was available to the author at the time of writing.

Among the government libraries, the various ministries have libraries but some are more useful and available than others, especially to the general public. One of the accessible libraries is that of the Secretary of State for Foreign Affairs, of more than 25,000 documents and 3,000 general reference works (10). By its nature the collection primarily treats international law, Dominican history, and international affairs in general. The library of the Central Bank of the Dominican Republic is a specialized collection of about 2,500 volumes with emphasis on economics and banking. Included are many publications of various international banking agencies. In addition, the library receives several hundred periodicals. The Ministry of Education and Fine Arts Library has about 9,000 volumes (10). None are loaned to the public for home use.

In general, the idea of public libraries that lend books to the public for home use is still unknown in the Dominican Republic. This is true of publicly supported libraries as well as of private libraries which serve as public libraries. The Ministry of Education and Fine Arts supports sixteen libraries in Santo Domingo and eight other cities. The collections are typically small, ranging from a few hundred to more than a thousand. The books are not loaned for home use.

As late as 1966, there was another group of ninety-six public libraries maintained by the *ayuntamientos,* or local governments. Statistics for the same year show about 335,000 readers and 360,000 books (11) consulted, i.e., used in the libraries as these libraries do not loan for home use either. Logically, the largest library, one of several in the city, is in Santo Domingo and has a reported collection of about 7,600 volumes (10). Many of the volumes in these public libraries are on the humanities, but they also include many textbooks because the public served is primarily in school.

In other cities the collections are smaller, often only of a few hundred books and, like the others, not loaned for home use. In general, the collections are in closed cases, so that a patron must ask the attendant, i.e., librarian, for assistance. In a few cities there are collections of books maintained either by neighborhood or by trade-union groups which do lend for home use, but the numbers of books in such collections is small, often a hundred or so.

There are a number of privately supported libraries whose collections are open to the public, but like most of the municipal libraries, they do not lend books for home use. The libraries are incorporated and are supported by a combination of levies on the society or club members and by public funds. Typical is the library Amantes de la Luz (Lovers of Light) in Santiago with 26,000 volumes (12). The library sponsors cultural events, readings of poetry, and similar events, and is in general a cultural center as well as library. Another type of privately supported library is that typified by the Association for Development, in Santiago, with a specialized collection of

about 3,300 volumes oriented toward development, especially economic and agricultural. The library published many academic studies and bibliographies.

There are two binational center libraries, one each in Santo Domingo and Santiago. These United States Government-supported libraries have extensive collections (10,000 volumes in Santo Domingo) of books in English as well as in Spanish. A third library, the United States Information Service Library (3,000 volumes), is almost exclusively in English. These are private, membership institutions and loan for home use.

There are few public schools with libraries. Where there are libraries, in general the collections are old, much-used, uncataloged, not loaned for home use, and of only a few hundred volumes, although occasionally they include as many as 1,500–2,000 volumes (*10*). The private school libraries fare little better. If there are libraries and a few more books, neither are they loaned for home use. Books are usually used by the teachers for preparing the lessons, especially when there is a shortage of textbooks.

In spite of the scarcity of libraries in the schools, there is nevertheless a positive attitude on the part of educators for the need for school libraries. As is normally the case, a shortage of funds prevents the acquisition of books and the availability of space for a library.

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EUGENE W. MOUSHEY

DORMITORY LIBRARIES

Dormitory or residence hall libraries have long seemed like a good idea. This type of library has appealed to librarians who believe that a collection of books in the right place will aid the student to educate himself and, hopefully, instill in him the desire to know. In the United States there are other factors that make librarians attempt to reach the student in his dormitory. These factors are: the rise of the multiversity which tends to isolate students and dehumanize education, the increased emphasis on tutorial work which increases the need for the student to know how to make use of a library, and the increasingly important role of the residence hall to a student's education and life style.

Harvard University established the first major house library in 1928. The librarians at Harvard hoped that these libraries would help counteract a standardized and depersonalized educational system. In the early 1930s the University of Chicago established a dormitory library in order to contribute to the physical, emotional, and intellectual development of students residing in residence halls. Over the years hundreds of libraries across the country have placed small collections of books in college or university living areas and a few of the larger university library systems have followed Harvard's example and developed large branch libraries in their major residence areas. The smaller dormitory book collections have emphasized recreational reading, while the larger house or branch libraries have collections consisting of standard reference works, the leading general periodicals, collateral or reserve book material, the popular classics, and recreational reading.

The most important factor to the continued success of dormitory libraries is a carefully selected collection of several thousand volumes. This assures rewarding browsing for a large number of students with varying academic interests. It also enables the student to obtain some of the collateral reading or ready reference material he needs without having to go to the main library. In addition to having a balanced book collection, the large house library must have full-time supervision. All materials located in residence hall libraries should also be in the general library collection. Each residence hall collection must have a cataloged collection with its own card or book catalog.

Since size is important to the educational potential of a residence hall library, this type of collection should only be developed under the following conditions. Student living centers should be clustered and not widely scattered over the campus. The character of student housing facilities must allow for the inclusion of a library that could contain up to 10,000 volumes. Ideally, the library should be in a separate building that is centrally located in a residence hall complex or be a part of the main recreational building serving the particular residence area. The operational and book funds of the university must be large enough to assure the continued staffing, supervision, and purchase of duplicate book material for the dormitory library or for a system of dormitory libraries without sacrificing any of the services

of the central library. Under no condition should the centralized book collection be diluted for the sake of the residence branch collection or collections.

Libraries not having the funds available to establish dormitory libraries with large and varied book collections but wanting to place books in the living areas should consider one of the following alternatives. A small collection of 50 to 200 reference titles is helpful to students, relatively easy to accommodate in most dormitories, and requires a minimum of supervision by library staff. A collection of paperback books usually proves to be successful. One approach would be to have a noncirculating paperback reference collection and a self-service type circulating paperback collection. Many libraries invite students to take a paperback the library has selected for a collection and replace it with one they think other students would enjoy reading.

The reason behind the organization of dormitory libraries has always been to make books available to the student and, thereby, encourage reading. There is no guarantee, however, that making books available is enough to encourage reading, improve reading skills, or help the student to develop a successful life pattern. The ubiquitous paperback and the presence of a good campus bookstore are probably doing as much to encourage reading as a dormitory library. The main function of the residence hall library is to provide student with a pleasant study area, reference material, and assigned and recreational reading.

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MILTON H. CROUCH

DOVES PRESS

The Doves Press, with the Kelmscott and Ashendene Presses, was one of the great triumvirate of English private presses at the turn of the century, and is arguably the greatest of all. Thomas James Cobden-Sanderson (q.v.), whose Doves Bindery was responsible for some of the best English bookbinding at the end of the nineteenth century, had become increasingly concerned with the idea of the book as an organic whole during the late 1890s, and recorded in his *Journals* his determination to "create

the type for today of 'the book beautiful' and actualise it — paper, ink, writing, ornament and binding." A catalytic role was then played by Sydney Cockerell, who had been William Morris's Secretary at the Kelmscott Press, when he remarked how strange it was that nobody had revived Nicolas Jenson's roman type (at that time regarded as the best roman face ever cut) in its pure form. It became Cobden-Sanderson's model for his own type. In 1900 Cobden-Sanderson entered into a partnership with Emery Walker, who had been very closely connected with the Kelmscott Press, and the Doves Press was born.

The partners were an ill-matched pair; Cobden-Sanderson the enthusiastic and often obsessive visionary, Walker the sober and scholarly practical man whose typographical knowledge was sorely necessary to make the venture a success. At first they worked well together. Walker had photographic enlargements made of the letters of Jenson's type, which were touched-up by his employee Percy Tiffin and then passed to the master punch-cutter E. P. Prince for punches to be engraved and the type cast. Meanwhile Cobden-Sanderson leased premises at No. 1 The Terrace, Hammersmith, and they arranged for presses to be installed, paper to be ordered, and a compositor, J. H. Mason, was engaged. To Mason's skill and to Walker's direction of the work belongs much more of the credit for the success of the Doves books than is generally recognized. And the Doves Press was a success from the publication of its first book, an edition of Tacitus' *Agricola* in 1901.

The pages of the Doves Press books were in complete contrast to much private and fine press work of the period, still heavily under the influence of the Kelmscott Press. Completely without decoration or ornament (apart from initials designed by the master-calligrapher Edward Johnston or his pupil Graily Hewitt), they depended for their effect entirely on the beauty of the type, the clarity of the layout, and the excellence of the presswork (see Figures 1 and 2). The Doves type was itself of very high quality; by no means simply a facsimile recutting of Jenson's face, its letters combined well to make a fine and very legible page. Despite some faults in the font (the y, J, and the question mark were not altogether satisfactory), it was in its time the most beautiful type in use. The simplicity of the pages was, of course, deceptive. They are full of those almost invisible refinements in the setting of type which mark off the superb from the merely good, and for this Walker and Mason must have been responsible. But this simplicity was the perfect expression of Cobden-Sanderson's dictum that "the whole duty of typography . . . is to communicate, without loss by the way, the thought or image intended to be communicated by the author." At a time when far too much printing was luxuriating in the lavish decoration on the Kelmscott model, this reminder that the medium is not the message, but merely its vehicle, was very timely. The Doves Press design showed the way for the effective development of book design in the twentieth century.

With most of the other private and fine presses concerned with printing as an art one can trace a development in style, but in the Doves Press books there was little change from first to last, because Cobden-Sanderson's concept of "the ideal book" was realized almost from the start. To modern eyes the very strong family resemblance of all the Doves books is a weakness. There is insufficient change of tone

Earl Rivers, the Lord Scales of the Burgundian marriage embassy of 1467, who had asked Caxton to read a translation which he had made of the Dictes and Sayings of the Philosophers, — the translation preserved in the first dated book issued from the English press. Caxton, who would seem to have had the genuine scholar's instinct for verifying statements and hunting up original sources, promptly discovered that the Earl had omitted those portions of the original text which contained "certayne and dyverse conclusions touchyng women. Wherof I mervaylle that my sayd Lord hath not wreton them, ne what hath movyd hym so to do ne what cause he hadde at that tyme. But I suppose that some fayr lady hath desired hym to leve it out of his booke, or ellys he was amerous on some noble lady, for whos love he wold not sette yt in hys book, or ellys for the very affeccyon, love & good wylle that he hath unto alle ladyes and gentyl women, he thought that Socrates spared the sothe and wrote of women more than trouthe. ¶ But I apperceyve that my sayd Lord knoweth veryly that suche defautes ben not had ne founden in the women born and dwellyng in these partyes ne regyons of the world. Socrates was a Greke. I wote well that of whatsomever condicion women ben in Grece, the women of this contre ben right good, wyse, playsant, humble, discrete, sobre, chaste, obedient to their husbondes (it is supposed that Caxton married not long before he settled down
24

at Westminster) trewe, secrete, stedfast, ever besy and never ydle, attemperat in spekyng, and vertuous in alle their werkis, or atte leste sholde be so, for whiche causes so evydent my sayd Lord as I suppose thoughte it was not of necessite to sette in his book the sayengs of his auctor Socrates touchyng women. ¶ Therfore in accomplisshing his commandement to correcte & amende where as I sholde fynde fawte, and other fynde I none. . . for as muche as I am not in certayn whether it was in my Lordis copye or not or ellis peraventure that the wynde had blowe over the leef at the tyme of translacion, I purpose to wryte the same sayings of that Greke Socrates, which wrote of the women of Grece & nothyng of them of this Royame, whom I suppose he never knewe."

THE ANNALS of LITERARY HISTORY offer to the imagination no more fascinating picture than that of the first in the long line of English publishers who have also been men of letters, a man who was likewise one of the earliest in the succession of English merchants and men of affairs who have found recreation & fame in the production of literature. When William Caxton went to his reward in the year 1491, he completed a career of widely varied activities, regarding which we have much more than the average of record left by the public men of his age — records preserving not one single hint of any untoward incident to qualify our
d   25

FIGURE 1. *A double-page spread from* William Caxton, *by G. P. Winship and published by Doves Press, 1909. The initial T is printed in red in the original.*

between books of totally different nature, and the chilly classical perfection of the work makes them less comfortable to read than other typographically inferior editions. Cobden-Sanderson's concept of "the ideal book" was essentially a false one in suggesting that one style was suitable for all work, but in their time the Doves Press books were vitally important models.

After some twenty volumes, including a magnificent *Bible* (1903-1905), had been published, the partnership between Cobden-Sanderson and Walker broke up. For Walker the Doves Press was but one of many interests, and he wished to make the type available for more general use; for Cobden-Sanderson the Doves Press was his whole life and he had come to identify the type with himself, regarding it as a "consecrated instrument." No reconciliation was possible, so in 1909 Walker withdrew (Mason left at about the same time) and Cobden-Sanderson continued to direct the work of the Doves Press and of the associated Doves Bindery alone. He published a further twenty-odd volumes plus a few slighter pieces before closing the Doves Press with a final *Catalogue raisonné* in December 1916. Its publications, as well as the *Bible,* had included many of the standard classics so often printed by these private presses, but it was more adventurous than many, producing also a series of five volumes of the work of Goethe in German, the last volume in 1916 — an act of
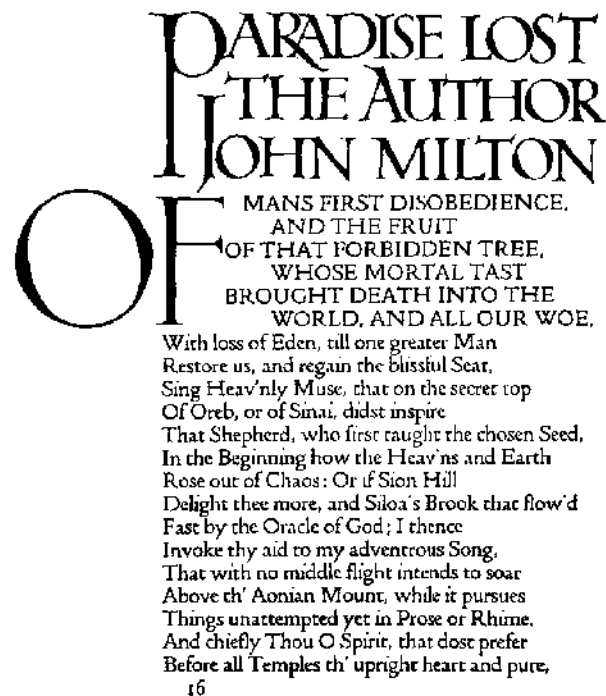
PARADISE LOST
THE AUTHOR
JOHN MILTON

OF MANS FIRST DISOBEDIENCE,
AND THE FRUIT
OF THAT FORBIDDEN TREE,
WHOSE MORTAL TAST
BROUGHT DEATH INTO THE
WORLD, AND ALL OUR WOE,
With loss of Eden, till one greater Man
Restore us, and regain the blissful Seat,
Sing Heav'nly Muse, that on the secret top
Of Oreb, or of Sinai, didst inspire
That Shepherd, who first taught the chosen Seed,
In the Beginning how the Heav'ns and Earth
Rose out of Chaos: Or if Sion Hill
Delight thee more, and Siloa's Brook that flow'd
Fast by the Oracle of God; I thence
Invoke thy aid to my adventrous Song,
That with no middle flight intends to soar
Above th' Aonian Mount, while it pursues
Things unattempted yet in Prose or Rhime.
And chiefly Thou O Spirit, that dost prefer
Before all Temples th' upright heart and pure,
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FIGURE 2, *Doves Press* Milton. *The heading and initials are in red in the original.*

some courage in view of the anti-German feeling in England during World War I. Most of the volumes published were edited by Cobden-Sanderson, and the majority of the slighter works were from his pen.

From 1911 onward, or even earlier, Cobden-Sanderson had been contemplating destroying the Doves types, and during the period 1913-1917 he threw the punches, matrices, and types into the Thames from Hammersmith Bridge. This was in fulfillment of an entry made in his *Journals* for June 11, 1911: "My Last Will and Testament. To the Bed of the River Thames, the river on whose banks I have printed all my printed books, I bequeath the Doves Press Fount of Type . . . and may the river in its tides and flow pass over them to and from the great sea for ever and for ever, or until its tides and flow for ever cease; then may they share the fate of all the world, and pass from change to change for ever upon the Tides of Time, untouched of other use and all else." It would have been a splendid gesture had not Cobden-Sanderson agreed, when his partnership with Walker broke up, that the type should pass to Walker if he survived. The loss to Walker was considerable, but he forebore to prosecute, probably realizing that the irrational Cobden-Sanderson was scarcely responsible for his actions. The loss to posterity was not disastrous; other recuttings of classical typefaces (including Jenson's) which have been made generally available since have provided printers with types which are equally good. But the end of the Doves Press was as mean as its work had been magnificent.

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RODERICK CAVE

DREXEL LIBRARY QUARTERLY

The *Drexel Library Quarterly* is a professional journal devoted to examining contemporary aspects and problems of American library and information science. Each issue treats a single topic and attempts to provide a comprehensive survey of subjects not treated in depth elsewhere in professional literature; they might be characterized as mini-books. The *Quarterly* is sponsored by the Graduate School of Library Science, Drexel University, Philadelphia, Pennsylvania. Its content is determined by the Publications Committee, which is composed of representatives from the faculty, student body, and alumni; editorial responsibility is assigned to the chairman of the committee, and each issue is attributed to an issue editor. Established in 1965, the *Quarterly* is published in January, April, July, and October. Back issues remain in print, and the *Quarterly* may be purchased either by annual subscription or as single issues.

MARY E. STILLMAN

DREXEL UNIVERSITY: GRADUATE SCHOOL OF LIBRARY SCIENCE

The Graduate School of Library Science at Drexel Institute of Technology had its beginning in a library training program organized in November 1892 at the Drexel Institute of Art, Science and Industry under the direction of Alice B. Kroeger, librarian of the institute. At that time there were only two other schools of library

science in the United States, the New York State Library School at Albany, under Melvil Dewey's direction, and the Pratt Institute Library School in Brooklyn. During the first year of operation of the library training program two persons, along with Miss Kroeger, made up the faculty. In June 1893 certificates were awarded to nine of the ten people who made up the first class.

In its early years the program at Drexel was largely technical in content and was modeled after Dewey's school at Albany, of which Miss Kroeger was a graduate. The course was of 8 months' duration, and students were admitted by competitive examination based on 2 years' work beyond high school, although many, even in the early years, were college graduates. Changes in the course of study were frequent during the early years as the school developed under Miss Kroeger's direction. The systematic study of book selection and reference work soon achieved equal importance with the technical aspects of training—cataloging, classification, accessioning, shelf listing, and filing. Practical work in the institute library accompanied the lectures and formed an integral part of the course of study.

Alice B. Kroeger was in charge of the school until her death in 1909. She was a librarian of considerable importance, serving on the ALA Committee on Library Training and making a valuable contribution to the profession with her *Guide to the Study and Use of Reference Books*, which was first published in 1902 and was continued after Miss Kroeger's death in subsequent editions by Isadore G. Mudge and later by Constance Winchell.

Miss Kroeger's successor was Mrs. Salome Cutler Fairchild of the New York State Library School at Albany, who served as acting director until 1910 when June Donnelly of Simmons College was appointed as dean. Miss Donnelly served for only 2 years; upon her resignation in 1912 she was replaced by Mrs. Corinne Bacon.

In 1914, shortly after the appointment of President Hollis Godfrey, the decision was made by Drexel to suspend the library education program despite its seeming success. President Godfrey stated in a *Library Journal* article in April 1914 that Drexel had decided to eliminate the marginal library education program and to concentrate its resources on the Engineering School, the School of Domestic Science and Arts, and the Secretarial School. This decision was consistent with the planning of those years that saw Drexel primarily as a school oriented to the needs of greater Philadelphia. Despite vigorous protests from alumni and from the library profession, the suspension of the school went into effect. The school was closed and was not, as the director and alumni hoped, reopened elsewhere.

The Alumni Association continued to work for the reactivation of the school and in 1922, shortly after a new president, Dr. Kenneth Matheson, succeeded the retiring Dr. Godfrey, the Board of Trustees acted to reestablish the Library School. Mrs. Ann Wallace Howland, who had been director of the Library School at the Carnegie Library in Atlanta, was appointed director of the school and later librarian of the institute. Under her direction new quarters were equipped and a library science book collection was reassembled. Sixteen students enrolled in September 1922 in the newly designated Drexel Institute School of Library Science. The 1-year course offered work in three categories—administrative, bibliographical, and tech-

nical. Upon completion of the course a certificate was awarded. College education was not yet a prerequisite for admission, which was still by competitive examination in literature, history, general information, and language.

The reactivated school became a member of the Association of American Library Schools in 1924; in that year also, it was visited by the Board of Education for Librarianship of the American Library Association. In 1926 it was on the first list of accredited schools, one of five programs so designated by the American Library Association. In 1926 the State of Pennsylvania granted Drexel the right to confer the degrees of Bachelor of Science in Library Science and Master of Science in Library Science, and a college degree was made an entrance requirement. However, until 1950 the only degree offered was the fifth-year Bachelor of Science in Library Science. A further step in the development of the school came in 1926 when the Carnegie Corporation granted Drexel $20,000 for program expansion in the field of school librarianship, including summer sessions for persons unable to attend regular academic year classes.

During the decades of the 1930s and 1940s changes in the basic curriculum were few. Experiments with summer sessions, with visiting lecturers, with field work, with a 3-year part-time program for employed persons, and with cooperative arrangements between Drexel and the University of Pennsylvania for a combined Bachelor of Arts and Bachelor of Science in Library Science were among the innovations.

In 1936 Dean Howland retired and was succeeded by Marie H. Law, who had been a faculty member since 1922 and was to be dean until 1949. During her term as dean the Drexel school, like most of the other accredited library schools, revised its curriculum and instituted the practice of awarding a Master's degree for the fifth year of study. With this change in the fall of 1949 came requirements for a 2-week presession course entitled "Introduction to Library Methods," a course on methods of research, and a comprehensive written report of a field investigation.

Harriet MacPherson, who became dean in 1949, was a scholar of note in the field of languages as well as a specialist in cataloging and academic librarianship. During her decade of service, standards for admission and graduation were raised and the academic stature of the school increased. A number of advanced courses were added to allow a student to specialize by type of library and Drexel became especially strong in its emphasis on preparation for special librarianship. In 1954 the name Graduate School of Library Science was adopted.

With Miss MacPherson's retirement in 1958 and the appointment of Dr. John Harvey as director of libraries and dean of the Graduate School of Library Science, the school entered a new phase of growth. It moved in 1959 to new quarters in the Drexel Library Center; began a steady increase in size of enrollment, which by the mid-1960s made it one of the largest schools in the country; assumed a more active role in providing research and service activities for the region and the state; and expanded its evening and Saturday classes in order to make the attainment of a library education somewhat easier for the part-time student. In 1963 a separate curriculum in Information Science was introduced and many notable people from this field

taught courses on a part-time basis in the Drexel program. The *Drexel Library Quarterly* began publication in 1965. The "Drexel Library School Series" and the "Drexel Information Science Series" were soon added to the publication program. Drexel also became actively involved in continuing education activities, serving as a sponsor for many short courses and conferences. In 1962, the dual designation as director of libraries and dean of the library school was ended and Dr. Harvey became dean of the Graduate School of Library Science alone. An active member of the American Library Association and the American Society for Information Science, Dr. Harvey's interests included recruitment, library periodicals, and research in librarianship. In 1967 he resigned the deanship to accept a 2-year Fulbright lectureship in Iran.

In September 1968 Dr. Guy Garrison became dean of the school, moving to Drexel from a position as research professor at the Graduate School of Library Science, University of Illinois.

In February 1970 the name of Drexel Institute of Technology was officially changed to Drexel University. In the Graduate School of Library Science, effective September 1970, the separate curricula in library science and in information science were merged. The school now awards the undesignated Master of Science degree with specializations in library science, information science, and educational media.

<div align="right">GUY GARRISON</div>

DRIVE-IN SERVICE FOR LIBRARIES

Drive-in windows for libraries are relatively new. Drive-up book drops were the initial idea behind the drive-in libraries. They were installed as a curbside convenience for library patrons who wished to return books and found it impossible to find a parking place near the library. The borrower was able to deposit books in a mailbox-type receptacle without leaving his car. Many libraries were installing these book drops by the early 1950s. As these book drops served only patrons returning books, a need was felt for a drive-in service where patrons could pick up books as well as return them.

Banks and restaurants had already faced the matter of serving the motoring public, and it became obvious that libraries in downtown areas, where parking space is at a premium, had the same problem. The Public Library of Cincinnati and Hamilton County, Ohio, inaugurated a drive-in service in March 1955. Hartford, Connecticut, opened its drive-in service in 1957 (*1*).

By 1969 three other Ohio libraries added drive-in service to their facilities — Dayton and Montgomery County in 1962, Cleveland Public Library in 1965 (see Figures 1 and 2), and Akron Public in 1969. "A report, *The Local Public Library Administration*, edited for the International City Managers' Association by Robert

FIGURE 1. *A borrower calling for books which he had requested by telephone.*

Bowler, says on page 311, 'Several new libraries have been planned with drive-in service windows for the return of books and for calling for books that had been requested earlier. The type of book return facility selected by a given library for the convenience of its readers will depend entirely upon local requirements' " (2).

The drive-in window is often used as a return service, and this may always be true. Some borrowers will always prefer to select their material in person, but the drive-in facility is designed for the person seeking a specific item — books, film, phonodiscs, or periodicals. It is popular with those who know of it, but its use requires constant promotion.

As part of their will-call service at the drive-in window, which was inaugurated in May 1966, Milwaukee Public Library also fills requests for Xerox orders, company loans, and Blind Services. They have a selection of paperbacks on display, and

FIGURE 2. *A borrower returning and paying fines on overdue books at the drive-up window, Cleveland Public Library, Cleveland, Ohio.*

patrons may choose these without advance request. They keep a supply of free materials such as travel brochures, income tax forms, and the *Milwaukee Reader*.

Drive-up windows have "night depositories" where materials may be deposited when there is no staff available.

The drive-up window can be attractive as well as functional and serve as an effective public relations device.

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EMILY LOU ALFORD

DUBLIN. UNIVERSITY OF DUBLIN, TRINITY COLLEGE LIBRARY

Trinity College Dublin was founded in 1591 by Queen Elizabeth I of England. Its library has grown steadily with the college over more than three and a half centuries and is now the largest library in Ireland, containing well over a million books and an important collection of manuscripts. In addition to its essential function as an undergraduate and research library for the university of which it forms part, it makes its resources freely available to users from outside the college, including visiting scholars from all parts of the world. The library provides an information service to government departments, research organizations, and technical, industrial, and commercial bodies within Ireland. It cooperates with the National Library of Ireland in the acquisition of older books and manuscripts of Irish interest and in the maintenance of a national library service.

Since 1801 the library has enjoyed the right to claim all British publications under the terms of the British Copyright Act (41 Geo. III, c. 107). By the Industrial and Commercial Property (Protection) Act of the Irish Free State 1927 and the Copyright Act 1963, the copyright privilege of the library was continued in respect of books published in Ireland.

The college and its library have their origins in the period when the unification of Ireland under the Tudor Crown had almost been accomplished. The idea of an Irish university had been in the air for some time, and in 1591 a small group of Dublin citizens obtained a charter incorporating the College of the Holy and Undivided Trinity of Queen Elizabeth, near Dublin. The Corporation of Dublin granted to the new foundation the land and dilapidated buildings of the monastery of All Hallows, lying about a quarter of a mile southeast of the city walls, and 2 years later a few Fellows and students began work in the new college. During the next 50 years the community increased, endowments, including considerable landed estates, were secured, new fellowships were founded, a curriculum was devised, and statutes were framed.

Though the present Old Library building was not erected until the early eighteenth century, the library as a collection of books can be traced back to the years immediately following the foundation of the university itself. In the original college building, a small brick quadrangle erected in the last years of the sixteenth century, the upper story above the scholars' rooms was set apart for the library. Of these buildings nothing now remains, though a stone panel carved with the arms of Queen Elizabeth, believed to be that which stood over the gate, is preserved in the library.

By 1600 some thirty books and ten manuscripts were listed, but in the course of the following year two Fellows of the College, Luke Challoner and James Ussher (the future Archbishop), went to England to collect books for the library. The booksellers' accounts for these purchases fortunately survive and their discovery has undermined the old legend that the library was founded by a grant assigned from

the soldiers' pay after the victory of the English over the Irish and Spaniards at the Battle of Kinsale (December 1601). It is likely that government grants, supplemented by private subscriptions, aided the college's library development at this time, but the amounts and details are not known. At all events, the early acquisitions were extensive and important. By 1604 the library contained about 5,000 books.

This excellent beginning was not maintained and the library seems to have had no notable accessions for 60 years. The second half century of the college's history was, in any case, a time of turmoil, marked in Ireland by an interregnum and two civil wars. In 1641 the provost fled, and two years later the college had to pawn its plate. But the seventeenth century was also an age of learning: Trinity men such as Marsh, the orientalist; Dodwell, the historian; Stearne, who founded the Irish College of Physicians; and Molyneux, the correspondent of Locke, were typical of the adventurous and wide-ranging scholarship of their day, of which Ussher, the great polymath, is the outstanding figure.

Ussher's personal collection of more than 10,000 books and manuscripts was acquired by the library in 1661. During the civil wars this great body of learned works had been confiscated once from their owner and bought back for him by his friend John Selden, the celebrated antiquary. Ussher had intended to leave his library to the college, but before his death in 1666 he found he had to bequeath it, for want of other provision, to his daughter. However, it was bought from her by Cromwell and brought from England to Dublin Castle. The Protector's intention was that it should form the basis of the library of a new college which he intended to found. After the Restoration, the Irish House of Commons voted to give the collection to Trinity College. At about this time also, the greatest treasure of the college, the Book of Kells, having been brought to Dublin from the parish church of Kells for safety during the war, was transferred to the library.

A number of other acquisitions of the second half of the seventeenth century deserve comment. In 1671 the Countess of Bath presented a gift of books costing £200 in memory of her husband, who had been a Fellow. Three years later Sir Jerome Alexander, a Justice of the Court of Common Pleas, left his law books and manuscripts to the library. In 1691 Provost Henry Huntingdon, on his resignation, presented part of his collection of oriental manuscripts to the college.

The collections which had been accumulated in the first century of the library's history were still housed in the original building. In 1651 Vice-Chancellor Henry Jones, Bishop of Meath, had furnished it with two oak staircases which led to the gallery. They were later transferred to the present Old Library and fulfill the same function on either side of the entrance to the Long Room. Besides the main hall with its gallery, the seventeenth-century library had in the west end a "division made by a kind of lattice-work" containing Ussher's books and a chamber at the east end to hold the Countess of Bath's collection.

The eighteenth century, for the most part a peaceful era in Ireland, saw a great revival in the fortunes of the college, which coincided with the revived prosperity and gradual expansion of the city of Dublin. Unlike the English universities, Trinity took its duties seriously. The Fellows were hard-worked, both as teachers and admin-

istrators, the curriculum was kept up to date, and there were quarterly examinations at which prizes were granted to successful candidates. Most of the outstanding Irishmen of the eighteenth century, including Swift, Berkeley, Burke, Goldsmith, Grattan, and Tone, were Trinity graduates.

During this century Trinity was the university of the Protestant Ascendancy, and Parliament, meeting on the other side of College Green, viewed it benevolently and made generous grants for building. In the latter part of the seventeenth century and the early years of the eighteenth century, the college had been rebuilt on the scale of one of the smaller colleges of Oxford or Cambridge, with two squares chiefly in red brick. Of these buildings the range known as the Rubrics is the only one to survive today. The final rebuilding in stone, expressing the ordered vigor of the college life, was on a much larger scale, and began appropriately with the erection of the library in 1712. A new building was certainly overdue, for George Berkeley, the philosopher, who had recently been appointed librarian, writes of the former building that it "is at present so old and ruinous and the books so out of order that there is little attendance given." In 1712 the foundation stone of the present Old Library structure was laid, and it was conceived on such a grand scale that it was sufficient, with various modifications and additions, to meet the needs of the college for more than two centuries and still houses the greater part of the library's books.

The library was designed by Thomas Burgh, Chief Engineer and Surveyor-General of His Majesty's fortifications in Ireland. He clearly took as his model Wren's Library in Trinity College, Cambridge, which had been completed less than 20 years before. The underlying principle of both buildings is that the books should be housed in a long room on the upper floor raised above an open colonnade and approached at one end by a grand staircase. Such a design gave protection from the damp which was equally to be feared on the banks of the Cam and the Liffey. At either end of the building Burgh provided a pavilion which contained a lecture-room on the ground floor; that at the west end was assigned to law, that at the east to divinity. Originally the building was faced with a warmly-tinted sandstone which must have toned suitably with the brick buildings of the college. In the early nineteenth century it had to be refaced in the present granite ashlar like the rest of the later stone buildings. The celebrated Long Room of the library deserves its name (see Figure 1), being 209 feet in length by 40 feet in width (including the depth of the stalls on either side). Originally it was not as high as at present (48 feet) but was covered with a flat ceiling at a short distance above the level of the gallery. At that time, too, the stalls were not congested by the lower bookcases which now stand between them. The main floor of the room was clear of furniture from end to end and could be used for promenading. No provision was made for heat or light because of the risks from fire.

The changes which have taken place in the eighteenth century building have all been occasioned by the need to provide additional accommodation for books and readers. In 1802 the purchase of the Fagel Library (see below) made necessary the removal of the manuscripts from the end of the Long Room to the floor above it. By 1858 the Long Room was full and more space was sought by raising the ceiling and filling the gallery with high stalls. Within 40 years this extension too proved
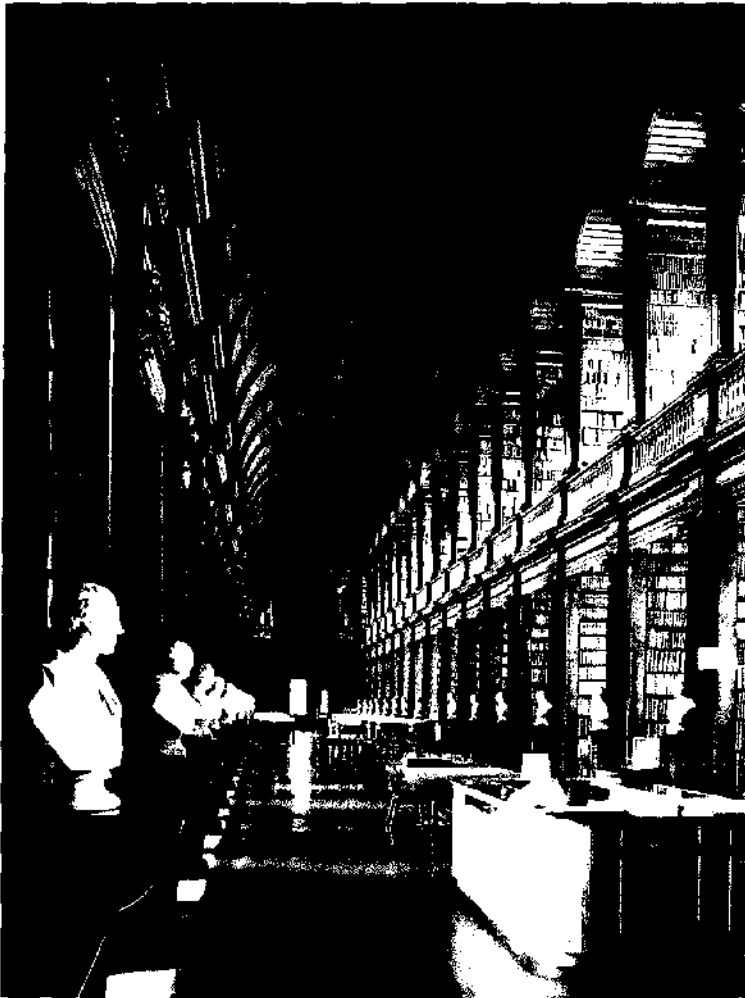
FIGURE 1. *The Long Room of Trinity College Library. (Reproduced by permission of the Board of Trinity College Dublin.)*

insufficient and the college took the regrettable decision of walling in the colonnade to form a large enclosed area on the ground floor. This gave a great addition to the library's accommodation, but removed at the same time one of its chief architectural beauties. At first only half the space thus acquired was used for storage while the other half became a reading room.

In recent years a complete restoration of the Old Library has been undertaken. This has included the provision of a reading room for older printed books and special collections in the East Pavilion (completed 1967) and the creation in the West Pavilion of a new Department of Manuscripts (completed 1971). The book-stack in the colonnade was sufficient for the needs of about half a century. But already before it was full, plans were made to erect a reading room as a separate building. This was begun by the Hall of Honour, dedicated in 1928 to the memory of those

members of the college who fell in World War I, to which is attached an octagonal reading room completed in 1937.

It will be obvious already that the history of the library since the early eighteenth century has been one of continuous growth. A list of even the principal accessions would be monotonous, but a few are worth separate mention. Two Fellows of the college made important private collections which were intended to come to the Library. William Palisser, ultimately Archbishop of Cashel, bequeathed 4,000 books in 1726, and 10 years later Claudius Gilbert gave the college his valuable collection of some 13,000 volumes. For more than 40 years as a Fellow he had been gathering books which would be useful as accessions to the library, and he has remained its most extensive benefactor. At about the same time John Stearne, Bishop of Clogher, who had founded the University Printing Press, bequeathed to the college his manuscripts, including a large collection of historical records of the seventeenth century. In 1786, through the influence of Edmund Burke, Sir John Seebright presented to the college an important collection of Celtic manuscripts made by Edward Lluyd.

In 1802 the Erasmus Smith Board bought and presented to the college the library of Mr. Greffier Fagel. He was Pensionary (i.e., Chief Minister) of Holland and came of a long family of distinguished scholars and statesmen. Napoleon had confiscated his property when he invaded the Netherlands, but on recovering it Fagel transferred his library to London where it was to have been sold at Christie's in March 1802. But instead the 20,000 books and some valuable manuscripts were bought for the college as one lot for £10,000. It is the biggest single accession ever received by the library and has been kept together as a collection. The large number of continental printings which it contains give it a special importance. Of almost as great value, though very much smaller in size, is the Quin collection, received by bequest in 1805. Henry George Quin, who had graduated at Trinity, was a dilettante and book collector who spent much time and money on purchasing at auctions the rarer specimens of early printings of the classics and the great Italian poets. These he had bound by Roger Paine, Kalthoeber, and other master binders. The collection numbered only 127 volumes, but all of them were splendid examples of their kind. He bequeathed his collection to the college by a will made 9 years before his death, in which he gave minute directions for their preservation in his original bookcase. The nineteenth and twentieth centuries have generally seen less of the large and valuable benefactions to the library. The most considerable was the bequest of the Reverend Aiken Irvine in 1881. This contains some 1,000 volumes, mostly early continental work on theology. More often the library has benefited in recent years by the small gifts of individuals.

The library's collection of manuscripts is one of its principal claims to a place among the great libraries of the world. The range and importance of the collection can be indicated only in the briefest way. The early Irish manuscripts are of particular significance and among these the *Book of Durrow* (seventh century) and the *Book of Kells* (ca. A.D. 800) are the most celebrated. The treasures of the collection are not, however, confined to manuscripts of this period. The *Winchcombe New Testament and Psalter* (twelfth century), the *Book of St Albans* (thirteenth century), and the *Dublin Apocalypse* (fourteenth century) are notable examples from later

centuries. The library is also rich in more modern manuscript material. It possesses, for example, the fifty-five volumes which are the sole survivors of the archives of the Roman Inquisition; the notebooks of Archbishop James Ussher; and the correspondence of such internationally prominent figures as Sir William Rowan Hamilton, the discoverer of quaternions; of W. E. H. Lecky, the greatest of Irish historians; of Edward Dowden, a pioneer in the establishment of English as a university subject. In 1968 the library acquired the most important of its recent accessions, the manuscripts of the playwright John Millington Synge.

In the present century the library has had to fulfill its various roles under increasingly difficult circumstances. The Copyright Act of 1801 extended to Trinity College the privileges long enjoyed by Oxford and Cambridge of claiming one copy of every book published in the British Isles. At first the number of works received in this way was not large, but gradually, in cooperation with the other two universities and the National Library of Scotland, Trinity College has come to claim all published matter worthy of preservation. The storage of this great mass of printed material and the provision of adequate space for library staff and readers required the construction of a new library building.

For this purpose an appeal was launched in 1958 to which the Irish Government contributed on a pound for pound basis. In 1960 an international competition was held which attracted more than 200 entries from architects all over the world. Mr. Paul Koralek, who won the competition, produced a design for a building which has already taken its place as one of the great buildings of the college, harmonizing admirably with the older buildings which surround it, while remaining entirely modern in conception and style (see Figure 2). Its somewhat inflexible design, however, makes it less successful as a functional library building. The New Library was opened on July 12, 1967 by His Excellency Eamon De Valera, president of Ireland.

The form of the New Library building has arisen from a consideration of the internal functioning of the building and of its relationship to the existing college
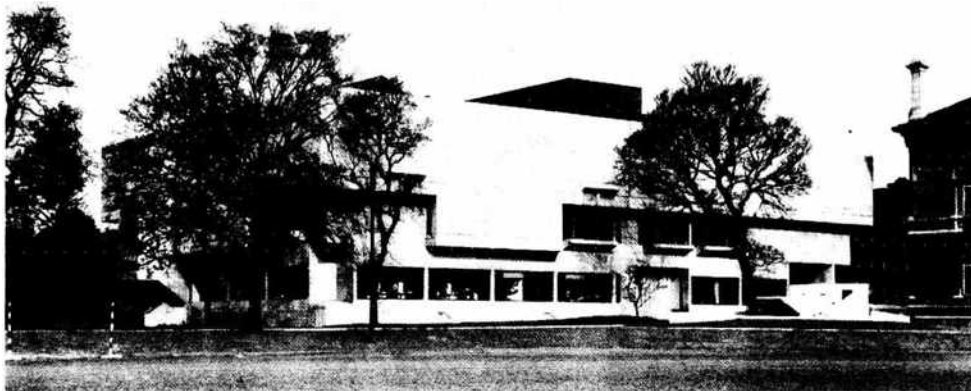

FIGURE 2. *The New Library of Trinity College Dublin. (Reproduced by permission of the Board of Trinity College Dublin.)*

buildings. It is placed in relation to the Old Library and the Museum building so that a courtyard is formed between them, providing a natural extension of the system of courtyards and outdoor spaces which is the pattern of Trinity College. The new building consists of three elements: the basement bookstack; the ground floor, devoted to administration and staff facilities, catalog and reference rooms; and the first and second floors, which form a single large reading and open-access book-storage area. These elements are linked vertically by the main stair and a central service core containing elevators, book-hoist, service ducts, and a staff stair, which together form a vertical spine around which the building is planned. The New Library has space for some 500 readers and over 800,000 books.

The growth in student numbers in recent years and the college's plans for future development have rendered even the New Library inadequate to the needs of the university. A comprehensive library development plan has been evolved, which makes provision for a separate undergraduate library as part of a new Arts building, a separate science library as part of a complex of science buildings at the east end of the college, and an off-site book-storage building to house the less-used acquisitions received by copyright deposit.

The library has been concerned in recent years to take advantage of developments in the application of computers to library administration and the first stages have been completed of a plan to automate a wide range of its activities. The library has been selected as one of the primary participants in the British MARC Project, and MARC tapes are being used as a basis for cataloging accessions under the Copyright Act and for an information service on current publications.

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E. F. D. ROBERTS

DUKE UNIVERSITY LIBRARY

The Duke University Library in 1969 contained 2,000,000 volumes, 4,000,000 manuscripts, and received 10,000 periodical. With a staff of 200 and a budget of $2,250,000, it serves 7,800 students, the university community of faculty and staff, and gives area scholars outside the university community generous access to its collections.
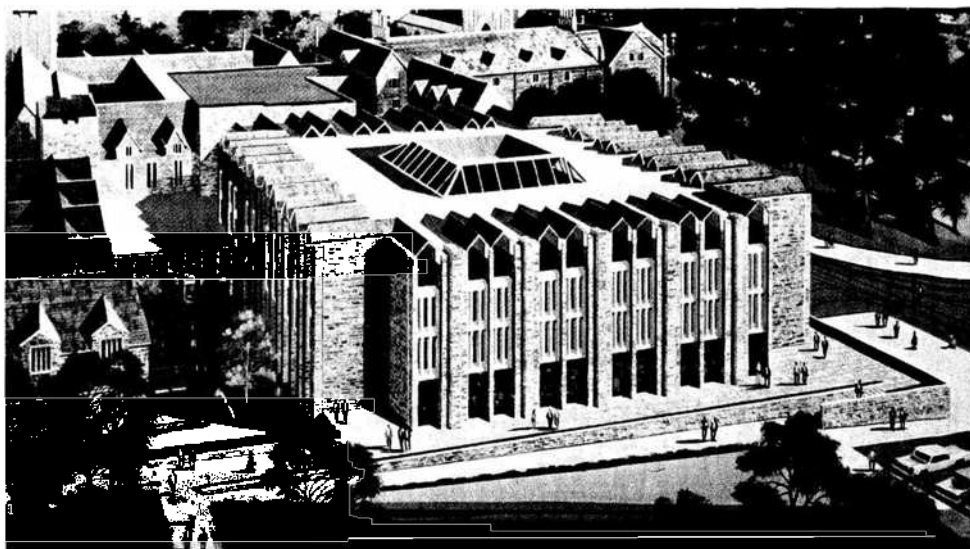
The library was created more than 100 years ago in the university's antecedent, Trinity College. The institution that had been Union Institute, then Normal College, was 20 years old in 1859 when it was renamed Trinity. Although there was discussion in 1840 about the formation of a library society, little was done except by the two literary societies in bringing books together in the college. There were, however, small "college" and "theological" collections in the 1850s. These were merged with the two literary society libraries in 1887 to form the college library of 10,000 volumes. When the college's first library building was given at the turn of the century by James Buchanan Duke, who 24 years later was to create Duke University with a $40,000,000 endowment fund, the library contained 12,000 volumes. Completion of the building encouraged gifts of books and the establishment of several modest endowment funds, and when the college became Duke University in December 1924 the library contained 80,000 volumes.

During the 5 years between creation of the university and the move to a new campus (the number of volmes in each in 1969 is shown in parentheses): Biology— the Woman's College were formed. Doctoral programs, meanwhile, were approved in twelve fields. Intensive development of the book collections started immediately and in 1930 these special libraries were established in separate quarters on the new campus (the number of volumes in each in 1969 is shown in parentheses): Biology— Forestry (100,000), Chemistry (26,000), Divinity (143,000), Law (163,000), Medical Center (95,000). The Mathematics–Physics Library (37,000) was established late in the 1930s. The Engineering Library (43,000) was not moved to the West Campus until 1946 when a new building was ready. The Woman's College Library (178,000) book collection, formed *de novo* during the half decade, was left in the library building on the old campus to serve the undergraduate women students in the university.

The General Library of the University (1,225,000 volumes), which in 1966 was named for Judge William R. Perkins, a close associate of the founder of the university and author of the indenture creating the university, serves the research needs in the humanities and social sciences as well as the every day library needs of undergraduates (see Figure 1).

An annual library fee of $2.00 per student, initiated in 1892–1893, was the first regular source of income for the library. This was increased to $10.00 a year in the 1920s and to $22.00 a few years before it was discontinued in 1968, when an equivalent amount was provided in the annual appropriation. The library has as a rule received generous financial support. For three decades, from the middle 1920s, it regularly received from 6 to 10% of the educational budget of the university, and except for a few years has always received about 5%. Such support enabled strong research collections to be built in the relatively few fields in which the university granted the doctorate. As the university's teaching and research interests have been extended in recent years in several departments such as history, political science, economics, and engineering, the book funds, though they have been increasing, have been less than needed to support the new programs.

The average annual expenditure for books in each 5-year period since 1925 and the average number of books added annually are shown in Table 1.

FIGURE 1. *William R. Perkins Library.*

The faculty have always played an important role in book selection and in building the collections. A percentage of the book fund is allocated regularly to the departments for faculty use in the purchase of books. In the early days of the university — in the 1920s and 1930s — when desiderata lists were being prepared and major collections could be acquired without fear of much duplication, professors traveling or studying abroad bought heavily for the library. Professor W. Laprade spent $10,000 in 1926–1927 while acquiring many of the basic sources for the study of British history. The following year Professor E. M. Carroll was in Europe selecting books and journals which greatly strengthened the library in the fields of French and German history and politics. The efforts of Professors John Tate Lanning and J. Fred Rippy led to the acquisition in 1928 of the Perez de Valasco Collection of 3,000

TABLE 1

Average Annual Expenditure for Books and Average Number of Books Added Annually at the Duke University Library

	Average number volumes added annually	Average annual expenditures for books ($)
1925/26–1929/30	21,031	69,499
1930/31–1934/35	46,791	140,000
1935/36–1939/40	36,230	131,171
1940/41–1944/45	25,655	103,634
1945/46–1949/50	28,999	143,239
1950/51–1954/55	42,610	182,164
1955/56–1959/60	49,277	255,447
1960/61–1964/65	60,785	477,223
1965/66–1968/69	82,344	804,771

titles relating to all phases of Latin American life. Meanwhile, Professor A. M. Webb negotiated successfully for the purchase of the 11,000 volume library of Professor Gustav Lanson, noted French scholar and critic. The private library of Professor Leo Strisower, president of the Institut de Droit Internationale, consisting of monographs and periodicals in international law and relations dating from the seventeenth century, was secured by Professor Robert Wilson. The late Dr. Karl Holl's 8,000 volume library in church history and Dr. Graf von Baudissin's 2,500 volume collection in Hebrew and Old Testament were acquired for the Divinity Library.

Others who played major roles in building the collection during the early years were Professors Paull F. Baum, Allan H. Gilbert, Clarence Gohdes, Jay B. Hubbell, and Newman I. White, of the Department of English; W. K. Boyd of History; W. H. Glasson, of Economics and Political Science; Paul M. Gross, Chemistry; Hugo L. Blomquist and Paul Kramer, Botany; Arthur S. Pearse and George T. Hargitt, Zoology; Clarence Korstian, Forestry; J. Miller Thomas, Mathematics; Walter M. Nielsen, Physics; Walter Seeley, Engineering; Wilburt C. Davison, Medicine; and Bryan Bolich and Law Librarian William R. Roalfe, Law.

The direction of growth of the library quite naturally has been determined by the teaching and research interests of the university, but gifts, fortuitous availability of special collections, and the enthusiasm and collecting interests of the faculty have enabled greater strength to be built in some fields than others. For example, a special endowment fund has supported development in depth of printed and manuscript materials relating to the southern United States; and foundation grants permitted early joint purchases, with the University of North Carolina, of Latin American materials and books on the Negro. Other grants encouraged the purchase, for one or the other of the libraries, of important research items needed in the region but not at Duke or North Carolina or available in any nearby college or university library.

Some of the Library's special collections of materials, which in every research library provide unique strength in the fields they cover, are described briefly below.

Trent Collection of Walt Whitman. This collection of the distinguished American poet, Walt Whitman, was presented to the university in 1942 by Dr. and Mrs. Josiah C. Trent in honor of their daughters. The printed volumes include all of the first editions of Whitman's work. The manuscripts — 200 Whitman manuscripts and 400 letters written by the poet, his relatives, and friends — make this the strongest Whitman manuscripts resource to be found in any academic library. Sheet music, photographs, clippings, periodical articles, and miscellanea round out the collection.

Josiah C. Trent Collection in the History of Medicine. The 4,000 books in this collection include many of the great medical classics in the printed history of medicine. Among the 2,500 manuscripts are letters and papers of distinguished pioneers in medicine such as Benjamin Waterhouse, eighteenth century New England doctor who introduced the practice of vaccination in this country; Benjamin Rush, Surgeon General during the American Revolution; and Walter Reed, discoverer of insect transmission of yellow fever. The private library of Dr. Josiah C. Trent, it was pre-

sented to the university in 1956 for the Medical Center Library by Mrs. James H. Semans in memory of Dr. Trent, her late husband.

George Washington Flowers Memorial Collection of Southern America. Begun more than 40 years ago with the financial support of the Flowers family, continued development of the collection has been assured by generous bequests of William W. Flowers, late chairman of the board of Liggett & Myers Tobacco Company, and Robert L. Flowers, late president of Duke University. Now containing 75,000 books, 2,500,000 manuscripts, and many thousands of broadsides, maps, newspapers, and photographs bearing upon the history and culture of the southern states, it is one of the strongest resources available anywhere for study of the South.

Confederate Imprints. Publications which emanated from the southern states that seceded from the Union have been brought together to form here a distinguished collection of southern imprints for the years 1861–1865. The number so identified now totals 3,600 and includes monographs, reports, almanacs, catalogs, official papers, sheet music, government publications, and broadsides.

Baker Collection of Wesleyana and British Methodism. A lifetime of collecting by a distinguished scholar, Professor Frank Baker, is represented in this collection which contains 13,500 volumes and 4,000 manuscripts and documents relating to John Wesley and British Methodism. It is the outstanding Methodist collection in the Western Hemisphere. The writings of John and Charles Wesley are represented by 1,500 editions, about one-half of those known to exist; 300 are first editions and ten have hitherto been unreported.

Perez de Velasco Collection. All phases of Latin American life are covered in this distinguished collection of 3,000 titles which was the private library of the late Perez de Velasco of Lima, Peru.

Gustav Lanson Collection. A working library of 11,000 volumes, this collection was brought together by Professor Gustav Lanson, a noted French critic and scholar. It is rich in standard works of modern French authors and in literary criticism.

Greek and Latin Manuscripts. Every century from the eleventh through the seventeenth is represented in the library's collection of forty-five Greek manuscripts. Predominantly religious texts, the items include hymnals, music, lectionaries, New Testament, and canonical books used in religious and studious pursuits by priests, monks, cantors, theologians, and lay members of the church.

The collection of 116 Latin manuscripts begins with the tenth century and includes texts of Cicero, Ovid, Plato, various books of the Old and New Testament, and an impressive list of others of interest to classical, medieval, and renaissance scholars.

Paul Hamilton Hayne. The 1800-volume personal library of Paul Hamilton Hayne, the nineteenth century South Carolina poet, and his correspondence of more than 4,000 letters to or from members of his family and friends.

Philippine Collection. Virtually all phases of Philippine affairs are represented in the collection of more than 5,000 books, pamphlets, and manuscripts which was the private library of the late James A. Robertson, pioneer editor of the *Hispanic American Historical Review* and editor of the fifty-five volume monumental collection of source materials — *The Philippine Islands, 1493–1898.*

Mazzoni Collection. The late Professor Guido Mazzoni of Florence, Italy, built this collection of Italian literature which contains 23,000 volumes and 67,000 pamphlets. His private working library, the collection is particularly strong in the Renaissance Period and in the nineteenth century.

William B. Hamilton Collection. A collection of British manuscripts and personal papers presented to the library over a period of years by Professor William B. Hamilton who has played a prominent role in building the Library for 30 years or more. The British manuscripts represent political, diplomatic, colonial, military, naval, ecclesiastical, economic, and literary interests from the late eighteenth century and include papers of John Backhouse, George William Barrington-Seventh Viscount Barrington, George Douglas Campbell-Eighth Duke of Argyll, William Eden-First Baron Auckland, John Fane-Eleventh Earl of Westmorland, John Nicholas Fazakerley, Sir Almeric William FitzRoy, Charles Alexander Gore, Townsend Monckton Hall, Henry Labouchere-First Baron Taunton, Sir Albert Houtum Schindler, and Lady Margaret Jane (Stuart-Wortley) Talbot. An endowment fund has been established by the donor to insure continued development of the collection.

The personal correspondence and other manuscripts relate in part to Professor Hamilton's research interests but principally to the operation and growth of the university as reflected in the papers of one who has participated actively in the work of committees and decision-making bodies of the faculty for three decades.

Strisower Collection. This private library of Professor Leo Strisower, at one time president of the Institut de Droit Internationale, contains more than 5,000 volumes in the fields of private and international law and international relations dating from the seventeenth century to the present.

Holl Collection. This private library of 8,000 volumes, strong in European Church history through the Reformation, belonged to the late Professor Karl Holl of the University of Berlin.

Baudissin Collection. Professor Graf von Baudissin of the University of Berlin assembled this collection of 2,500 volumes whose special strength is in Hebrew and the Old Testament.

The James A. Thomas Collection. Contains more than 2,000 volumes on all aspects of Chinese history and culture. Many fine books on Chinese painting and art in its many forms are included in this collection given during the 1920s and 1930s by Mr. Thomas of White Plains, New York, a friend and business associate of Mr. James Buchanan Duke.

Utopian Literature. About 600 titles of Utopian literature are contained in this collection, most of which have been assembled by Professor Glenn Negley during 20 years of collecting. Among these fictional descriptions of ideal states and communities are the first editions of Campanella's *City of the Sun,* Swift's *Gulliver's Travels,* Formaleoni's *Caterin Zeno,* and early editions (1615 and 1631) of More's *Utopia.* A new catalog of the collection is being published.

Robert Frost. The Reverend George Brinkmann Ehlhardt presented to the Library in 1947 this collection of limited and first editions, ephemera, and association items, including all of the poems of Robert Frost. Many of the items are autographed.

Stevenson Collection of Canadian Literature. This collection of 500 volumes, assembled by Professor Lionel Stevenson, is strong in poetry, but contains also fiction and literary history and criticism. Most of the major Canadian writers are represented.

Emblem Books. The collection of emblemata, consisting of more than 210 titles, is one of the significant collections of emblem titles in the country. It serves not only the disciplines of art and architecture, but also literature, theology, philosophy, and even the social sciences. During the sixteenth and seventeenth centuries the characteristic emblem book with its picture, motto, and verse was a common source of reference for the orator, painter, sculptor, preacher, and the common man who was entertained and taught by these literary curiosities.

Ralph Waldo Emerson. Assembled by the noted collector and bibliophile Carroll A. Wilson, this collection contains first editions of all the books by Emerson, a large number of reports of individual orations and essays, as well as the English editions which for one reason or another are valued by collectors. Many of the items are copies inscribed by the author to friends, among them William H. Furness, Charles Eliot Norton, Edmund Hosmer, and Coventry Patmore. Inserted in several of the books are autographed letters to interesting people, among them George Eliot and Wendell Phillips.

A Coleridge Collection of the editions of Coleridge's works which appeared between 1820 and 1860. Many of them are first editions. The collection also contains volumes edited by Coleridge, association items, and a variety of supplementary materials of interest to Coleridge scholars. Of great interest and value are the marginalia.

J. Walter Lambeth Collection. Books designed "to promote international understanding" have been brought together with a capital gift from the late Congressman Lambeth of Thomasville, North Carolina. The collection was established by Mr. Lambeth in 1957 and its continued development is assured by an endowment fund.

Walter de la Mare. The Robert W. Christ Collection of Walter de la Mare contains most of the titles by that author as well as those edited by him. Among the fifty-four titles of de la Mare's works are his ghost stories, rhymes, and poetry, nearly all of which are first editions and many of which are signed by the author. Other than his own literary orations, the collection includes books of poetry edited and compiled by de la Mare, and a number for which he wrote introductions.

Commonwealth Countries. Establishment of the Commonwealth Studies Center in 1955 led immediately to increased emphasis on acquisition of material from the Commonwealth countries, at first from Canada, Australia, New Zealand, Nigeria, Ghana, the Rhodesias and South Africa, then India-Pakistan, and, more recently, from Ceylon and Malaya. The acquisitions program has placed particular emphasis upon public documents, with the result that the university's holdings in primary source materials have been greatly strengthened.

The library's collection of secondary materials, already reasonably strong in several Commonwealth countries when the Studies Center was established, has been developed at an accelerated pace. Its holdings of current monographs, newspapers,

journals, and periodicals therefore constitute, with the primary materials, a strong resource for teaching and research in the area of Commonwealth countries.

A selected list of the library's holdings of selected official publications and serials of the British Commonwealth has been published.

The Socialist Party of America. The papers of the Socialist Party of the United States of America number about 300,000 manuscripts, pamphlets, leaflets, broadsides, periodicals, newspapers, and photographs. They include correspondence of national secretaries, minutes of national committees, resolutions, and convention materials; the papers of Socialist organizations in the various states and those of the Young People's Socialist League. Of interest are smaller files of manuscripts pertaining to such movements in the United States and abroad as Communism, State Ownership, Pacifism, Totalitarianism, and Civil Liberties and Civil Rights. Among the papers pertaining to individuals is a notable group of letters and writings by Norman Thomas.

The University Libraries, excluding those of Law and the Medical Center, are administered by the university librarian and a staff of 184. (The Law and Medical Center Libraries are operated on the budgets of those schools under the direction of librarians directly responsible to the deans of the schools.) The William R. Perkins Library, the central library of the university, is organized under four divisions: Technical Services, Readers' Services, Manuscripts, and Rare Books. Technical Services and Readers' Services are further divided to provide special staffs for Acquisitions, Serials, Cataloging, Receiving and Shipping, Lending, Reference, Documents and Maps, Photographic Services, Newspapers and Microforms, and the Undergraduate Library. Technical Services are directed by the assistant librarian, and Readers' Services by the associate librarian who is also responsible for personnel.

The books are classified by the Dewey Decimal Classification system. A single dictionary card catalog was abandoned about 25 years ago in favor of two catalogs, author-title and subject.

The library thus far has employed automation in its procedures to only a limited degree. A systems analyst, a programmer, and two keypunch operators form the staff created in 1968 in this division of the library. The serials are now being listed on tape with holdings. Programs for acquisitions and accounting are being developed, after which cataloging will be studied. It is unlikely that other processes will be automated or studied in the immediate future.

A library committee was created in 1894 and continued with little change in function until it was superseded by the Library Council in 1928. An advisory body, the council is composed of nine members of the faculty, each appointed by the president for a 3-year term, two students and the university librarian. The council's principal functions are to approve the annual book and binding budget, advise about the expenditure of certain research funds, about library policy, and such other matters as the university librarian brings before it.

Dr. Benjamin E. Powell, who first joined the Duke University Library staff in 1927, after serving as director of libraries at the University of Missouri from 1937–

1946, returned to become university librarian in 1946. Dr. Powell was president of the American Library Association in 1959–1960.

Direction of the library from 1928 to 1941 was in the hands of a faculty director of libraries. Dr. W. K. Boyd, Professor of History, was director until 1934 when he was succeeded by Dr. Harvie Branscomb, Professor of Theology. The director gave attention to coordinating the growth and activities of all the libraries, and although Law and Medicine were relatively independent and on separate budgets, a sound philosophy of cooperation and service was developed which has enabled the libraries to serve the university community and the region more usefully. A Union Catalog of holdings of all the libraries was established early, and duplication of materials has been held to a minimum. During this period the well-known cooperative library program with nearby University of North Carolina was initiated. When the director resigned in 1941, direction of the library was returned to the librarian, whose title became university librarian.

Cooperation with the University of North Carolina began in 1934 with a grant from the General Education Board for photographing and exchanging author cards of the two libraries. With essential information available about book and journal holdings on each campus, mutual agreements were developed that greatly extended the resources of the libraries while increasing their usefulness. For example, certain distinctive subject and geographic areas were accepted by each institution for development; and agreements were reached that rare, expensive, and infrequently needed materials in any field are not to be duplicated except in unusual cases. These agreements attracted to the two institutions foundation funds already mentioned elsewhere. Reciprocal lending policies granting faculty and graduate students of each institution easy access to the library of the other were formulated early and have much increased the utility of the two collections.

The first separate library building for what is now Duke University was given by James Buchanan Duke in 1903. Before the building was completed he also gave $10,000 for books. His generosity inspired others with the result that in the years immediately following several modest endowment funds were created and some excellent book collections received by gift. That first building was removed in 1927 when construction of new buildings for the Woman's College of Duke University, which was to occupy the old campus, was completed. Among the new buildings was a library in which most of the books of the university were housed from 1927 to 1930.

The General Library Building on the West Campus, the original part of the present Perkins Library, was occupied in the fall of 1930. A gift of $1,500,000 from Mrs. Mary Duke Biddle permitted that building to be doubled in size in 1947. A new research library building, attached to that structure, was completed in 1969 at a cost of $7,500,000. With the renovated old building, which will serve primarily as an undergraduate library, the electrically heated and air conditioned Perkins Library complex will contain about 350,000 gross square feet of floor space, have a stack capacity of 2,500,000 volumes and reading stations for 2,100. Special facilities are provided in the new building for manuscripts, newspapers and microforms, documents and maps, photographic services, and for the use of audiovisual materials.

Study-teaching-research space in the stacks includes thirteen departmental study-lounge rooms for the departments in the humanities and social sciences that grant doctorates; seminar rooms; typing rooms; reading islands, each seating from eight to twenty; and 511 carrels, 160 of which are enclosed. The Rare Books Department will remain in the old building but is being expanded to provide new rooms for special collections, for research, study, and administration and new shelf space for 120,000 volumes.

The Divinity Library will move into enlarged and renovated quarters in 1970, which will provide 275 reading stations and a shelf capacity of 250,000 volumes. A new Chemistry Library containing 102 seats and shelf space for 45,000 volumes was opened early in 1969. A recently constructed Law Building contains 336 seats and shelf capacity for 250,000 volumes. Present capacity of all University Libraries is 3,500,000 volumes and about 3,400 readers.

An organization of the Friends of the Library was formalized in 1935. It is directed by an Executive Committee of twenty-five, elected by the 500 members, and presided over by a chairman elected by and from the Executive Committee. The Executive Committee meets annually in the fall, the Friends in the spring, usually for dinner and a program. The Friends publication, *Library Notes,* has appeared occasionally since 1935.

BENJAMIN EDWARD POWELL

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EAST AFRICA, LIBRARY DEVELOPMENT IN

"East Africa" is a term widely used for that area extending from Sudan and Ethiopia in the north to the Zambesi River in the south. This part of Africa includes Kenya, Uganda, Tanzania, and Rowanda. The following article deals with the first two countries. For Tanzania and Rowanda, the reader is referred to the individual articles covering them alphabetically in later volumes.

The development of libraries in East Africa follows a pattern also to be found in the other African countries that at one time were under British influence and control. The specialized libraries founded in the various research institutions were the first ones of any size and were in a few cases favored with sufficient funds to allow them over the years to build up excellent collections in the subjects relevant to the research carried on. These organizations were either government departments or were institutions developed by the East African High Commission (later the East African Common Services Organization, and now the East African Community), which was created to control a number of services common to the three countries of East Africa.

Public library services developed considerably later than these, and in the beginning consisted of subscription libraries in the larger towns, notably Nairobi in Kenya and Kampala in Uganda. These served the white colonial population almost exclusively and were very limited in scope. The East African Literature Bureau, founded in 1948, was formed to publish suitable reading material for East Africa and encourage original writing by the indigenous population, but it also provided a rudimentary library service, mainly to outlying centers or individuals by postal lending and book boxes. This service was eventually taken over by the national library services in each country, but before this took place college collections had been founded and had expanded at a much greater rate than was the case with any other libraries. The oldest, Makerere College, was founded in 1949 but developed most rapidly from the late fifties onwards. On the formation of the University of East Africa in 1962. Uni-

versity College Nairobi and University College Dar es Salaam were created. The former was based on the Nairobi Technical College and had a library of reasonable size; Dar es Salaam and its library were completely new.

It was not until the early 1960s that the National Library Services, providing public library programs, came into being. A survey of the three countries, Kenya, Uganda, and Tanzania, was carried out by Sidney Hockey, who had been responsible for the formation of the Library Services in the Caribbean in the 1950s. His report, published in 1961, formed the basis on which the three National Library Services in East Africa were formed. Each, however, developed independently and not always exactly in the way or to the extent that the Report had recommended. In general, the process was one of taking over existing subscription libraries while developing services in a variety of ways to areas not previously reached. Financially, the schemes are based on the principle of support by the local government with generous supplementation by the British Government through the British Council.

From the beginning, the majority of the staffing, certainly in senior positions, has been by expatriates, mainly British. Every effort has been made in all libraries to train East Africans to take responsible posts. Much was done by in-training, notably in the University College at Nairobi, and by sending suitably qualified persons to the United Kingdom or the United States for full time courses. This was felt to be inadequate, and in 1961 UNESCO aid was received to begin a training course at Makerere College. This took the form of a 6-month full-time Certificate course designed to provide library assistants with a basic training in library techniques. Under the sponsorship of the Rockefeller Foundation, a conference on library training was held in Nairobi in 1961, the school at Makerere and its certificate were approved, and a more advanced Diploma course was recommended. This course, designed to be the highest East African qualification, was begun in 1966. However, in addition to this local training, suitable applicants continued to be sent to training colleges overseas.

Uganda has a number of institutions supported by the East African Community, having been founded under the original East African High Commission. From the library point of view, the most important of these is the Virus Research Institute at Entebbe. With a stock of approximately 25,000 volumes, there is, as with a majority of such libraries, an emphasis on the periodical collection, and this has been built up very strongly and is constantly being expanded. Smaller specialized libraries are to be found in the East African Fisheries Research Organisation and the Animal Health Research Centre, both supported by the East African Community.

Of the Uganda Government Department libraries, the collection at the Agriculture Library at Kawanda is the strongest research tool, and is closely followed by that of the Geological Survey. The Development Corporation has more recently built up a good library, and equally important is the Law School at Entebbe which is gradually creating a working collection of statutes and laws. An older and more comprehensive law library is that at the High Court in Kampala. A very important special library of a scientific nature is that of the Namulonge Cotton Research Station, which was originally one of the stations of the Cotton Research Board, but is now a Uganda Government body.

The most important libraries connected with higher education are those at Makerere University College (Makerere University from 1970) and at the newer Uganda Technical College, formerly the Kampala Technical Institute. The Library of Makerere developed as a college library after World War II, and has grown steadily to a present size of 130,000 volumes, with an excellent periodical and government document collection, housed in a very attractive modern building. It has two sub-libraries; a fine medical library situated with the College's Medical School at Mulago, also in its own building of recent construction, and the National Institute of Education Library. Within the attached Makerere Institute of Social Research is a small but specialized collection of material on anthropology and economics.

The Technical College Library has a basic college collection and a growing specialized collection of technology material, now totaling about 20,000 volumes with some 200 periodicals taken currently. The library is designed for use not only by the college but by the local community, since the library is intended to act as the country's main technological library and technical information center.

There are, of course, numerous other libraries within the country. Several religious institutions have collections appropriate to the instruction they give, notably Bishop Tucker College and the Katigondo Seminary. The Uganda Society possesses an excellent collection of material related to Uganda, and the United States Information Service has a considerable library at its offices in Kampala.

The East African Literature Bureau ran its service in Uganda for many years, having a central reference library and distribution center in Kampala, from which books were circulated to outlying centers throughout the country by means of book boxes. The National Service merged this with the Kampala and other municipal subscription libraries, and an integrated system is being built up to provide as extensive a public library system for the country as possible. The central library and administration is in Kampala and there are branches throughout the country. The British Council assists in the running of some of the branches, and the service also incorporates a number of small general collections which at one time were maintained by the council in the centers of population. Use is made of mobile libraries for the more scattered population, but the relatively small number of concentrated population areas and the large number of languages, for many of which there is little printed matter, present great difficulties for the service.

Kenya has many more libraries than Uganda, older and therefore larger. Again, the earliest were the libraries of research institutions. That of the East African Agriculture and Forestry Research Organisation and Veterinary Research Organisation at Kabete is one of the largest and derives from the old German Amani station formed early in the century in Tanganyika. Comparatively well equipped, staffed, and supported financially, it has an excellent collection of books and periodicals in the subjects relevant to the organization's research. The Library of the East African Meteorologist Department is also noteworthy, especially in material relevant to tropical meteorology. East African Railways has a small library but a very interesting and unique collection of archives and records of railway development in East Africa.

Of the Kenya Government Departments, the Agricultural and Veterinary Depart-

ments have good workable research collections, long established and well maintained. They, like many East African Libraries, have benefited from outside grants, notably from the Rockefeller Foundation. The Veterinary Department Library is combined with the University College Veterinary School Library, since both institutions are located together at Kabete near Nairobi. The main Agriculture Library is situated in Nairobi, but several small specialized research collections affiliated to the main library are located at outlier research stations.

In the medical field Nairobi has a very fine collection at the Wellcome Medical Library, maintained by the Medical Research Laboratories, which has received considerable financial help from overseas.

The libraries of academic institutions developed later but grew at a faster rate. The University College Nairobi has built up a good college collection over the last few years, based on that of the former Gandhi Memorial College and supplemented by several specialized collections deposited by local societies and associations. More recent still is the library of the Kenya Institute of Administration, originally founded and built up under the auspices of Syracuse University of New York State. This library, too, situated in a pleasant building on the campus some miles from Nairobi, has grown rapidly by East African standards.

In the usual pattern, the public library service came last. Nairobi has a long established subscription library, the MacMillan Library, named after Lady MacMillan who founded it. With a fine collection of Africana as well as a good general collection, it now forms part of the National Library Service of Kenya, which since 1964 has been developed throughout the country on the same principles as those of Uganda.

E. J. BELTON

EAST AFRICAN SCHOOL OF LIBRARIANSHIP

In 1960 the British Council turned its attention to the development of library services in East Africa under the dynamic leadership of its Libraries Organiser in East Africa, Sydney W. Hockey. The first tangible sign of Hockey's furrowing this new field in East Africa came with his publication *Development of Library Services in East Africa: A Report Submitted to the Governments of East Africa* in December 1960. In his report Hockey pleaded for the establishment of a library school on a regional basis as an integral part of a plan for the development of libraries in East Africa. An advisory committee was appointed by the three East African governments to consider this, but it was felt that a library school was beyond the financial capacities of the three governments at that time, and that funds could only be found for establishing new national library services.

Between 1960 and 1963 Hockey made untiring efforts to persuade the British

Council that, having fathered the idea of aiding East Africa to establish national library services, it should also help in founding the library school. However, it fell to the Rockefeller Foundation to take the first step by financing a library training conference in Nairobi in 1963 in recognition of the need for providing facilities for training in the region.

The conference was attended by representatives of the three East African governments, prominent librarians, plus representatives of the overseas library organizations and UNESCO. The conference was held in April 1963 under the auspices of the Provisional Council of the University of East Africa. The conference set up a Working Party which recommended to the university and the three governments that a school of librarianship should be established under the auspices of the University of East Africa at one of its three constituent colleges at Dar es Salaam, Nairobi, and Kampala. The conference also decided that the school should conduct a Certificate Course for new entrants to the profession, and a Diploma Course, of 2 years duration, which would qualify successful candidates for professional posts in libraries.

There was a pioneering element in the establishment of the first school of librarianship to serve the needs of the entire region. Therefore it was not surprising that Makerere University College, Kampala, the oldest of the three constituent colleges, should have shown interest in offering the school its hospitality. Responding to this initiative, the University Senate delegated the organization and administration of the school to Makerere University College in September 1963. At the same time the university recommended to Makerere College that a committee be set up as the Council for Library Training in East Africa (CLTEA) for the general supervision of the school, and to coordinate with the Academic Board of the College and the University Senate. As a result of these developments UNESCO appointed Professor Knud Larsen of Denmark who had participated in the Nairobi Conference as Director of the East African School of Librarianship in 1963. UNESCO has assisted the school since then.

In September 1968 the East African Community set up a Working Party on Higher Education to consider the likelihood that the constituent colleges of the University of East Africa would be replaced by three or more separate universities after the end of the triennial planning period on June 30, 1970.

A memorandum was submitted to the Working Party by the director of the school in September 1968 urging it to allow the school to continue as a regional institution. The Working Party in its report stated that it did not wish to set down guide lines for specialization, and preferred to leave the future of the nonduplicated facilities for discussion among the proposed universities and governments through the agency of an Inter-University Committee to be set up after the establishment of the three independent universities. The Working Party, however, made a specific recommendation with regard to the school of librarianship which was subsequently accepted by the East African Community: "We recommend in the case of the professional training of librarians that the East African School of Librarianship at Makerere University College should continue to serve all three states on a regional

basis after the dissolution of the University of East Africa until the circumstances warrant it." This decision of the East African Community was further endorsed by the Visitation Committee to the Makerere University College before the college assumed the status of a national university on July 1, 1970.

The Working Party had recommended that the three universities should cooperate in providing and maintaining nonduplicated facilities such as the East African School of Librarianship. At present, however, it is not clear whether the three governments have accepted this recommendation of the Working Party for the capital development and maintenance of any nonduplicated facility. Thus the school enjoys the support of the three states of East Africa but it is being financed exclusively by Makerere University and the Uganda government.

Makerere University is composed of eight major faculties and four institutes. The School of Librarianship is now one of the four main institutes independent of the faculties. The general supervision of the school is entrusted to the CLTEA which has representatives from all the three countries of East Africa. This composition of CLTEA safeguards the status of the school as a regional institution. The functions of CLTEA are identical with those of a faculty board. But, as it is an independent body directly responsible to the Makerere University Senate, this arrangement ensures that the school has a certain degree of autonomy which simplifies the administrative procedures.

It will be seen from the brief account which follows of the aid received by the school in the early stages of its existence that the history of the school has been full of difficulties. These difficulties largely resulted from the number of agencies which each bore partial responsibility for the school, but none of them accepted complete control. The school might have developed more rapidly, instead of carrying on a tenuous existence, if it had been wholly financed by UNESCO or by any single external agency. However, judged from the nature and diversity of the aid, every single contribution has been useful and has helped the school to survive.

The British Council has aided the school in many ways since its foundation in 1963. This aid has taken the form of cash donation to meet office expenses in early stages of the school's existence, gifts of books for the school's professional library, expenses with regard to the students' attendance at biennial library conferences, and the award of scholarships to the students from each of the three states annually for library studies at the school. The last named aid continues and has been increased to help a little more with meeting demand. Finally, the British Council provided the services of a Visiting Lecturer in 1969 for a period of 2 years to ensure the school's success.

The Rockefeller Foundation financed the Nairobi Conference on Library Training in April 1963 and helped the school with a tutor and funds for secretarial assistance until December 1965.

Professor Larsen served the School of Librarianship for a period of 2 years. On his return to Denmark in 1965, Professor Larsen brought the school to the notice of the Danish Foreign Affairs Ministry which provided the school with a young librarian to serve as a lecturer in September 1965. In 1967, when the school was

faced with a serious staffing situation, the Danish government increased its financial assistance by providing a second lecturer for a period of 2 years. After 1969 the Danish government continued to provide the school with a lecturer on a bilateral basis until June 1971 when the aid given to the school came to an end. Professor Larsen also projected the needs of the school eloquently in his address to the Conference on Library Work in Africa held in Narkaping in August 1965, urging the Swedish librarians "to bring the school out of the deadlock by a quick rescue operation."

In 1967 the Swedish librarians and library readers raised Stg. £1,212 by voluntary contributions for the award of scholarship to the students as a gesture of their interest in the School of Librarianship. Two years later the school received a further gift of $6,575 (U.S.) from Sweden for the same purpose "as a proof of the importance which the Swedish public librarians put on the training offered by the School of Librarianship."

UNESCO has aided the school since it was established in 1963. The assistance has been limited largely to providing the director's salary and to funds for the purchase of books and equipment. Until 1967 the school was aided by UNESCO under the Country Programme of UNDP Technical Assistance. This program requires the host country to determine the priorities of the projects which it wishes to finance from UNDP funds allocated to the country for its development. It is therefore likely that the Uganda government asked only for the services of a director because of the pressure on its allocation for the development of other projects.

In 1967, however, realizing the slow growth of the school, UNESCO transferred the school from the UNDP Country Programme to the Regional Programme in order to plan assistance on a long-term basis according to its own assessment of the school's needs. In 1969–1970 UNESCO increased the allocation of funds for the purchase of equipment, raised the director's status to be compatible with the increasing responsibilities developed by the project, and provided funds for a fellowship for an East African citizen to be trained as director.

UNESCO's assistance to the school will be continued until end of 1972. The importance which UNESCO places on the progress of the school springs from UNESCO's theory that libraries manned by professional librarians have an essential role in developmental programs. UNESCO clearly entered the project under the Regional Programme in the hope that the school will be able to achieve its objectives as a regional institution.

By offering hospitality to the school in 1963, Makerere University College took the initiative in good faith. As the school was being set up because of the agreement among the East African governments, the college was hopeful that proportionate funds would be made available by the three countries as well as by a certain external agency because of its express interest in the project in 1963. But the arrangements for financing the school failed to materialize. Nevertheless, Makerere provided the school with an office and teaching accommodations, both of which were far from satisfactory, housing for the director and lecturers, and a

small amount of money to meet administrative expenses. In short, the school maintained a semblance of life with whatever support Makerere could offer coupled with uncertain bilateral aid from external agencies which provided lecturers for a limited period to enable the school to establish itself.

From the end of 1963 until July 1965 the school conducted only the Certificate Course in Library Studies, the teaching being undertaken by the director plus one lecturer provided by the Rockefeller Foundation. In July 1965 the school launched its first 2-year Diploma Course, although this had to be lengthened to a 3-year course as the students failed to meet the university's entrance qualifications and were required to spend an extra year reading General Studies. Nor did the students who joined the second Diploma Course in 1966 fare any better. The future of the school seemed to be in grave doubt at this time, and leaders of the library profession in East Africa continued to send their better apprentices abroad for library training. In short, the reputation of the school failed to be established during the difficult formative years.

In July 1967, however, Makerere made a beginning to provide the school with a financial structure by including it in the University of East Africa's triennial budget 1967–1970. The school's budget was grossly inadequate but its main purpose seemed to be to free the school from almost total dependence on external agencies for its existence. However, one encouraging feature of the school's budget, which was a sign eagerly awaited by foreign agencies, was the establishment of one post of lecturer. At the same time the fortunes of the school suffered a setback during the academic year 1967–1968 when the post of the UNESCO director remained vacant, and Makerere made an unsuccessful application to the government of Tanzania to move the school to University College, Dar es Salaam.

CLTEA had made a specific recommendation to the Makerere authorities that there should be a staff of six members for the Diploma Course alone. But it was obvious that the only way to convince the Makerere authorities of the school's future possibilities was to launch all of its programs in the first instance. At the beginning of the academic year 1968–1969, the strength of the staff consisted of two Danish lecturers financed by the Danish government, a British lecturer financed by Makerere, and the newly appointed UNESCO Director. Since then the strength of the teaching staff has varied from four to three members. However, since 1968–1969 the school has offered the two programs envisaged in the school's founding objectives in 1963 and the Introductory Library Studies Course.

Certificate Course in Library Studies. This is an intensive 6-month course intended to provide library assistants already employed in libraries with a knowledge of the basic techniques and routines, and has proved to be a most useful and popular course. The syllabus consists of classification and cataloging, bibliography and reference materials, and library administration and routines. The educational objective is to give the participants a general survey of the organization of libraries and to explain in a limited way the principles underlying the various techniques with emphasis on practical aspects of librarianship. The practical work includes use of the Abridged Dwewy Decimal Classification, broad acquaintance with the Anglo-

American Cataloguing Rules, and case studies in reference and bibliographical work. The school has trained 112 students as library assistants since June 1964 when the first group of students took their examination. Of the 112 students, thirty came from Kenya, two from Malawi, forty-four from Tanzania, thirty-three from Uganda, and three from Zambia. Current enrollment (1970–1971) for the Certificate Course is twenty-six students as against sixteen students in 1969–1970. The entry qualifications have been gradually raised and only those candidates who have passed the school certificate with five credits are now admitted to this course. In the more affluent societies training courses at this level are offered in technical colleges. Abolition of the Certificate Course has been recommended by CLTEA so that the school will realize its true purpose of offering only professional courses. The efforts made by the school to pursuade the three East African countries to take the responsibility for running this course on a national basis in established educational institutions have not borne fruit.

Diploma in Librarianship Course. The 2-year Diploma Course is offered to students possessing the general entrance requirements of the university. This course qualifies successful students as professional librarians. The main elements of the syllabus are libraries in their social setting, management of libraries, classification, cataloging, bibliography, and reference materials. These courses are general in nature with little subject specialization, although the needs of East African libraries are always borne in mind. An important feature of study is an individual project in which the students are required to attain a satisfactory standard before they are awarded the diploma. The subject of the project is elective within the curriculum of the diploma, and the student is required to work under the direction of a supervisor. The project tests the student's capacity for exact and patient study of his theme together with his ability to organize his thoughts logically by writing an acceptable paper. Thirty-two students have been awarded the diploma since 1968 when the first group of students took their final examination. Of the thirty-two students, ten came from Kenya, four from Tanzania, fifteen from Uganda, and three from Zambia. Enrollment in the Diploma Course for the current academic year (1970–1971) is twenty students as against five students in 1969–1970.

Introductory Library Studies Course. This course is given as a part of their education syllabus to all second year students studying for the degree of Bachelor of Education. The over-all objective is to demonstrate the place of the library in the school, to outline some of the elementary techniques used for inculcating the reading habit, and to teach the use of library materials to the pupils. It does not aim at producing teacher librarians because the students are not available for the longer period necessary for such a course. The course was given in 1968–1969 to sixty-seven students, in 1969–1970 to ninety-four students, and in 1970–1971 to 183 students.

The execution of full training programs with inadequate teacher strength and without the certainty of continuing assistance from bilateral sources since 1968–1969 has helped to focus the attention of the Makerere authorities on the needs for providing the school with a permanent staff and an adequate budget.

A Development Plan for the school for the triennium 1970–1973 was compiled on the basis of the actual and projected training programs, and on the clear understanding that it would be wrong to enter the new triennium relying on bilateral aid in the face of clear indications that such provisions was liable to cease at any time. The plan also pointed out that it was impossible to establish and maintain academic standards without continuity of staff.

The plan asked for the establishment of five posts for 1970–1971, six for 1971–1972, and seven for 1972–1973, which included provision for the director's post at the end of December 1972. The university authorities and the Uganda government have accepted the main arguments of the Development Plan, and have sanctioned five permanent posts and generous funds for part-time teachers, secretarial staff, office expenses, and stores and equipments beginning with the academic year 1970–1971.

The hope that the establishment of the posts would end the staffing crisis has proved illusory. Despite all the measures which the University Administration has taken to recruit the staff during the last 18 months, the school is still beset with the problem of filling the vacant posts.

It is recognized on all sides that no satisfactory solution to the future of an educational institution engaged in professional training is possible unless an African staff can be recruited. Two years ago the school was admitted to the Staff Development Programme of the university, and a vigorous search was made to select a suitable candidate for training as a library educationalist. At the same time a renewed effort was made to select a candidate for the award of a UNESCO Fellowship to train as a counterpart director or as a lecturer by advertising the fellowship on an East African basis. The school's efforts in both these directions were successful, and the two candidates went overseas in October 1971 for a minimum period of 1 year.

The school does not yet have its own quarters. UNESCO's committee on the evaluation of the regional offices, centers, and institutes it operates or aids in Africa, which visited the school in November 1967, observed in its report that "the administration of the School is housed in very inadequate premises which give the Director an office which is little larger than a cupboard."

Makerere has many pressing demands on its resources. Young departments like the School of Librarianship vie with each other for accommodations which might give them some degree of stability. Indeed, such is the pressure of accommodation that there is a standing allocation committee charged with the responsibility of resolving the claims of the various departments without permanent homes. Strenuous efforts have been made to improve the situation, and in October 1968 the school moved to the new Mathematics/Science Building; a vast improvement over its previous accommodations.

As funds for a building could not be forseen from Makerere's resources, efforts were made to pursuade a certain donor country to invest its resources in providing a capital grant for the school, but without success. Following this setback, negotiations were set in motion with another donor country which expressed interest in

providing a capital grant. After protracted correspondence and procedural difficulties, a formal application was made for the funds. Following this application, the country sent its library adviser to Kampala to hold discussion with various officials. However, the negotiations made no significant progress over considerable time, and now there is little optimism over the outcome.

Nearer home these efforts made a surprising impact in appropriate quarters, with the result that the Uganda government advanced a loan to Makerere University for the construction of the long awaited building. This favorable development is yet another proof of the recent concern for meeting the school's pressing needs and securing its future.

In addition to normal offices, seminar rooms, and lecture rooms, the building will provide functional quarters for the school's professional library which will serve as a "workshop" for the student librarians and, at the same time, as a model school library for teacher librarians.

Makerere University has probably the finest collection of books and periodicals on librarianship, bibliography, documentation, and information science in East Africa. The collection also includes multiple copies of textbooks on librarianship and is enriched by the school's departmental library which has been built up with funds from UNESCO and the British Council. All these collections are expected to be housed in the new premises.

It will be seen that the school has surmounted most of the difficulties which had impeded its progress. In the course of executing its programs it has had to pay close attention to defining the objectives of its programs, reviewing entrance qualifications, and effecting improvements in the existing syllabi and structure of examination schemes. But it would be idle to pretend that professional education in East Africa has been put on a firm basis.

One of the problems surrounding the development of professional education which had to be tackled immediately concerned the Diploma in Librarianship. Librarianship is a developing discipline in East Africa and its importance is generally being accepted, but this was not so in the first few years of the region's independence. It was therefore inevitable that in the beginning the school depended largely on the libraries to provide trainees. Accordingly the candidates meeting university entrance requirements and seeking admission to the Diploma Course were required to work as apprentices in a library for a year, which gave them practical experience, and then sent them to the School of Librarianship on leave of absence and met their training expenses by awarding them bursaries.

By and large, libraries have awakened to the need to improve their services by training their personnel. A number of libraries already in operation are being expanded, and new libraries are multiplying following large school development in education at all levels, expansion of industry and government departments, and increase in research facilities. Investigations and enquiries received from employers indicate that a majority of libraries are run by untrained librarians. Because of these factors, a considerable increase in enrollment in the Diploma Course in the coming years is visualized, but in the last 2 years the school had seen a pattern of declining enrollment.

Investigations have showed that either the national public library system and the university libraries in the three countries were unable to provide sufficient training funds in their budgets, or were unable to attract apprentices with the required university entrance qualifications. What was far more distressing, some libraries were sending their undergraduate trainees to the school for the 6-month Certificate Course and then were seeking to send them abroad to obtain equivalent professional qualification on government scholarships or on Technical Assistance Awards secured on a bilateral basis. Aside from the fact that this was a completely outmoded practice of qualifying as a professional librarian, this method placed the school completely at the mercy of libraries for its recruitment of candidates. Furthermore, this reduced the diploma to an in-service course, denied the opportunity to schoolleavers to enter the library profession unless they served as apprentices in a library, and placed a heavy responsibility on the libraries to preselect trainees of university entrance qualifications and provide funds for their professional training. This method also left out government libraries and other types of libraries because these libraries, unlike the public libraries and the university libraries, have no system of setting aside funds for training librarians, or have no suitable library workers whom they would like to sponsor for training, or cannot afford the luxury of waiting for 2 years for a qualified librarian.

To give the fresh school-leavers the opportunity to take up the library profession and thereby provide the trained manpower needed for the development of libraries, Makerere University has abolished library experience as a prerequisite for entering the Diploma Course during the current academic year (1971–1972). This fulfills both a need and an ideal enshrined in the constitution of democratic societies everywhere that all citizens must be given the opportunity to exercise a choice in the selection of their profession. The trend in declining enrollment seems to have been arrested. The current enrollment is twenty students against five students last year, and as many as nine out of the twenty students are new entrants for whom the school will arrange specially devised and supervised library practice as part of their training program.

One can only hope that the gains made by the school in pursuading the governments not to award overseas scholarships for undergraduate training in librarianship, as the East African School of Librarianship exists solely for this purpose, will not be destroyed. Aside from the fact that it is naturally against the best interests of the governments of the region to utilize their overseas scholarships for courses which are available locally, it should be obvious that if the school does not get enough candidates for its major program, the much needed expansion of library services will remain an idle dream.

A further difficulty which has hampered the progress of the school relates to the problem of securing bursaries for the students. All three governments have worked out priorities for the allocation of funds for the award of bursaries to students in different subject fields. The school has had to engage in the task of persuading the governments to be more generous and far sighted in allocating bursaries for librarianship. For the first time (1971–1972) the school has experienced little diffi-

culty in securing bursaries for its students. However, it is impossible to say whether this can be attributed to the action taken by the school unless more is learned about the policies of the three governments in this matter.

One of the programs which the school wishes to introduce in the very near future is a full-time course for teacher librarians because the one-term Introductory Library Studies Course given to the prospective teachers at the Faculty of Education is not designed to equip the students to take a job as a teacher librarian. It is generally agreed that the most effective method of raising the standard of secondary education is to improve and develop sound library service by placing it under the charge of qualified teacher librarians. There is a great need to improve the competence of teacher librarians now in service who lack library qualifications.

The Ministries of Education are the official organizations in the three countries of East Africa which look after the development of the school and the teacher training colleges. It is an almost universal practice that school libraries are looked after by the same organization which looks after the country's schools. The School of Librarianship plans to organize a full-time course in school librarianship of a standard comparable to similar courses which lead to a Teacher Librarians Certificate, with the active cooperation of the Ministry of Education.

The school has been anxious to review its existing training programs; expand the school's functions to include special courses of short duration in public, university, and special librarianship for those who have received basic professional education; and above all to introduce postgraduate training in librarianship.

The author has canvassed support for professional training of graduates since joining Makerere in July 1968. The library profession has universally become a graduate profession. This trend has already established itself in two of the West African universities in pursuance of the decisions taken at the Ibadan Seminar on the Development of Public Libraries in Africa held in 1953. Apart from the fact that this is a natural extension of the work of the school, the preference for graduate librarians is now being reflected in the recruitment policies of the national and university library services for which candidates are being sent abroad.

Before Makerere University College assumed the status of a national university on July 1, 1970, both the Visitation Committee to the College set up by the president of Uganda and the Council of the College had lent the weight of their authority by commending the proposal for professional training of graduates to Makerere University. In 1971 the Council for Library Training in East Africa approved the proposal in principle and observed that the school, having achieved a satisfactory permanent basis, should enter a new phase of its development with the end object of providing courses at all levels.

In the author's opinion the future success of the school will depend upon how soon it can address itself to the task of introducing radical changes in the pattern of library education more appropriate to the library personnel requirements of East Africa. The School of Librarianship has come to stay. The school will soon have its own building. It seems unlikely that the full establishment of five provided in the school's triennial budget (1970–1973) will be appointed from local librarians

in the foreseeable feature, and the school will continue to rely on an expatriate staff to conduct courses for several years to come. But once the staffing problem is resolved with a mixture of indigenous and expatriate staff, all holding posts established by Makerere, and the supply of students as direct entrants continues, then the future of the East African School of Librarianship should be assured, and it should play a most important role in the future development of librarianship in East Africa.

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S. S. SAITH

EASTERN COLLEGE LIBRARIANS, CONFERENCE OF

One of the more popular fixtures on the American library calendar is the annual Conference of Eastern College Librarians, traditionally held on the Saturday after Thanksgiving at Columbia University in New York City.

Inaugurated in 1912, the conference came in response to a well-defined need. Although the American Library Association had long since included a College and Reference Libraries section, the group met but once a year and often at distant locations. Eastern librarians wanted a forum of their own that would be regularly accessible, in money as well as mileage. They had the precedents for it, moreover; similar forums already existed in New England and the Midwest.

But other circumstances favored the undertaking, too. By 1912 the number of colleges and universities in America was rapidly increasing with a corresponding rise in student enrollments. The old textbook method of instruction was giving way to more liberal methods. The day of electives had arrived and that of doctoral seminars, too. Equally important, most universities had come to recognize their research responsibilities and with them the need for strong research collections. In short, the time was ripe for such a meeting.

The librarians were equally clear on the kind of meeting that would best answer their needs. It was one that would be short on procedure and long on substance, one that would send them home armed with fresh ideas and new techniques for doing their job better. All then that remained was to establish the meeting, and with the endorsement of the New York Library Association this was soon done. On Saturday, November 31, 1912, the new conference met for the first time. And that was in Earl Hall, the little red brick structure which then as now served Columbia as a religious and social center.

A committee of four planned the meeting. These included Willard Austen, Reference Librarian of Cornell University, as chairman; William Coolidge Lane, Harvard College Librarian; Miss Mary Letitia Jones, librarian of Bryn Mawr; and Dr. William Dawson Johnston, formerly of the Library of Congress and then librarian of Columbia. The four planned well. The program they developed set the pattern that conference meetings have followed ever since.

It was a 1-day program of morning and afternoon sessions with a moderator and speakers for each. In the morning session over which Lane presided three men were heard. Willard Austen and Dr. Kendrick C. Babcock, Specialist in Higher Education, U. S. Bureau of Education, spoke on "Bibliographic Instruction in Colleges," and Dr. Harry L. Koopman of Brown, on "A New Way to Deal with Old Books."

In the afternoon Dr. Ernest C. Richardson, librarian of Princeton, presided. At this session Dr. T. F. Crane, acting president of Cornell, spoke on "The Library in Relation to Other Departments of the University;" Andrew Keogh, librarian at Yale, on "The Bibliographic Value of the Syllabus;" and Frederick C. Hicks of Columbia, on "Inter-Library Loans."

Little more is known of the first meeting except that forty-six people attended it and went away well pleased. But already it contained a number of elements that

promised enduring popularity. Among them were outstanding men on timely topics (outstanding women would come shortly, Miss Amy L. Reed of Vassar in 1913, and Miss Isadore G. Mudge, reference librarian of Columbia in 1914); a stimulating 1-day session; an opportunity to see old friends and make new ones; the convenience of Columbia; the pleasant tingle of New York City on a long holiday week-end; and an altogether justifiable break from professional routine at exactly the right time in the academic year.

But soon the conference would add other highly propitious elements, too: informality (it was always to be a stickler for that), free and easy discussion, and near total freedom from business and committee work. Officers, minutes, membership rosters, published transactions, constitution, by-laws, money mulcts in the form of dues — all these it left to the more orthodox conferences while daring to be different. It also jealously guarded its independent status. The idea of a merger only once came up and was as quickly discarded.

The Eastern College Conference soon developed a reputation for large liberality, too. Despite the restrictions implicit in its name, it was never to be a conference solely of *Eastern* librarians. Librarians might come, as they frequently did, from all parts of the United States as well as from Canada, Europe, and the Orient and be assured of a warm welcome. And the same applied to other than college librarians. University librarians had been there from the beginning, and soon the conference was attracting all manner of other librarians — theological, medical, government, business and commerce, and college of pharmacy librarians, to mention but a few.

No conference, of course, can be better than its programs and speakers. These are the ultimate test. And if annual attendance is any index, the conference has consistently distinguished itself on this front as well. Asked to explain the magnetic pull it has exerted year after year, one longtime participant gave this answer: "The Eastern Conference has always been a foreshadowing. Not only has it kept abreast of most of the important things librarians were talking about over the years but often well ahead of them."

Many examples of its prophetic powers might be given. In 1915, all of 15 years before the great omnibus wrought by Winifred Gregory, an unidentified speaker called for a union list of serials. In 1921 James Gerould of Princeton urged the research libraries of America to begin differentiating among the fields of their collecting. And this was over 20 years before the advent of the Farmington Plan. Again, library surveys were all but unheard of before Blanche Pritchard McCrum of Washington and Lee came and talked about them in 1938.

It remained, however, for Ralph R. Shaw, then librarian of the U.S. Department of Agriculture, to put on one of the more spectacular displays of prescience. In 1950, a full decade before the onset of information retrieval, he came to the rotunda in Low Library where the meeting that year was held and demonstrated his Rapid Selector.

Given the dynamism of Shaw, it may have been no coincidence what happened immediately after the demonstration. One of Florida's more severe hurricanes chose that precise moment to strike, tearing one of Low's big iron doors off its hinges, overturning a battery of tea canisters as they were being trundled up Low's steps,

and not only knocking poor Miss Constance Winchell to the sidewalk but also blackening both her eyes. Everything considered, one might well have wondered whether the hurricane was an Act of God or an Act of Shaw.

Along with forecasting the future, the conference has shown considerable fidelity to current issues and developments. It has discussed cooperation in almost all its advancing forms from interlibrary loans to union lists to library networks. It has talked about library administration, library architecture, and library standards. It explored photography near the dawn of its potentialities for libraries (the conference still has a few who were there when Andrew Keogh of Yale proudly wheeled his new Dexigraph Camera into the 1929 meeting to demonstrate its speed and accuracy in copying catalog cards). It then explored microphotography in 1937, Fremont Rider of Wesleyan taking that occasion among others to present his theory of exponential growth and to offer microfilm as an antidote.

In 1922 the momentous Williamson Report was published. This provided the conference with its theme in 1923 and since then education for librarianship has been a recurring topic. In 1962 Philip J. McNiff, then Harvard College Librarian, and others considered the burgeoning foreign area study programs and their effect on libraries. More recently, the conference has examined trends in books and book publishing; statewide library developments; national resources and services to college and research libraries; and the recruitment, training, utilization and status of non-professional librarians. Of special interest was another session devoted to the library as a teaching instrument and to the growing urgency of audiovisual equipment in the learning process.

Adding timeliness to the rest, one other source of the conference's continuing appeal should be mentioned. This has been its ability to arouse controversy. One such occasion veteran participants like to recall came in 1932 when Roger Howson, Columbia Librarian, chose to speak on the topic, "Must Catalogers be Robots?" An otherwise amiable man, Howson made very clear in that talk his long-harbored antipathy for catalogers. From this segment of his audience, not surprisingly, the response to the talk was outrage.

Scarcely less explosive in its effect was the appearance of Jacques Barzun in 1945. Taking as his title "A Scholar Looks at the Library," Mr. Barzun evidently spoke with more candor than diplomacy. Librarians came off in the talk as badly as the library. By all reports there was little peace in Harkness Auditorium for the rest of that meeting.

But surely no meeting has generated more heat than the one in 1968 on the subject of unions for libraries. Tempers both on the dais and off became explosive. As the discussion wore on, even friendships of many years' standing were subjected to an almost unbearable strain. It was not, indeed, until the meeting had adjourned to the School of Library Service lounge and until trays of refreshments had commenced their second and third rounds that tempers began to cool and something like a spirit of equanimity to be restored. Said one seasoned participant of the meeting with a special appetite for controversy: "clearly it was a superb job of topic selection."

Such successes, of course, cannot be guaranteed. And the same might be said of the entire future of the Conference of Eastern College Librarians, now well past middle age. But there are strong grounds of optimism nonetheless. A finer formula for conference longevity could hardly be imagined — informality, brevity, timeliness, Manhattan at Thanksgiving, and, of course, Morningside Heights.

HAROLD M. TURNER

ECONOMIC DEVELOPMENT LIBRARIES

An economic development library is a special library that is mission oriented. Its mission is to render a new type of information service not found within the traditional library environments. Economic development libraries are an outgrowth of "governmental programs to help developing countries organize and administer large scale action programs to deliver the fruits of new technologies to mass consumers (*1*).

Programs to improve the human condition began in the United States in the early 1940s with the United States technical programs in Latin America. The emphasis was on agriculture, education, and health. The United Nations Economic and Social Development Council advised member nations in 1946 that it would "Study the problem of furnishing economic, social and cultural advice to member nations deserving such assistance." Following World War II, 1948–1952, the emphasis of the Marshall Plan on the economic redevelopment of Europe and United States programs of technical cooperation in Africa, the Near East, and South Asia helped to enlarge the specialized information needs in this area. In 1949, the Point Four technical aid programs were started as a part of President Truman's doctrine to help the world's backward areas, and in 1950 the development of the Colombo Plan for economic development in Southeast Asia aided the thrust for library development for program support. The continued emphasis of United States foreign aid programs in the area of economic development led to the creation of the Agency for International Development in 1961, whose purpose was to carry out United States overseas programs for economic and technical assistance to less developed countries. The Peace Corps was also created in 1961. Its activities place volunteer men and women abroad in newly developed nations of the world, filling critical needs for skilled manpower. More recently there has been the Nixon Doctrine. Its central thesis is that the United States will participate in the development of allies and friends but will not participate in actually writing plans and programs. It will take a supporting role where it makes a real difference in United States interests.

The development of international financial mechanisms also aided the development of economic development libraries. Such institutions as the International Bank

for Reconstruction and Development in 1945, International Monetary Fund in 1945, International Finance Corporation in 1956, and International Development Association in 1960 added stimulus to growth in the field.

Economic development libraries have generally been defined as those concerned with problems of long- and short-term economic growth. As a consequence, these libraries are found in universities, government departments, and business organizations with significant international interests. Economic development libraries serve users in government policy and analysis; they collect statistical data, economic publications, and materials useful in analysis of the economies of countries. Many economic development libraries differ in specific orientation; some provide basic teaching-research support and are usually found in universities. Others supply information in support of international corporate interests. Governmental types reflect needs for information to serve the large-scale needs of specialized programs that result from federal legislative programs.

Lee Ash, in *Subject Collections* (2), lists under the subject heading "Economic Development," the following libraries as being so identifiable: Yale University, Economic Growth Center, New Haven, Connecticut; International Monetary Fund, International Bank for Reconstruction and Development; Joint Bank Fund Library, Washington, D.C.; National Planning Association Library, Washington, D.C.; U.S. Department of the Treasury, Treasury Department Library, Washington, D.C.; Library of International Relations, Chicago, Illinois; University of Pennsylvania, Lippincott; Library of the Wharton School, Philadelphia, Pennsylvania; McGill University, Redpath Library, Montreal, Quebec, Canada.

Mary T. Reynolds, in *Economic Development Libraries: Problems and Prospects* (3), lists economic development libraries that she had visited, including U.S. Department of State Library, Washington, D.C.; the New York Federal Reserve Library, New York, New York; U.N. Headquarters Library and Williams College Center for Development Economics. Any listing of economic development libraries is and will be incomplete. Many librarians list their collections in broad general terms and those collections often contain substantial amounts of materials that would be useful to the information needs of the Economic Development community.

Early phases of economic development rested on the 'gap thesis of development'—the proposition that existing American know-how can be supplied and would overcome a skills gap. This American know-how was to help eliminate those conditions that Gunnar Myrdal suggests when we speak of a country as underdeveloped:

> . . . that there is in that country a constellation of a great number of undesirable conditions for work and life: low outputs and income, unfavorable modes of production in many respects, low levels of living, unfavorable institutions stretching from those operating at state levels to those determining social and economic relations in the family and in the neighborhood (6).

This was also the Point Four approach. Changes in the approach to problems in the field has run from the "economy and efficiency" approach of the 1930s; to behavioral models which require the study of group interacting and interdependent individuals

possessing their own interests and demonstrating some ability to force management to take these interests into account; to quantitative and analytical models in which mathematical logic is used to optimize the performance of an organization, in cost effectiveness terms; and a fourth approach is the comparative study of administration and its emphasis on social and cultural ecology. The changing attitudes which in the beginning called for the application of conventional wisdom have been inadequate to unconventional problems.

The first economic development decade has just passed. The literature is presently filled with despair. The hope for impact of the practitioners of economic development has lost, for the time being, the traditional support of its largest supporter, the U. S. Government.

Economic development libraries have tried to assemble small, high quality collections for each country. This may seem like a reasonable goal to begin with, but it soon becomes unreasonable when one tries to acquire the materials from government agencies and specialized studies, limited in distribution and multilingual in nature. Many economic development libraries try to acquire long runs of statistical materials, others want the latest statistical and special studies only. Many of these materials are extremely specialized and require specialized personnel to handle. Professional staff must be multilingual and have subject specialization to operate effectively.

Budget support is always a critical problem but becomes an increasing one when these collections become large physically or budget support comes from a university department budget. The priorities for budget are not always high and present problems in long-term planning.

Assembling a staff to carry out these functions is a complicated task. With limited budgets, the library must provide a staff that has a background in economics, statistics, politics, sociology, public administration, development planning, computer and information sciences, and who also are multilingual. Since the field of economic development is relatively new, not many qualified people are available to fill these positions.

Acquisitions for a missiontype library is less complicated, but if a library seeks to be comprehensive it becomes a formidable task. Acquiring national plans, bank reports, and special studies from international agencies, government departments, and planning groups requires a constant search for fugitive materials. They arrive in almost any form from low-grade paper, poorly typed, and unbound to outsized formats. Traditional classification schemes are adequate for some materials; inadequate to others. Subject heading lists are a constant problem in a new and emerging field that has moved from an economic emphasis to a multidisciplinary one that now recognizes that the development plan requires development administrators with management techniques that result in plan implementation. And finally, it must be understood that no set of information tools is going to enable a user to make full use of the information flow unless it includes some means of digesting, condensing, evaluation, and repackaging materials into something comprehensible.

Despite the difficulty of dealing with the complex information needs of this community, some order could evolve. Each of these libraries should at least accept the

responsibility for local comprehensiveness. They should try to hold complete documentation for the local region they serve and comparative holdings if possible. For example, Pittsburgh might try to collect materials on cities of similar size in the Northeastern United States, Birmingham, England and Dusseldorf, Germany. An international information network might be established. Materials repackaging using microform for international distribution in reduced physical form would ease the acquisitions problem. The establishment of worldwide regional resource centers needs to be supported.

New opportunities appear on the horizon. The development of computer based information retrieval programs is now beginning. The Graduate School of Public and International Affairs, Department of Economic and Social Development, at the University of Pittsburgh is now beginning the development of a data base that will include input from course development in terms of abstracts and extracts from relevant periodical literature. Instructional television is adding a new dimension to training people for field work. Future plans call for sharing these tools for data bases developed by others in this field. The electronic exchange of these materials between various communities and libraries is now possible.

Economic development is a policy for the future. The world's political ideal consists of the prosperous and developing countries committing themselves to bringing about a form of international cooperation that will undertake the development of a world community of a higher order (4). The future task of economic development libraries is to accept the mission and respond.

A bibliography (5) of titles of value to an individual who must build an "Economic Development" collection is given below.

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NICHOLAS C. CARUSO

ECONOMICS LIBRARIES AND COLLECTIONS

"Economics libraries" can be both a generic term covering economic policy libraries and business libraries and a precise term reflecting the ambit and emphasis of the current discipline of economics. Political economy, as such, comes largely but not entirely within the scope of our definition; insofar as it deals with rational choices under conditions of certainty or uncertainty it is part of our concern, but when it deals with the politics of the possible, it begins to go beyond.

By the same token business as a discipline involves much that is clearly economics, yet when such aspects as the psychology of advertising are touched, the topic has moved to the unsettled 'frontier, and, consequently, somewhat away from the generally acknowledged home territory of the economics discipline.

Insofar as law libraries deal with the regulation of economic activities as they relate to individuals, households, private and semi-private and public production units, the line between economics and law is a matter of personal interpretation. One school of American economists (the Institutionalists) has, in the German and Italian tradition, argued for the great overlap of legal and economic topics. [The most comprehensive treatment of the evolution of the economics discipline in America is in the monumental Dorfman study (*3*).] Other economists, particularly those influenced by the nineteenth century Austrians and some the later twentieth century British economists, tend to view economics as dealing with abstract principles (rather than concrete, if logically less definable, institutions) and they tend to regard the overlap to be quite slight, if present at all. As a subject eco-

nomics has been in many European countries a part of the law faculty, emphasizing legislation and quoting legal authorities as effective determiners of economic practice: the corporation, certainly no small instrument of economic power, is noted as a legal fiction, a soulless person with a spectrum of legal rights, created by the state.

Economics has always touched upon the causes of and results emanating from technological change. While it is true that engineering libraries have not always been historically-oriented, it is nonetheless true that economists have, since the time of David Ricardo (1817) and Nassau Senior (after 1832), relied heavily upon perceptions of engineering progress to supplement all discussions of depreciation, obsolescence, and maintenance costs as an alternative to wage costs. The relatively recent discipline of Operations Research, as well as the somewhat older discipline of Industrial Engineering, share many interests with most production and distribution of goods and services economists. What is true of engineering is becoming true of public health and even the more restricted biology and medical libraries, where the rate of technological discovery has created social problems of production and allocation, areas long considered by economists as their home territory.

The line between economics library contents and history library contents is impossible to define since both disciplines offer carefully chartered tours in the disputed area. Both economists and historians are quantitatively as well as episode-oriented. Information, including both hard data series and sociological theories, are employed by both economists and historians. One can only conclude that a distinction between the two kinds of libraries cannot be drawn insofar as the two disciplines have not agreed whether economic history is *terra irredenta* or an internationalized zone. There are even those who consider it to be a "free state," with citizens who belong to neither the history nor the economics nation. Insofar as libraries serve a clientele, such self-limiting *economic historians* want libraries of their own. At the London School of Economics, while total independence has not been achieved, the fact is they have their own autonomous province, namely their own reading room.

While one could go on describing the "grey areas" of interdisciplinary relationships, suffice it to conclude this discussion with reference to the point that economics, once the love child of philosophy (out of a passing union paraded under the name of Moral Philosophy), has paid scant attention to that lineage. This historical connection aids in explaining why economics libraries usually do not provide contemporary information on a subject where they almost invariably supply eighteenth and nineteenth century material.

Most libraries are organized about a perception of research rather than teaching needs. The three principal classification systems used in economics libraries are the old Dewey Decimal system, the one developed by the Library of Congress, and the one much more recently evolved by the American Economic Association.

The Decimal Classification, developed by Melvil Dewey and first published in 1876, is used by the great majority of libraries. Yet, as a system it is not par-

ticularly adapted to the set of interdependencies of specialized economics collections (*13*, pp. 168–170). What is true of the Dewey Decimal system is also true, albeit perhaps slightly less, of its European adaptation, the Universal Decimal Classification, now sometimes (somewhat inaccurately) referred to as the British Standard 1000A:1961.

The Library of Congress Classification system has emerged as the most useful of the several developed by professional librarians. [Other classification systems considered as having special features believed at one time or another useful for economics libraries include Henry Evelyn Bliss Bibliographic Classification (1940–1953), J. D. Brown's Subject Classification, S. R. Rangathan's Colon Classification, and the (Harvard University) Classification of Business Literature (*13*, pp. 170 ff.).] Materials in economics are generally in the "H" group, or social sciences, although there could be an obvious overlap with the "J" group, Political Science. The basic rationale of the Library of Congress system is (as with the Dewey Decimal Classification) that like material should be grouped together; presumably a scholar looking for material would find it as he worked his way down the shelf of a good research library. In the "H" category there are 15 principal subcategories; but only nine are conventionally in the ambit of economists' concerns:

HA	Statistics
HB	Economic theory
HC	Economic history and conditions
HD	Economic history; agriculture and industries (including labor)
HE	Transportation and communication
HF	Commerce (general)
HG	Finance
HJ	Public finance
HM	[Sociology]
HN	[Social history]
HQ	[Family marriage. Home]
HS	[Associations; Secret Societies, Clubs. (But not including modern unions)]
HT	[Communities, Classes, Races]
HV	[Social pathology. Philanthropy]
HX	Socialism, Communism, Anarchism

There are two criticisms of this system which should be mentioned. The first strikes directly to the economic problem of storage and accessibility; it may be argued that because so much material has to be put on shelves, and as only one principal topic can be used for locational purposes, there is more reason to store by size than by subject. Consequently, it is both cheaper and wiser to place reliance on retrieval of references from computers rather than on the fact of the propinquity of similar books, Such a technological reform, if ominous to contemplate now (because it would require working over the millions of books in existence to improve our catalog subject files), will be even more horrendous to undertake in the future. The other criticism is that economics is a very dynamic topic and a 9-shot, basically one digit matrix designed in one decade will not

be particularly appropriate for another. The latter criticism quite obviously has occurred to a great many professional economists. At present, however, books in most research libraries are still largely cataloged according to the Library of Congress System.

One other system worth discussion was designed in the mid-1960s by a select committee of the American Economic Association and was grafted on to a revised version of the National Scientific Register. It was intended to replace a crude 17-pigeon hole classification system used by the association in its two quarterly publications and to reorganize a similar 700-pigeon hole system for articles organized at Yale University (in part for the association) by Professors John Perry Miller and Richard Ruggles.* The present American Economics Association classification system consists of a 3-digit 100-pigeon hole matrix, used in the association's quarterly *Journal of Economic Literature (JEL)* and a compatible 4-digit 300–400-pigeon hole matrix used in the *Index of Economic Articles, Series II*, for the period starting in 1969. The present system is found in the Appendix. The creation of a data bank of articles and essays, using the 4-digit system, is a responsibility of the editor of the *JEL;* there are plans for making the data bank available to library correspondent subscribers.

At present there are about 1,500 English language books printed on economics topics each year. While many libraries use Library of Congress proof sheets (as well as the comparable services provided by the British Museum and similar national libraries), there are other more systematically selective services. From 1954 until 1962 the Department of Political Economy of the Johns Hopkins University published quarterly an annotated listing of selected new books, *Economic Selections Lists* (Series One). [Copies of *Economics Selection Lists* (Series I and II) can be obtained from Micro Photo Division, Bell and Howell Co., 1700 Shaw Ave., Cleveland, Ohio 44112. All the books are classified by principal subject (according to a 17-pigeon hole classification).] In 1964 coverage was expanded and the service was transferred to the Department of Economics of the University of Pittsburgh. (Copies may be obtained from Gordon and Breach, Science Publishers, Inc., 150 Fifth Ave., New York, New York 10011.)

Both the Hopkins and the Pittsburgh products conclude each annotation with

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*These volumes were prepared by the American Economic Association and published by Richard D. Irwin (Homewood, Illinois). Volumes 1 through 7 are entitled *Index to Economic Journals.* Volumes 7A through 9 are entitled *Index to Economic Articles.*

Volume 1, 1886–1925 (published 1961)
Volume 2, 1925–1939 (published 1961)
Volume 3, 1940–1949 (published 1961)
Volume 4, 1950–1954 (published 1962)
Volume 5, 1954–1959 (published 1962)
Volume 6, 1960–1963 (published 1965)
Volume 7, 1964–1965 (published 1967)
Volume 7A, 1964–1965 (published 1969)
Volume 8, 1966 (published 1969)
Volume 9, 1967 (published 1970)

a recommendation of what kind (size) of economics library ("social science," "undergraduate teaching," "graduate teaching," or "research") should purchase the book. From 1945 until 1970 the books were classified according to the old American Economic Association system; starting with 1970, the *Economics Selections* adopted the 2-digit version of the new (1969) American Economic Association *Journal of Economic Literature* matrix. The *JEL* also annotates new books (over 1,500 per year), but it makes no recommendation pertaining to library acquisition; these books are classified according to the 2-digit version of the *JEL* classification system.

Economics libraries invariably contain serial acquisitions. Many are journals; the *JEL* lists approximately 250 journals which its editors consider as most important for the profession in the September issue from 1971 on. Business newspapers (e.g., *The Wall Street Journal*, the [*London*] *Financial Times*) as well as the business sections of regular newspapers, (e.g., *The New York Times*) are also found in most economics libraries.

The economics discipline had its principal origins in moral philosophy, although, as we shall note shortly, private groups had their tract writers on economic subjects to influence public policy. The term "economics" has Aristotelian origins and its application to a set of semiprofessional reformers is generally associated with the French Physiocrats. Many American economists identify Adam Smith's 1759 *Theory of Moral Sentiments* (an attempt to explain in ethical and cultural terms why men act as they do) as of the older parent discipline, while his *Inquiry Into the Nature and Causes of the Wealth of Nations* (popularly known by the last four words of the title) as being clearly in the newer economics tradition. It should also be noted that Sir James Steuart's summa, *An Inquiry Into the Principles of Political Economy* (1767), has much to commend it as the pioneer summa; its treatment of the role of money is superior to Smith's, which is poor.

The English classical economists were social reformers interested in increasing international trade (and specialization) of production, and in encouraging the emergence of a new social group (replete with its own ethos), the manufacturers. The game of identifying who said what first belongs properly to the history of thought specialists, but the influence of William Stanley Jevons (1835–1882) is usually associated with the first steps of applying mathematical techniques more advanced than simple arithmetic to the subject: he introduced the calculus. Paul A. Samuelson, the second Nobel Laureate in Economics (1970), has done as much or more among contemporary economists to identify economic concepts which can be manipulated by mathematical techniques to the advancement of understanding. For a discussion of the relationship between mathematics and economics see Arrow (*1*, pp. 376–389), Gruchy (*6*, pp. 462–467), Strotz (*17*, pp. 350–359), and Suráyni-Unger (*18*, pp. 454–457).

Economics, as such, has long enjoyed a competition between those favoring a preference for logically symbolic constructs (often using geometry, algebra, calculus, and probability) and a priori methods, and those favoring empirical or somewhat similar generalizations and a posteriori methods. These are not the only methods used by economists. Others involve positive, and the rival, normative,

standards; culturally associative, and its rival, *Wertfrei*, standards, and so forth. Methodology, a formal branch of philosophy concerned with why one selects one set of criteria rather than another, is a topic that has from time to time been of interest to the profession. Unfortunately the very term, methodology (for which there appears to be no substitute), is so frequently misused (in the sense that it has come to mean a comparison of methods—rather than a comparison of criteria for the selection of methods) that one must conclude that the topic must be misunderstood and consequently totally (or almost so) popularly neglected. [For a discussion of the role of methodology see Keynes (*10*) and Marshall (*14*, pp. 770–784).]

One of the key articles on economics libraries was written prior to 1915 by Foxwell; it is mentioned below. Here it is worth noting that so great has been the growth of economics collections that except for materials printed prior to 1850, there are scores of excellent modern libraries and collections for everything Foxwell thought worthy of mention. What follows is a brief guide to some outstanding economics research libraries.

Among the best known general economics libraries is the special economics collection of the New York Public Library at 42nd Street and Fifth Avenue (with over a million entries). But, since the turn of the century, the various departmental and similar libraries of the United States Government in Washington (these are discussed below) have purchased with virtually unlimited funds. And the tremendous economics collection of the Library of Congress, acquired by purchase and by copyright registration, is no less spectacular. All of the foregoing is not to slight the holdings of several American university libraries: Harvard's general system includes over 12 million entries (*19*), the Sterling Library at Yale is almost as good, and the Columbia University Library has more than 4 million entries, with admittedly only a minority in economics. There are half a million entry holdings at the London School of Economics. [There is a London Bibliography of the Social Sciences which is the acquisition list of the London School of Economics (*12*).]

General Economics, Theory, History, and Economic Systems. There are several excellent encyclopedias with considerable space devoted to economics material. *The Encyclopedia of the Social Sciences* (1934) was edited by two economists, Edwin R. A. Seligman (Professor-Emeritus, Columbia University) and Alvin Johnson (then Director, New School of Social Research). Its articles were written by many of the great economists between the two World Wars. These economics articles were assigned by a board of advisory editors including in economics Edwin F. Gay (Harvard University), Jacob H. Hollander (The Johns Hopkins University), and E. G. Nourse (The Brookings Institution). The advisory editors also included several non-American economists: J. M. Keynes, Sir Josiah Stamp, and R. H. Tawney (all of "England"), Charles Rist and F. Simiand (France), and Carl Schumacher (Germany), and Luigi Einaudi (Italy) (*4*).

In 1968 a second general encyclopedia was published; the *International Encyclopedia of the Social Sciences*. Its editor was David L. Sills, a sociologist, but Alvin Hansen was the Honorary Editor and another economist, W. Allen Wallis

(who served as Dean of the Graduate School of Business of the University of Chicago and then as President of the University of Rochester), was the Chairman of the Editorial Advisory Board. Albert Rees (University of Chicago and then Princeton University) was the Associate Editor for Economics.

Another invaluable encyclopedic work, although severely dated, is *Palgrave's Dictionary of Political Economy,* originally published in 1894–1899 but re-edited by Professor Henry Higgs during 1925–1926 (7). It contains a truly magnificent array of bibliographic data about economists as well as survey summaries on a very wide selection of topics about which economists ought to be informed. Indeed, it has a lengthy article on "Economic Libraries," describing in some detail the Goldsmiths' Company Library, the Manchester Libraries, the Foreign Office and other Libraries, the United States Libraries, and the John Crerar Library of Chicago. The article is by several authors, including Herbert Simon Foxwell (discussed below) and Clement Walker Andrews.

Modern economic theory is not a topic that lends itself to the collection of books and other bibliographic data sets. There is a Johns Hopkins *Economics Library Selections List* (Series II) identifying the key books which should be found in most teaching libraries. There are, however, several magnificent collections of historic tracts and texts on economic topics. Space precludes discussion here of some of the early reference works listing earlier publications; suffice it to note the collections of Joseph Massie (d. 1784), listed as MS 1049 in the British Museum, and the catalog of the library belonging to John Ramsey M'Culloch (1789–1864), as pretwentieth century evidence of the existence of general collections (*15*).

The doyen of the efforts in this century to amass collections of the great historical works was Herbert Somerton Foxwell (1849–1936), a Fellow of St. John's College, Cambridge, and Professor at University College, London. Foxwell spent much of his professional life searching stores and catalogs for possible purchases. The best of his collection, focusing on material prior to 1851, was sold by him in 1901 to the Worshipful Company of Goldsmiths for a mere £10,000, after a public appeal by the Royal Economic Society to keep the collection from being purchased by the Crerar Library of Chicago. The Goldsmiths' Library has, since the date of the original purchase, augmented the collection; it now contains over 40,000 individual pieces and is housed in the Univeristy of London Senate House and Library in its own chamber. This magnificent collection is described in an elegant large 3-volume catalog being published by the Cambridge University Press (*5*).

Foxwell continued his connection with the Goldsmiths' Library until early 1915 when, after a profound disagreement, they parted company. As he had retained many of the seconds and thirds, originally collected by him, he remained busy in his bibliographic enterprise. He was helpful to several American collections, whose purchases are now generally available in the United States. Professor Edwin R. A. Seligman collected much of the English material in which Foxwell was so interested, but Seligman's collection included French, German, and American

pieces as well as much literature (both pamphlet and book) on socialism. Seligman was Professor at Columbia University; he endowed his collection and gave it to that university. It consists of 21,000 pieces and is in the class of the Goldsmiths' Library in the breath of selection as well as the handsomeness of its holdings.

The Kress Library of Business and Economics, focusing on entries prior to 1850, contains over 30,000 items. It is housed at the Baker Library of the Harvard Business School. What has been most useful about this collection is that its curators have been energetically publishing a descriptive list of the holdings; this list has served as a point of reference for scholars investigating the emergence of the discipline (*11*). At the time of writing of this article only the first of three volumes listing the Goldsmiths' Library holdings has appeared; there is no published list of the Seligman Collection holdings.

Another collector, Jacob H. Hollander, Hutzler Professor of Political Economy at Johns Hopkins, was instrumental in developing what are now two smaller collections. The Hollander collection was sold in the early 1960s by Hollander's children to the University of Illinois. It contains a good many items from what Hollander called the "early period" (i.e., 1574–1750) and the "middle period" (1751–1797). The Hollander collection has a published catalog (*8*).

Hollander also put his considerable talents to collecting the Hutzler collection. Abram Hutzler was a Baltimore merchant and an uncle of Hollander's wife. He and his friends, including *inter alia* Mr. George Cator and Mr. Abraham Epstein, and his relative, Mr. David Hutzler, were encouraged by Hollander to purchase books, focusing particularly on post-1776 publications. This collection was given to Hopkins, where it remains. It has some of Adam Smith's personal library, although virtually all of the latter is now in the Tokyo University Library. The Hutzler collection does not have a published catalog.

Economic Growth. A library containing over 100,000 entries, with many containing theoretical and empirical material on economic growth, is at the Washington, D.C. headquarters of the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (IBRD). This library is presently located at 19th and H Streets, N.W.

Economic and Social Statistics. The U.S. Department of Commerce has an excellent library at its headquarters in Washington, D.C. as well as at the Suitland, Maryland location of the Bureau of the Census. British records are at the Public Records Office, London. Old American census entries are in Alexandria, Virginia. [For a survey of econometrics see the *International Encyclopedia of the Social Sciences* (*9*).]

Monetary and Fiscal Economics. The U.S. Treasury has a collection of 75,000 to 100,000 volumes in economics alone (and an even larger collection in law) pertaining to domestic and foreign economic conditions and public finance. It is at 15th Street and Pennsylvania Avenue, N.W., Washington, D.C.

The Federal Reserve System Board of Governors, also in Washington (at 20th Street and Constitution Avenue, N.W.) has a large (90,000 entry) library with particular strength in banking and monetary theory and policy.

The joint IMF-IBRD (mentioned under *Economic Growth* above) also has strength in this area.

International Economics. The U.S. Tariff Commission in Washington (8th and E Streets, N.W.) has about 65,000 entries, and is particularly strong in the area of commercial policy.

The IMF-IBRD library, already mentioned, is similarly strong in this area.

The Walker International Finance Section of Princeton University has a large collection of material. It is located in the Princeton Firestone Library.

Managerial Economics. The Baker Library of the Harvard Business School holds not only one of the largest such collections, but the holdings are published as a volume (2).

Industrial Organization. One such library particularly worthy of note is at the Federal Trade Commission (6th Street and Pennsylvania Avenue, N.W., Washington D.C.); it has over 150,000 entries. Other such libraries include the Department of Commerce, mentioned above, and the Interstate Commerce Commission (in Washington).

Agricultural Economics. The U.S. Department of Agriculture maintains in Washington (14th Street and Independence Avenue, S.W.) a gigantic collection with 250,000 entries in agricultural economics, agricultural statistics, and rural sociology.

Labor Economics. In the labor economics area there are some excellent general collections. Mention must be made initially of the large library of the International Labor Organization in Geneva.

The American collections of particular merit include the Department of Labor Library (actually it was historically under the Bureau of Labor Statistics) in Washington with 425,000 volumes (estimate as of 1968). The University of Wisconsin/State Historical Society libraries (both on the Madison campus) contain considerable material pertaining to unions, socialism, and industrial relations collected between 1890 and the present. The Johns Hopkins University Library has an almost complete list of union constitutions, convention proceedings, and union newspapers from about 1900 to date. The John Crerar Library collection on labor economics topics has been put in part in the University of Michigan Library (Ann Arbor) and at the University of Wisconsin Library. Harvard University's collection is somewhat erratic; it includes many important, otherwise all but unobtainable, industrial relations materials since the year 1945.

The New York State School of Industrial and Labor Relations (Ithaca, New York) has had the good fortune of adequate funds for purchase and an excellent librarian (Emeritus Professor Gormley Miller, now in Geneva). Other schools or centers of industrial and labor relations studies or research at Berkeley, Los Angeles, Urbana, East Lansing, and Princeton have similar but not as extensive holdings.

Welfare and Regional Economics. The U.S. Department of Health, Education, and Welfare has inherited the large office of Education and Social Security Libraries, each containing much pertinent economic material. The HEW Library is located

in Washington at 330 Independence Avenue, S.W. with 500,000 volumes (as of 1968).

The University of Pittsburgh (Pennsylvania) has a special regional economics collection for which an entries list is available (*16*).

Appendix A. 4-Digit Index

000 General economics; theory; history; systems
    010 General economics
        011 General economics
            0110 General
            0111 Teaching of economics
            0112 Role of economics; role of economists
            0113 Relation of economics to other disciplines
            0114 Relation of economics to social values
    020 General economic theory
            0200 General economic theory
        021 General equilibrium theory
            0210 General equilibrium theory
        022 Microeconomic theory
            0220 General microeconomic theory
            0222 Theory of the household (demand for consumer)
            0223 Theory of production (factor from microeconomic view, firm, and industry; and production functions from a microeconomic standpoint)
            0224 Theory of distribution (factor) and distributive shares
            0225 Price and market theory of firm and industry in competition; single market equilibrium
            0226 Price and market theory of firm and industry in noncompetitive relations
        023 Macroeconomic theory
            0230 General macroeconomic theory (monetary theories of income determination cross-referenced here)
            0231 Developments in general macroeconomic theory 1930–1945
            0232 Theory of aggregate demand: Consumption
            0233 Theory of aggregate demand: Investment
            0234 Theory of aggregate supply
            0235 Theory of aggregate distribution
        024 Welfare theory
            0240 General welfare economics
            0242 Allocative efficiency including theory of benefit/cost. (Does not include empirical applications of cost/benefit studies. See 0226 for welfare distortion due to monopoly. See 4116 for welfare distortion due to commercial policy)
            0243 Redistribution
            0244 Externalities
        025 Social choice
            0250 Social choice
    030 History of thought; methodology
        031 History of economic thought
            0310 General

0311 Ancient, medieval
0312 Preclassical except mercantilist (physiocrats)
0313 Mercantilist
0314 Classical
0315 Austrian, Marshallian, neoclassical
0316 General equilibrium until 1945
0317 Socialist until 1945
0318 Historical and institutional
032 History of economic thought (continued)
0321 Other schools since 1800
0322 Individuals
0329 Other special topics
036 Economic methodology
0360 Methodology
040 Economic history
041 Economic history: General
0410 General economic history
0411 Development of the discipline
0412 Comparative intercountry or intertemporal economic history
042 Economic history (continued): American
0420 General North American (United States and Canada) economic history
0421 History of American product prices and markets
0422 History of American factor prices and markets
0423 History of public economic policy (all levels)
043 Economic history (continued): Ancient and medieval
0430 Ancient and medieval until 1453
0431 History of product prices and markets
0432 History of factor prices and markets
0433 History of public economic policy (all levels)
044 Economic history (continued): European
0440 European economic history
0441 History of European product prices and markets
0442 History of European factor prices and markets
0443 History of European public economic policy (all levels)
045 Economic history (continued): Asian
0450 Asian economic history
0451 History of Asian product prices and markets
0452 History of Asian factor prices and markets
0453 History of Asian public economic policy (all levels)
046 Economic history (continued): African
0460 African economic history
0461 History of African product prices and markets
0462 History of African factor prices and markets
0463 History of African public economic policy (all levels)
047 Economic history (continued): Latin American and Caribbean
0470 Latin American and Caribbean economic history
0471 History of American and Caribbean product prices and markets
0472 History of American and Caribbean factor prices and markets
0473 History of American public economic policy (all levels)
048 Economic history (continued): Oceanic
0480 Oceanic economic history
0481 History of Oceanic product prices and markets

0482   History of Oceanic factor prices and markets
0483   History of Oceanic public economic policy (all levels)

050   Economic systems
    051   Capitalist economic systems
        0510   General capitalist (market economies, including cooperatives in predominantly market economies)
    052   Socialist and Communist economic systems
        0520   Socialist and Communist economic systems (not to be used for every Socialist and Communist country study)
    053   Comparative economic systems
        0530   Comparative economic systems

100   Economic growth; development; planning; fluctuations
    110   Economic growth, development, and planning theory and policy
        111   Economic growth theory and models
            1110   Growth theories
            1112   One and two sector growth models and related topics
            1113   Multisector growth models and related topics
            1114   Monetary economic growth models
        112   Economic development models and theories
            1120   Economic development models and theories
        113   Economic planning theory and policy
            1130   Economic planning theory and policy
            1132   Economic planning theory
            1136   Economic planning policy
        114   Economics of war, defense, and disarmament including product and factor market topics
            1140   Economics of war and defense, including product and factor market size
    120   Economic development studies
        121   Economic development studies of less developed countries
            1210   Economic development studies of less developed countries, general
            1211   Comparative country studies
            1213   European studies
            1214   Asian studies
            1215   African studies
            1216   Latin American and Caribbean studies
            1217   Oceanic studies
        122   Economic development studies of developed countries
            1220   Economic development studies of developed countries
            1221   Comparative country studies
            1223   European studies
            1224   Asian studies
            1225   African studies
            1226   Latin American and Caribbean studies
            1227   Oceanic studies
            1228   North American studies
        123   Comparative economic development studies involving both developed and less developed countries; international statistical comparisons
            1230   Comparative economic development studies involving developed and less developed countries; international statistical comparisons
    130   Economic fluctuations, forecasting, stabilization, and inflation
        131   Economic fluctuations
            1310   Economic fluctuations

3112 Monetary theory; empirical studies (cross reference monetary income determination theories to 0230)

3116 Monetary policy (including all central banking topics)

312 Commercial banking

    3120 Commercial banking

313 Financial markets

    3130 Financial markets, general

    3132 Financial markets studies and regulation

    3135 Portfolio selection: theories and studies

314 Financial intermediaries

    3140 Financial intermediaries

315 Credit to business, consumer, etc. (including mortgages)

    3150 General

    3151 Consumer finance

    3152 Mortgage market

    3153 Business credit

320 Domestic fiscal policy and public finance

321 Domestic fiscal theory and policy

    3210 Domestic fiscal theory and policy

    3212 Fiscal theory; empirical studies

    3216 Fiscal policy; studies

322 Federal government expenditures and budgeting

    3221 Federal or national government expenditures; including cost/benefit studies

    3226 Federal or national government budgeting

    3228 Federal or national government debt management

323 National taxation and subsidies

    3230 National taxation and subsidies

324 State and local government finance

    3240 General

    3241 State and local government expenditures and budgeting

    3242 State and local government taxation subsidies and revenue

    3243 State and local government borrowing

325 Intergovernmental financial relationships

    3250 Intergovernmental financial relationships

400 International economics

410 International trade theory

411 International trade theory

    4110 International trade theory, general

    4112 Theory of international trade: Prices, comparative advantage, etc.

    4113 Theory of protection

    4114 Theory of international trade and economic development

420 Trade relations; commercial policy; international economic integration

421 Trade relations

    4210 Trade relations

422 Commercial policy

    4220 Commercial policy and trade regulations; policy and empirical studies

423 Economic integration

    4230 Economic integration, general

    4232 Theory of economic integration

    4233 Economic integration: Policy and empirical studies

430 International finance; balance of payments

431 Balance of payments; mechanisms of adjustment; exchange rates

615   Economics of transportation
      6150   Economics of transportation
620   Economics of technological change
    621   Technological change; innovation; research and development
      6210   Technological change; innovation; research and development, general
      6211   Technological change and innovation
      6212   Research and development
630   Industry studies
      6300   Industry studies, general
    631   Industry studies: manufacturing
      6310   General
      6312   Metals (iron, steel, and other)
      6313   Machinery (tools, electrical equipment, and appliances)
      6314   Transportation and communication equipment
      6315   Chemicals, drugs, plastics, ceramics, glass, and rubber
      6316   Textiles, leather, and clothing
      6317   Forest products, building materials, and paper
      6318   Food processing (excluding agribusiness), tobacco, and beverages
    632   Industry studies: extractive industries
      6320   Extractive industries, general
      6322   Mining (metal, coal, and other nonmetallic minerals)
      6323   Oil, gas, and other fuels
    633   Industry studies: distributive trades
      6330   Distributive trades, general
      6332   Wholesale trade
      6333   Retail trade
    634   Industry studies: Construction
      6340   Construction
    635   Industry studies: Services
      6350   Services, general
      6352   Electrical, communication, information, and transportation services
      6353   Personal services
      6354   Business, legal, educational, and health services
      6355   Repair services
      6356   Insurance
      6357   Real estate
      6358   Entertainment, recreation, tourism
    640   Economic capacity
      6410   Economic capacity
700   Agriculture; natural resources
    710   Agriculture
      7100   Agriculture, general
    711   Agricultural supply and demand analysis
      7110   Agricultural supply and demand analysis
    712   Agricultural situation and outlook
      7120   Agricultural situation and outlook
    713   Agricultural policy, domestic and international
      7130   Agricultural policy, general
    714   Agricultural finance
      7140   Agricultural finance
    715   Agricultural marketing and agribusiness
      7150   Agricultural marketing; cooperatives: General
      7151   Agribusiness

716   Farm management; allocative efficiency
      7160   Farm management
717   Land reform and land use
      7170   Land reform and land use, general
      7171   Land ownership and tenure; land reform
      7172   Land development; land use; irrigation policy
720   Natural resources
    721   Natural resources
      7210   Natural resources
      7211   Recreational aspects of natural resources
    722   Conservation and pollution
      7220   Conservation and pollution
730   Economic geography
    731   Economic geography
      7310   Economic geography
800   Manpower; labor; population
  810   Manpower training and allocation; labor force and supply
    811   Manpower training and development
      8110   Manpower training and development
    812   Occupation
      8120   Occupation
    813   Labor force
      8130   Labor force, general
      8131   Agriculture
      8132   Manufacturing
      8133   Service
      8134   Professional
      8135   Government employees
  820   Labor markets; public policy
    821   Theory of labor markets and leisure: Phillips curve
      8210   Theory of labor markets and leisure (including Phillips curve and structural unemployment)
    822   Public policy; role of government
      8220   Public policy; role of government; general
      8221   Wages and hours
      8222   Workmen's compensation
      8223   Factory act and safety legislation
      8224   Unemployment insurance
      8225   Employment services
      8226   Employment in public sector
    823   Labor mobility; national and international migration
      8230   Labor mobility; national and international migration
    824   Labor market studies, wages, employment
      8240   Labor market studies, wages, employment: general
      8241   Specific labor market studies
      8242   Wage and fringe benefit studies
      8243   Employment studies; unemployment and vacancies
    825   Labor productivity
      8250   Labor productivity
    826   Labor markets; demographic characteristics
      8260   Labor markets; demographic characteristics
  830   Trade unions; collective bargaining; labor management relations
    831   Trade unions
      8310   Trade unions, general

832 Collective bargaining
    8320 Collective bargaining, general
    8321 Collective bargaining in the private sector
    8322 Collective bargaining in the public sector
833 Labor management relations
    8330 Labor management relations, general
    8331 Labor management relations in private sectors
    8332 Labor management relations in public sectors

840 Demographic economics
  841 Demographic economics
    8410 Demographic economics
850 Human capital
  851 Human capital
    8510 Human capital

900 Welfare programs; consumer economics; urban and regional economics
  910 Welfare programs
    911 General welfare programs
      9110 General welfare programs
    912 Economics of education (consumption side)
      9120 Economics of education (consumption side)
    913 Economics of health
      9130 Economics of health
    914 Economics of poverty
      9140 Economics of poverty
    915 Social security (public superannuation benefits and survivors benefits)
      9150 Social security (public superannuation benefits and survivors benefits)
    916 Economics of crime
      9160 Economics of crime
    917 Economics of discrimination
      9170 Economics of discrimination
  920 Consumer economics
    921 Consumer economics; levels and standards of living
      9210 Consumer economics, general; leisure
      9211 Living standards studies and composition of over-all expenditures
      9212 Expenditure patterns and consumption of expenditure on specific items
      9213 Consumer protection
  930 Urban economics
    931 Urban economics and public policy
      9310 Urban economics and public policy
    932 Housing economics
      9320 Housing economics
    933 Urban transportation economics
      9330 Urban transportation economics
  940 Regional economics
    941 Regional economics
      9410 Regional economics, general
      9411 Theory of regional economics
      9412 Regional economic studies
      9413 Regional economic models and forecasts

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MARK PERLMAN

ECONOMICS LITERATURE AND PERIODICALS

This survey aims to consider the printed materials dealing with economic–business activities in Western Europe and the United States, with some reference to publications emanating elsewhere. It seems appropriate to handle all economic and business printed literature as a single whole, for when the entirety of this literature is examined, one finds no clearly marked dividing lines. All items can be regarded as falling in a spectrum, extending perhaps from a mathematical formulation of international trade to a flyer in Canadian uranium stocks. The differences are notable at the extremes, but there are no sharp breaks in the succession of types.

Nearly all economic and business literature is purposeful, intended by its authors to be of use in modifying public policies, improving business performance, informing the youth or the general public, and providing other than amusement or aesthetic enjoyment. This review of economic–business literature therefore seeks to determine how it has served its purposes. It is also necessary to determine whether the materials for the formation of public policies has changed over the centuries. If so, how and when? More in some countries than in others? It is also pertinent to inquire whether economic theorizing has improved over the centuries; i.e., can economists be said now to think better than those of 100 or of 200 years ago? And do economists and businessmen think differently from their predecessors of 1850 or 1750? If so, in what ways? and as a result of what forces?

Concepts are slippery things and seem often to have gotten into the literature only with difficulty. This study of economic–business literature therefore attempts to reflect the process and the timing whereby and when concepts important in this area were introduced into printed form, repeated in other printed items, and incorporated into libraries where the policy-makers or the research members of their staffs could gain access to them and employ them.

The centuries since Gutenberg seem divisible, as far as economic–business literature is concerned, into four periods of somewhat variant length—one lasting until the latter half of the seventeenth century, another extending thence until the closing years of the eighteenth, a third carrying down then until about 1880, and a fourth extending to the present. These are set off by more than one phenomenon in all cases and the dividing dates become rather fuzzy. However, the periods have distinctive characteristics.

The First Period

The first period was one of mixed movements, extending from the invention of printing with movable type to the latter decades of the seventeenth century. Within it, there was an extension of themes from preprinting days; there were new themes that failed to persist, as if lacking in pertinence; and there were other new themes that gained the strength to spill over into subsequent periods.

The publications of the earlier portion of this period, and to some extent throughout it, reflect considerations or controversies of pre-Gutenberg days. There were the treatises and tracts pertaining to usury; incunabula, such as the booklet by Consobrinus, and as late as 1634 John Braxton's *Usury Condemned*. Books on agriculture also kept appearing all through these centuries—and of course have never ceased appearing. The classical writers on agriculture were frequently reprinted in the early decades of printing: *Scriptores Rei Rusticae*, among the incunabula; the collection called *Geoponica* somewhat later; plus individual Latin authors, often also in translation, rather thickly down through the middle of the sixteenth century. Overlapping with them and continuing later were the books by such authors as Estienne, Heresbach, Markham, and Tusser.

There was a third type of continuing item, compilations and treatises upon commercial law. They appear in the fifteenth century, and they continue like the books on agriculture. In some measure there was change here over time. For example, the "Consulate of the Sea" type of compilation reaches back into pre-Gutenberg days, but they became infrequent after about the middle of the sixteenth century. And then there is the case of Malynes. His *Consuetudo, vel, Lex Mercatoria*, the leading English specimen of its genus, first published in 1622, went through a growth that seems to mirror the changing business world. By 1656 appendices had been added in which the exchange of money by bills was "anatomized," and the "ordering and keeping" of merchants' accounts were explained. Knowledge of the law was apparently moving over to give place to knowledge of business practices.

In these decades there were some literary occurrences that stirred no immediate continuing developments. One is the Malynes-Misselden debate over the effects of the exchange rates. Their contentious pamphlets flew back and forth in the early 1620s, and then everyone appears to have forgotten about the matter. There was a considerable number of items pertaining to money in the sixteenth century, including Jean Bodin's famous *Apologie*, but then little was published again until the eighteenth century. Finally, one may note the tracts of the Levellers, especially Gerrard Winstanley, in the Commonwealth period, expounding communistic ideas that were not to become common for another couple of centuries.

On the other hand, some novel developments may be recorded. One is the rise of the controversial pamphlet related to secular affairs. This was something new in the world. The outpouring was much the greatest in England. The names of Sir Dudley Digges, Thomas Mun, and many others will occur to students of the history of economic thought. There were some comparable items of Continental origin, such as those of Laffemas in France or of Pieter de la Court in Holland. On the whole, however, the Continent remained an inhospitable area for publications of this type, even to the end of our next time-period, the close of the eighteenth century, except for the Netherlands and Sweden. With all due allowance for these countries, England provided the richest and most productive soil for this form of literature.

The period also brings the first calls to make money. The oldest book on retail selling, William Scott's *Essay of Drapery* (1635) seems to take a stand with one foot in the Middle Ages and one in the modern world. As early as 1558, Roger Bieston

had been willing to argue that money was "a necessary mean to mayntayne a vertuous quiet lyfe" in his *Bayte and Snare of Fortune*. Gervase Markham thought it advantageous—presumably in keeping with the spirit of the times—to label a book on agricultural practices *A Way to Get Wealth* in 1625. So uninhibited had the sponsors of wealth-seeking become by 1684 that a volume with the gay title of *The Pleasant Art of Money Catching* could be published.

There were also the first publications of types that have since blossomed luxuriantly. One may note two subvarieties of manuals, one with a geographical and another with a technical base. The former type existed as early as the fourteenth century. There were specialized printed specimens devoted to the moneys of various regions, appearing as early as 1530 in Antwerp, and in Vienna in 1563 (which had progressed to being a reckoning book). Books of broader coverage were soon to be issued: one in 1576 out of London, which gave data upon "the most famous cities in Europe," their "trade and traficke," "their coynes and the places of their mynts," to be followed half a century later (1638) by Lewes Roberts' famous *Merchants Mappe of Commerce*. This extensive folio manual went through at least four editions, the last appearing in 1700.

The other subvariety includes books of arithmetic and ready reckoning, compounded particularly for the use of merchants, the expositions of bookkeeping such as Ympyn's *Nieuwe Instructie* published in Antwerp in 1543, together with volumes of applied science, which may perhaps be considered to begin with Schopper's illustrated book on mechanical arts, printed in Frankfurt in 1574.

A second general type of literature with a modern flavor is that stimulated or issued by individual companies. John Wheeler wrote his *Treatise of Commerce* (1601) in support of the Company of Merchant Adventurers; Sir Dudley Digges addressed his *Defence of Trade* (1615) to the governor of the East India Company; and Thomas Mun composed his *Discourse of Trade* (1621) in defense of that Company. Before 1680 quite a flock of pamphlets had been printed about enterprises from the "West-Indische Compaignie" of Holland to the "Company of Royal Adventurers of England Trading into Africa." Sometime in the 1650s, if not indeed earlier, such enterprises commenced to issue material on their own initiative, e.g., *The Advantages of the Kingdome of England* from the operations of the "Fellowship of the Merchant's-adventurers of England" (c. 1650), which looks very much like a "public relations" piece, or minutes of meetings of the general court of the English East India Company.

Despite these new sorts of items, and despite the issue and reissue of divers books on agriculture, the general impression of the literature of this whole period is that of discontinuity and some naivete.

The Second Period

The second period was one characterized by enhanced continuity, by the beginnings of measurement, and by the development of integration—a period extending from the late seventeenth to the late eighteenth century.

The "continuity" is evident on various sides. The effort of the Parisian Académie des Sciences to prepare and issue its *Description des arts et métiers* is a case in point. The original idea was broached as early as the 1660s, it recurred fitfully in the next few decades, a more formal start was made in the 1730s, and the volumes appeared from the 1760s to 1788. The successive editions of Savary's *Parfait négotiant* from 1675 to 1763, of Ricard's *Traité générale de commerce* from 1706 to a fifth edition in 1732, or of Thomas Mortimer's *Every Man His Own Broker*, first published in 1761 and reaching its twelfth edition in 1798, yield the same picture—there was a persistent interest in the particular line of thought. Publishing houses were increasing within the economic–business field.

However, institutional connection was not essential. Continuity begins now to be more clearly apparent in the evolution of economic thought. Some such condition is evident in English mercantilist thought, especially after Mun; but it takes a more creative turn on the Continent. In France there was the development of speculative ideas in Boisguilbert, Cantillon, Quesnay, and Dupont de Nemours, resulting in the advent of an informal group that promoted discussions and supported journals of communication. In Germany one can find a persistent growth of cameralistic thought, beginning actually a little earlier than physiocratic ideas or preliminary notions, namely, with the publication of Becher's *Politische Discurs* in 1668. Here evolution took the road leading into administration and education. Officials of Austria and the German states were intimately connected with the development. And Hermann Conring (1606–1681), Gottfried Achenwall (1719–1772), and many other professors gave lectures that by and large were presentations of economic data relevant to public administration. This concentration of economic thought, teaching, and governmental activity persisted into the nineteenth century.

Continuity in the area of business communication presents a curious but intriguing picture. During the seventeenth and eighteenth centuries, merchants dominated the business communities of all countries; and merchants have always been interested in changes in commodity prices, movements of ships, and alterations in the course of exchange rates in about that order of declining values. A natural evolution in instrumentalities, once the volume and diversity of business required more than the partial picture conveyed by private letters from agents and correspondents, was that an entrepreneur would set up a reporting agency to serve a given community. Thus began *Oram's New York Price Current and Marine Register* (1798–1804) and *Ming's New York Price Current* (1805–1813, 1815–1817), which would be displaced in time by a newspaper of broader coverage—in this New York case, by the *Shipping and Commercial List and New York Price Current*, which in fact ran continuously (with only one minor change in title) from 1815 to 1861 (*1*). At other places a mercantile journal carried current commodity-price quotations as a regular portion of its news; this "prices current" section was reprinted on a flyer, sometimes with a merchant's name added as a running head, and merchants distributed copies of these prices-currents to their correspondents.

Neither of these sequences occurred in the Netherlands and in England. In the one case, printed lists of commodity prices began to appear in the first years of the

seventeenth century. They were soon compiled under regulations of the city, and may have been printed by various booksellers for distribution. They continued to be issued up into the first part of the nineteenth century, and no general commercial journal seems to have blossomed on this stem. In the case of England, supposedly the "land of shopkeepers," the story is one of unexpected deficiencies. Some privately printed merchants' price lists appeared in 1670 and thereafter, but only intermittently until the first decades of the succeeding century. The only periodical that carried such price data seems to have been John Houghton's *Collection of Letters for the Improvement of Husbandry and Trade,* which ran from 1692 till 1703. For 30 years or so after 1715 there appears to have been no public or semi-public commodity-price reporting; then perhaps some specializing sheets; and not until 1775 and the launching of Prince's *London Price-Current* can one grasp commodity-price reporting that persisted into modern times in some form, if under various aspects (2).

In the meantime, to be sure, there had come periodicals that reported on financial affairs and on shipping: the semiweekly called *The Course of the Exchange* begun by John Castaing at almost the peak of the South Sea speculation, specifically in 1719, but carried on by him and his successors continuously ever since; and *Lloyd's List,* which, starting in 1734, gave news of ship movements, share prices, and some general matters of commerce.

The eighteenth century has been referred to as the "era of political arithmetic," and surely measurement became a more widely recognized desideratum. Doubtless Sir William Petty should be canonized as the patron saint of modern economics. Writing of his "Method," he stated that, "instead of using only comparative and superlative Words, and intellectual Arguments," he had taken the course of expressing himself "in terms of Number, Weight, or Measure." It is the creative ideas that are important: that in economic affairs, one might emulate the practices of the natural scientists; and from measurements one might derive apparent uniformities in economic life. Already John Graunt had seized upon London's "bills of mortality"—perhaps the only good result of the plague—and had laid the first bricks in demographic studies and actuarial science. Graunt was followed by Halley, de Moivre, Price, and a continuing band of students and writers in England; and by an equally notable, if not really superior chain of successors on the Continent.

Other seventeenth- and eighteenth-century English writers in various fields of economics adopted the Petty approach. Arthur Young wrote a *Political Arithmetic* of his own, devoted largely to agricultural problems of his times. There was a new stress upon "experience" and "experiments," as in William Harte's *Essays on Husbandry* (1764). In the meantime, too, the British government had seemingly become infected. Governmental reports began to be issued, often largely statistical in character, upon the course of trade, the activities of the East India Company, public finance, and the like. These reports were generally irregular, but they laid the basis for the series that in 1801 began as the Parliamentary Papers.

In other countries the zeal for measurement burned with variant brightness. In France, the impact appears not to have been great in this period though Vauban,

Deparcieux, and a few others were influenced. On the other hand, "political arithmetic" appears to have been quite congenial to cameralism. Johann Peter Süssmilch (1708–1767) became an exponent of the "method" in his own right. His *Göttliche Ordnung*, published in 1742, was noteworthy for its contributions to the study of what came to be called "vital statistics." His contemporary, Gottfried Achenwall, was the first person to use the term "statistics." Actually the word then signified general description of economic phenomena, not specifically quantified measurements and statement.

The notion of a census of population has been traced back to Bodin and Montchrétien. And certain censuses of population were taken in the eighteenth century: Sweden from the middle of the century onward; Austria in 1753, 1762, and 1777; not to mention certain Canadian provinces even in the seventeenth century. However, in Europe population data were not broadly published until the nineteenth century; military rivalry was too severe.

The evolution of syntheses seems a third feature of this period. One aspect of this trend was the compilation of dictionaries or collections of information upon various subjects—not merely merchants' *vade mecums* such as Savary's and Ricard's but more specialized, topical affairs, such as the *London and Country Brewer* (1736), or Duhamel du Monceau's six volumes on fishes and fishing (1769–1782). The Germans were particularly given to such compilations. Another type can be represented by *Select Essays on Husbandry* printed in Edinburgh in 1767 or John Almon's *Collection of Tracts, on the Subjects of Taxing the British Colonies in America, and Regulating their Trade* published in 1773.

More noteworthy yet were the efforts of theorists Quesnay, Sir James Steuart, and particularly Adam Smith to describe or analyze economic systems. Professor Schumpeter speaks of "quasi-systems" in earlier times. By this Schumpeter seems to mean partial views of the whole economy, from which one may properly infer that their authors possessed quite surely a sound concept of the whole (*3*). There can be less doubt of the physiocrats, Steuart, and the "father of political economy."

Smith's *Wealth of Nations* illustrates the importance of conceptualization. It has been said of Smith's book that, like the American Constitution, there is little that is original in it, and what is original isn't very good. However, Schumpeter—curiously reluctant to see virtue in "A. Smith"—does assert:

> We know that the skeleton of Smith's analysis hails from the scholastics and the natural-law philosophers. . . . They had worked out all the elements of such a scheme, and Smith was no doubt equal to the task of co-ordinating them without further help from anyone (*4*).

The leading features of this period may be embraced under the general term "increased sophistication." The developments of the decades after 1660 reveal a level of thought hitherto unattained in the economic–business field. Other phenomena lend support to this contention. One is the awakening of a historical sense, at least in this field of thought and publication.

The eighteenth century is noteworthy for the increase in number and the exten-

sion in variety of historical studies. Interest in coinage of the past was very early evoked as, e.g., in Occo's survey of Roman coins, published first in 1579. However, much more substantial works in this area were produced two centuries later, e.g., those of Leake and Snelling in England. And now appeared also such items as Madox's *History and Antiquities of the Exchequer of the Kings of England* (1711), Raynal's famous *Histoire philosophique et politique des établissements & du commerce des Européens dans les deux Indes (1770)*, even such a piece of business history as Henning Calvör's *Historische Nachricht von der Unter und Gesamten Ober Harzischen Bergwerke* (1765). Also not to be overlooked is the launching of effort in the area of price history—surely a "sophisticated" realm: e.g., Bishop Fleetwood's innovating volume entitled *Chronicon Preciosum: or, An Account of English Money, the Price of Corn, and Other Commodities, for the Last 600 Years* (1707).

Data of a somewhat different sort are supplied by the reprintings of earlier materials. Among those were John Smith's *Chronicon Rusticum-Commerciale; or, Memoirs of Wool* (1747) and Robert Vansittart's *Certain Ancient Tracts Concerning the Management of Landed Property Reprinted* (1767). The tracts were reproduced, not primarily because they would presumably be of utility in practical affairs, but seemingly because they were interesting in themselves; the wisdom of earlier times should not be forgotten, even if not immediately applicable to contemporary problems.

The increased sophistication, the rise of a historical sense, and the power of cameralistic thinking were responsible for another important development: the creation of bibliographies of economic literature. According to Kenneth E. Carpenter:

> The first bibliography of economics was J. B. von Rohr's *Compendieuse Hausshaltungs Bibliotheck* (first ed., 1716). For each of the subjects covered—"Cammeral-wesen", agriculture, commerce, mining, etc.—Rohr provides a kind of encyclopedia article, with comments on books, which are in most of the languages of western Europe. Rohr disclaims any attempt at completeness, but as a classified bibliography, it is perhaps still useful for some purposes.
>
> In his *Hausshaltungs Bibliotheck,* Rohr added his voice to that of numerous advocates of university chairs of Cameralism. The first in Europe was founded at Halle in 1727, and others in Germany soon followed. It is probably to this early recognition of economics as an academic subject that we owe a long series of German bibliographies (5).

Carpenter identifies other bibliographies of the period: "Two unusual and very definitely usable items are J. J. Moser's *Bibliothec von Oeconomischen- Cameral-Policey- Handlungs- Manufactur- Mechanischen und Bergwercks Gesetzen, Schriften und Kleinen Abhandlungen* (1758) and J. H. L. Bergius' *Cameralisten Bibliothek* (1762). They are essentially indexes to periodicals and laws and can make available much detailed information." These were published "prior to the work which has generally been considered the first bibliography of economic literature— the 34-page 'Catalogue d'une bibliothèque d'économie politique formée pour le travail du nouveau dictionnaire de commerce' in Mollet's *Prospectus d'un nouveau dictionnaire de commerce* (Paris, 1769)" (6).

However, lest the element of sophistication be overemphasized. Professor Edwin F. Gay made a considerable reputation for himself by controverting statistically certain allegations of sixteenth-century writers on the extent of the contemporary enclosures; and Professor Brebner has remarked that economic history writing of these centuries should generally be examined with much care; much of it was compounded to prove a case of some sort or another.

The use of earlier materials and of libraries was limited. One of the first notes about economic–business literature is contained in John Houghton's *Husbandry and Trade Improved* (1728) (7). He lists what looks like thirty-five titles: something like twenty in Latin, of which six or eight are reproduction of classical authors; two in Italian; three or four about trees; two or three about fishes; one about gardens; and More's *Utopia*.

It is recognized that the *Wealth of Nations* was not composed with a wealth of citations. It had not become the prevailing practice among scholars of Smith's time to acknowledge sources, but it is significant that in Smith's collection of books and pamphlets aggregating approximately 1,600 items, there are scarcely 150 that could be labeled economic (8).

In the case of David Ricardo there was apparently slight interest in predecessors. Despite Smith and Malthus and a few others, writers in the field were not generally learned.

Any impression that all proceeded smoothly in the evolution of economic–business literature is erroneous. Generally the most advanced thinkers of given periods are taken to represent those decades. This, of course, is not a satisfactory procedure if one is interested in this literature as a vehicle of the formation of public opinion and public policy. Some attention to the irregularities or bulges from any trend line is justified. There was the Cromwellian period in England, with its enhancement of volume and its manifestation of new idea through its John Lilburne, Gerrard Winstanley, Henry Parker, Henry Robinson, Thomas Violet, William Potter, and others. There was also the peculiarly interesting period between Robert Murray's *Corporation Credit* (1682) and the early years of the next century. The volume of economic writing expanded now, especially in the 1690s, and particularly with the first sizable crop of anonymous pamphlets, but it is also interesting how many writers of note from Nicholas Barbon to John Briscoe, and from Daniel Defoe to Sir Humphrey Mackworth fall into these decades.

In the meanwhile, cameralistic writings had flourished rather extraordinarily in greater Austria, if one may use that term. After Becher came his brother-in-law, Philipp Wilhelm von Hörnigk, with his *Oesterreich über Alles, wenn es nur will,* which went through thirteen editions in the course of a century; Wilhelm von Schröder's *Fürstliche Schatz- und Rentkammer,* which enjoyed six editions between 1686 and 1752; and scores of lesser writers. There was also the especially interesting phenomenon of Paul Jacob Marperger (1656–1730). Perhaps he should be recorded as the first full-time economist; some ninety separate publications may be credited to him, running literally into thousands of pages. He did not really rise to the level of theory, yet Marperger did not publish trash. He represents at least a bulge from any

general trend line, greater than that produced by Defoe, or earlier by Samuel Hartlib or Gervase Markham.

A bulge of a different type centers in the South Sea and Mississippi Bubbles. This movement may be measured in the numbers of items recorded in the Kress Library printed catalog which lists 524 titles published in the years 1720 and 1721, as compared with 128 in the years 1719 and 1722.

In Holland this "bulge" seems to have flooded Amsterdam with scores of satirical prints. Several plays and several poems were also prepared relative to the speculation in shares. These and other documents pertaining to actual company ventures were gathered up and issued as a warning in a thick folio volume entitled *Het Groote Tafereel der Dwaasheid* (or "The Great Mirror of Foolishness").

Similar deluges were to accompany later periods of excitement the controversy of England with her colonies in America; in France, the problems of the new government after 1789, especially those of currency, taxes, and the disposition of the lands of the Church and nobility; shortly thereafter in England and Ireland, the question of union between the two islands; and later still the "bullion controversy."

The Third Period

The third period, from the late eighteenth to the late nineteenth century, was marked by the efflorescence of printed matter and by the very considerable spread of organization within the business world.

Professor Innis has posited a hypothesis that media of communication succeed one another as the arteries of business are lengthened geographically and the pulse of business quickens. Oral communication was feasible when merchants could make frequent journeys in promotion of their enterprises, though each journey might run into months. As a second stage, correspondents kept in touch with their principals by letter. This latter system must have been quite unsatisfactory, and could not function adequately in such a trade as that which New York, Salem, and other American towns initiated with China after 1790.

The long period of wars between 1790 and 1815, with the uncertainties and changing demands that war always brings, seems to have stirred all segments of Western societies to cast aside the slow, private means of communication, to seek by political means an increase in the volume of governmental publication, and to stimulate, by means of subscription payments to venturesome entrepreneurs, the expansion of commercial vehicles.

The British Parliamentary Papers began to be issued regularly in 1801; by the 1840s fifty folio tomes were required, and by the 1880s ninety to a hundred. The publication activity of the United States government kept close pace with that of the British. Regularity was imparted to the *Congressional Documents* only with the 15th Congress (1819–1820), but many statistical and other materials were printed as individual *Documents* in the preceding 30 years.

In Canada a documentary series of the Dominion began in 1841, and one of the province of Quebec in 1869. France and Germany have contented themselves with

the publication of the reports of Enquêtes and Ausschusses, and with that of special series, for example, the French *Catalogue* and successive reports on inventions from 1791 onward, or its *Tableaux généraux du commerce* in 1818 and later years.

A considerable proportion of this governmental activity may be attributed to the desire for measurement that arose in the late seventeenth century. The United States was a leader in statistical developments. The census of population of 1790 was the earliest to be published; in 1810 and 1820 the federal government made some effort to secure data upon manufacturing facilities as well as population; and the reports on manufactures in the 1850, 1860, and 1880 censuses were more extensive than any elsewhere in the world.

Some of the American states became active in collecting data on population and in other lines: New York and Massachusetts, manufactures; Maine, ownership of bank stocks; and the like. There was the famous (if not too thorough) survey of manufactures and their likelihood of growth made by Hamilton, the better inquiry made by McLane in 1833, useful reports on various industries that accompanied the censuses of 1860 and 1880, and essays on such topics as coal measures or movement of tobacco accompanying that of the later date. The annual statistical reports, such as those on commerce and navigation (regularized in 1820), and some special reports such as that of T. DeW. Andrews on the commerce of the Great Lakes, or on internal commerce of the country (1876-1891), produced notably useful data.

Quantitative reports also appeared in such periodicals as Niles's *Weekly Register*, Hazard's *Register of Pennsylvania*, DeBow's *Review*, and Hunt's *Merchants' Magazine*. Two other private statistical publications not seen duplicated in any other country for some decades appeared: Benton and Barry's *Statistical View of the Number of Sheep* [in north-western United States]; *And an account of the Principal Woolen Manufacturies in said States* (1837); and the other is William H. Sumner's *Statistics of the Woollen Manufactories of the United States* (1845). But the major private efforts come a bit later with the quantitative reporting of the *Commercial and Financial Chronicle*, including its annual *Investors' Supplement* volume of many years after 1875, and *Poor's Manual of Railroads*, of which a historical volume appeared in 1860 and regular annual ones after 1868.

In Europe (probably with the exception of Germany over the last decade or two of the period) the developments were less pervasive and somewhat more scholarly. There were published censuses of population, as in England in 1802 (and later decades), Sweden 1811, etc., but no industrial or agricultural censuses. Europe's principal contributions fell elsewhere.

"Statistical" activity in the sense of descriptive economics there was, and especially noteworthy examples pertain to agriculture in the British Isles, perhaps attributable to the influence of Arthur Young. The agricultural surveys of English, Scottish, and Irish counties were made between 1790 and 1815 or thereabouts. Those related to the British counties were prepared under the auspices of the semiofficial Board of Agriculture and Internal Improvement, some of them composed by Arthur Young. They number nearly ninety and were published between 1793 and 1800. Another series ran to over sixty volumes and appeared between 1804 and 1815.

Between 1801 and 1812, the Royal Dublin Society published surveys of twenty-one Irish counties (three others being published later: 1824, 1832, and 1833) with the slightly variant titles of a "general view of the agriculture and manufactures" of a given county, or "statistical observations" of the same.

More important was another contribution, namely, what Funkhouser describes as "the gradual merging of political arithmetic and the theory of probabilities in the science of statistics." Funkhouser traces the evolution of probability theory back to Pascal and Fermat working in the middle of the seventeenth century and notes that de Moivre discovered the formula for the normal probability curve in 1733, that J. B. J. Fourier drew the curve in 1821, and that de Morgan first made published use of the curve in 1838 (9).

There was a third contribution from Europe: new organizations in the field of statistics. The Statistischer Verein for the Kingdom of Saxony began publishing in 1831, the London Statistical Society was founded as early as 1825 and was publishing its own *Journal* in 1837, and the corresponding Dublin society followed somewhat later (1855). Shortly after the middle of the century, specifically in 1853, a series of International Statistical Congresses were launched, largely as a result of the initiative of Adolphe Quetelet, that until 1876 convened pretty regularly in alternate years in some European city. Their proceedings were published.

Another aspect of the increasing quantity of literature is the marked growth of periodicals. Before this period, journals that could be called professional were few and short-lived, although the *Leipziger Sammlungen von Wirtschafftlichen- policey-cammer-und finantz-sachen* was published from 1744 to 1761 and the *Ephémérides du citoyen*, published in Paris and carrying the discussion of the physiocrats, was maintained from 1765 to 1772 and from 1774 to 1776 under the title *Nouvelles éphémérides economiques*. A German endeavor to sustain publication of similar materials, issued under the title *Ephemeriden der Menschheit*, carried action along to 1782. If we look upon the *Journal économique* (1751–1772) and the *Gazette d'agriculture, commerce, arts et finances* (1776–1781) as in part supplementing the *Ephémérides*, it is obvious that professional publications did flourish for a quarter of a century in France's *ancien regime*.

Thereafter came a considerable hiatus. The *Journal of the London Statistical Society* was one of the first items in the new crop: the semiprofessional *Journal des économiques* and London *Economist* were launched in the early 1840s, the publication activity of the American Social Science Association started in the middle 1860s, Conrad's *Jahrbücher für Nationalokonimie und Statistik* began in 1863, and the *Jahrbuch für Gesetzgebung, Verwaltung und Rechtspflege* (which later became *Schmoller's Jahrbuch*) in 1877. However, organized professional publication in the English-speaking world had by and large to wait until the decade of the 1880s and later years.

One phenomenon in the 1785–1885 century marked that century as at least quantitatively unique: the reprinting of earlier materials. The Italians provided the startling example. Beginning in 1803 and continuing through 1816, they produced

an amazing fifty volumes that they entitled *Scrittori classici italiani di economia politica.* A sequence of reprinting and translation efforts which took place after 1850 produced five more series with seventy-one volumes. Between 1840 and 1848, a *Collection des principaux économistes* was published in France, running to sixteen volumes; while in England McCulloch edited a half-dozen volumes of "early" or "scarce and valuable" tracts on "economical" subjects. A German, Reinhold Pauli, unearthed and published *Drei volkswirtschaftliche Denkschriften aus der Zeit Heinrichs VIII* in 1878. The background was being laid for professional economics.

Carpenter has pointed out that "not until the nineteenth century is well along does one find bibliographies compiled by historians for historians." He then identifies several landmark bibliographies. The first general bibliography of economic literature of this period is John Ramsey McCulloch's *The Literature of Political Economy: a Classified Catalogue* (1845), based on his own library. "The first attempt at a comprehensive historical bibliography of a nation's economists was Manual Colmeiro's *Biblioteca de los economistas españoles de los siglos XVI, XVII, XVIII* (1880), [while] Luigi Cossa's *Saggi bibliografici di economia politica* (1891–1900, reprinted 1963) made a good start at doing for Italian economic literature what Colmeiro did for Spanish" (*10*).

In these same decades, the volume of business publication increased rapidly in the United States to cover a great geographical spread and the lack of any predominant city as in England or France. The start came in the form of prices-currents, but not long thereafter arose journals of wider character, such as the *General Shipping and Commercial List* at New York, soon the *Shipping and Commercial List and Price-Current* (from 1815 onward), the New York *Journal of Commerce* (1827 onward), even the *New Orleans Price Current* (1822 onward) despite its name. These were followed by specializing periodicals: the *American Railroad Journal and Advocate of Internal Improvements* (1832–1838, and succeeded by organs of somewhat similar titles); the *Bankers' Magazine* (founded in 1846); before the Civil War, a number of peculiarly American aids to the businessman, bank-note detectors; but also journals that pertained to mining, iron manufacture, and shoes and leather, beyond Hunt's *Merchants' Magazine,* already cited.

Activity in England was much more limited, and still less considerable on the Continent. England did have agricultural journals, Herepath's and other railway periodicals, a *Mining Journal and Commercial Gazette* that began in 1835, and a *Bankers' Magazine* that started 2 years prior to the American one of similar name. Perhaps the localization of merchants in specific regions in London—Mark Lane, Mincing Lane, etc.—was adequate for much communication; and mercantile newsrooms may have helped. Perhaps commodity bourses on the Continent served similar purposes.

For the most part, a single agricultural journal served England; but the United States had a journal for nearly every region: the *New England Farmer* (1822 onward); the *New York Farmer* (after 1828); the *Southern Farmer* and the *Prairie Farmer* (launched in 1840 and 1841, respectively); and others.

Two developments in the decades between 1780 and 1880 were of great magnitude: the rapid expansion of materials published by new organizations and the increase in the international flow of ideas.

Note has already been made of the East India Company, the Board of Agriculture and Internal Improvement, and the like. The number of such organizations was greater in the United States than in any other country. Societies for the promotion of agriculture were soon joined by those devoted to the promotion of manufacturing and the "useful arts." There were the private corporations—turnpike, canal, and railroad, particularly—that sought to keep in touch with their stockholders and with customers. By 1880 the volume of publications produced by American railroads was already considerable: not only annual reports, but indentures, leases, and other financial documents; freight tariffs; timetables; advertisements of lands for sale; even occasional public relations pieces. There were the periodicals stimulated by private enterprise and there were publications flowing from trade associations, chambers of commerce, stock exchanges, labor unions, credit reporting agencies, and other bodies.

A start in company histories had been made in the decades before 1780, but the period between that date and 1880 witnessed a significant expansion of output. Occasionally these documents arose from conditions of distress, as when Caleb Eddy wrote a sketch of the Middlesex Canal in 1846, when the enterprise was suffering from competition of the Boston and Lowell Railroad. Usually they were sponsored—at least blessed—by individual firms as a tribute to their successful existence over a substantial period of years. Such were Ludwig Wachler's *Geschichte des ersten Jahr-hunderts der Königlichen Eisenhütten-werke in Malapane* (1851) or Henry Domett's *Bank of New York* (1884). Historical accounts prepared by competent scholars who endeavored to write objectively were yet to appear.

Somewhat the same can be said of businessmen's biographies and autobiographies which were usually efforts at praise or self-justification. Such were Stephen Simpson's *Biography of Stephen Girard* (1832) or Bethel Henry Strousberg's document, *Dr. Strousberg und sein Wirken* (1876). There was quite a rash of such biographies in France—biographies of Laffitte (1884), several on the Rothschilds (1846, 1847, 1868, and 1869), François de Wendel (1851), Casimir Périer (1858), and a dozen others. The flow diminished after 1870, and has never really increased much in later decades. Businessmen's biographies have never amounted to much in England; they were infrequent in the United States before 1890. An interesting number of collected biographies, written generally in a popular vein, did appear: e.g., Smiles's lives of George Stephenson (1868) or Boulton and Watt (1865), and the collection entitled *Men of Invention and Industry* (1884) in England; Otto Spamer's *Buch berühmter Kaufleute* (two series, 1868 and 1869); and Freeman Hunt's *Lives of American Merchants* (1858) in America. Perhaps again the ground was being laid for higher grade performances later.

The international movement of ideas and materials has been indicated by the acceptance by German scholars of Petty's "political arithmetic," or the Italian translation and publication of works of non-Italian authors. However, movement in

the nineteenth century appears to have been much enhanced. Relative to Swedish economic development of that century, for instance, Professor Heckscher stated that "perhaps the most fundamental change of all was the tremendous increase in the international exchange of scientific and technological information (*11*).

There had been occasional translations of economic–business items in the earlier centuries, especially the eighteenth: Garzoni's *Piazza universale* (1st Italian, 1585; German edition, 1619); Savary's *Parfait négociant* (1st French, 1675; German, 1676); Savary des Bruslons' *Dictionnaire universal de commerce* (1st French, 1723–1730; English, 1751–1755; Italian, 1770–1771); Mandeville's *Fable of the Bees* (1st English, 1714; French, 1740); or Arthur Young's *Political Arithmetic* (1st English, 1774; French, 1775). Such movement was slow, with more international movement of items at the business end of the spectrum than at the economics end.

Adam Smith was important in helping to break down international barriers. Steuart's *Inquiry into the Principles of Political Economy* (1767), to be sure, was translated into the German promptly, appearing in 1769–1770. Smith's contacts were closer to France, at that time a more advanced country than Germany. Smith brought a foreign body of thought into English economic thinking for the first time in history. His *Wealth of Nations* was especially welcome in France. Before the end of the century nine editions had been published in French and editions had appeared in the United States, Ireland, Italy, Germany, Switzerland, Spain, France, Denmark, and the Netherlands. Excerpts appeared in Sweden in 1799 and a translation appeared in Russia in 1802–1806. Ricardo seems not to have been influenced by non-English ideas, but communication did increase more or less steadily in the decades between 1780 and 1880.

One vehicle of that communication was the international congress which not only provided for verbal exchanges of ideas during its sessions, but also left behind published proceedings or other documents. There was a "Congrès des économistes" in 1847, one on "réformes douanières" in 1856, one on "propriété littéraire et artistique" in 1859, meetings of the International Association for Social Progress in 1862–1865, an International Commercial Convention in 1868, and a series on "Sunday rest" beginning in 1876.

Another vehicle of communication among countries was the international exhibition. Elkanah Watson was the "father" of our agricultural fairs, which were initiated in 1810. Customarily, a report of some sort was issued covering the awards. Fairs are alleged to have been organized earlier, but little is known about them. Quite surely they produced no published residuum. One held in France in 1798, organized by M. de Neufchateau and devoted to French industrial productions, did yield a report, drafted by M. Chaptal. And there were a succession of such exhibits until the eleventh in 1849.

The Grand Exhibition of 1851 in London in the Crystal Palace was truly international in scope, and set the pattern for Philadelphia in 1876 and Chicago in 1893. These gatherings with their displays of machinery and products did much to promote industrial communication and left behind a considerable literature in the reports of judges, and in the findings of delegations from foreign countries. Documents pub-

lished on Philadelphia's Centennial Exposition of 1876 ran to more than twenty volumes.

Two features of the decades between 1780 and 1880 pertain to quality of output. One might be construed as a development from "political arithmetic," the graphic presentation of statistical data. The innovator was William Playfair, who in 1786 published his *Commercial and Political Atlas*, which was followed in 1801 by his *Statistical Breviary*. In these and other works of Playfair, one finds several varieties of diagram: line, bar, and pie.

The employment of diagrams expanded rather slowly, however, and their popularity came more in France than in their country of origin. Playfair's first book was translated into French, where it appeared under the title of *Tableaux d'arithmétique linéaire*, almost as if it were a study in method rather than a "commercial and political atlas" of England. Quetelet and other French vital statisticians made use of graphs, and so did the French government engineers having to do with public works and with transportation. C. J. Minard composed the first memoir on the graphic method in 1861, and E. J. Marey a notable text on *La Méthode graphique* in 1878. Funkhouser calls the period from 1860 to 1890 "the golden age of graphics . . . marked by the unrestrained enthusiasm, not only of statisticians, but of government and municipal authorities" (*12*).

The other qualitative change in the 1780–1880 period is that of economic thought. What Adam Smith had started, the generation of Ricardo, Malthus, James Mill, and Jean-Baptiste Say advanced further. As Professor Rogin put it, "Ever since the advent of economic science as a separate academic discipline there has existed an impulse to model it in the alleged image of an exact natural science and thus to evade both the intractability of history and disagreement as to values." From the physiocrats and Smith came the competitive equilibrium; and this provided the basis of abstract elaboration of principles in the nineteenth century, especially the roles of the different factors of production (*13*). Already in the first quarter of the century, Say was complaining of his contemporary, Ricardo, that the latter was "drawing all his results from a small number of principles, putting or leaving aside all others." He thought his case to be all the stronger because he believed Ricardo through his method "arrived at results different from the real state of the case" (*14*). Also it may be significant that in the generation after Ricardo and James Mill, economists began to be concerned with their own procedures. John Stuart Mill published his *Logic* in 1843—where he exposed "the methods of physical sciences as the proper models for the political"; John Elliot Cairnes wrote his *Character and Logical Method of Political Economy* in 1857; in the meanwhile the "historical school" in Germany had begun its creative response to the intellectual methods of the English proponents of political economy; and as late as 1891 John Neville Keynes, the father of John Maynard, issued a well-received volume on the *Scope and Method* of his subject. And in the 1870s and 1880s appeared the first substantial group of histories of economic thought, books that, unlike Blanqui's of 1842, dealt almost wholly with the abstractions and concepts that had sprung up in the preceding century.

These changes in the intellectual apparatus of economists indicated an enhanced sophistication. In the eighteenth century and earlier political economy had been largely a set of rather specific rules, not very broadly entertained, all more or less slanted toward spelling out the roles that individuals could play in the promotion of a richer, somehow better economy. In the nineteenth century, more and more, came the increased regard for imponderable, impersonal forces—maximization of profits, the interest rate, demand and supply, etc.—with at least an implied dichotomy between political and business economy. By reason of the change in the quality of political economy in the nineteenth century, a professional literature evolved within those decades—in the era, say, between David Hume and Alfred Marshall.

The Fourth Period

The final period, extending from about 1885 to the present, has been marked by a greatly increased volume of publication in the field, by enhanced professionalization in the ranks of economists, and by a revolution in the area of business administration and its literature.

The extraordinary enlargement of economic–business literature over the past 90 years has resulted from the operation of many forces: the alterations in printing technology; the changes in the publishing world; growth in the field of communication commanded by governments; increase in the number and variety of private organizations active in publication performance; and transformations of thought within both economics narrowly construed and business administration similarly viewed. There has also been a geographical expansion. Countries such as Canada, Australia, or Sweden were publishing relatively little in the field in the 1880s.

Publishing houses have contributed to the whole movement through their creative activities. Institutions such as McGraw-Hill or Simmons-Boardman were set up originally by innovating entrepreneurs. It was to the advantage of the publishing concerns to have more readers and the information they purveyed proved to be advantageous to the readers. Improved operations of business institutions, higher profits of the purchasers, meant in turn greater demand for the publishers' products. Beyond this, publishers were frequently creative by virtue of the missionary zeal for reform. Henry Varnum Poor waged almost continuous war against evils or in advocacy of reform while he was editor of the *American Railroad Journal*. The Simmons-Boardman Company promoted through its periodicals such improvements as standardized threads for bolts and nuts and standardized design for automatic coupling for railroad vehicles. The *American Journal of Mining* sponsored the American Bureau of Mines. This was good business for the economy as a whole and it helped to swell persistently the volume of business literature (*15*).

The change from laissez-faire to welfare government meant a tremendous increase in governmental production of literature concerned with economic–business affairs. Particularly pertinent is the conversion of occasional investigatory efforts

into persisting regulatory ones, with a marked enhancement of literary output. Already this change had occurred in England relative to railroads. It came in the United States primarily after 1880. The Windom and Cullom Committees that inquired respecting railroads were followed by the Interstate Commerce Commission. The Aldrich Committee of 1891–1893 and the National Monetary Commission of 1909–1910 were succeeded by the Federal Reserve Board. In the end the country possessed not merely these agencies of regulation but the Federal Trade Commission, the United States Tariff Commission, and numerous others equally well staffed and equally capable of issuing orders and regulations and special reports as well as the stock annual ones.

National governments have also become "service" states, assuming an obligation to provide freely, or at low cost, data essential or convenient for policy formation in agriculture and business, for public appraisal of economic–business affairs, etc. Such data is useful to various federal governmental agencies, but chiefly it has value to economists and businessmen scattered over the country. This is true of much work performed by the Bureau of Standards, the Department of Agriculture, and the Library of Congress. The American state governments have been equally active— or nearly so.

The enlargement of the flow of literature from private institutions has been particularly great in the United States. The decades since 1880 have witnessed notable increases in the number of trade associations, chambers of commerce, cooperatives, produce exchanges, and the like. But now international chambers of commerce, organizations of bondholders or taxpayers, and many other new institutions issue publications, especially periodicals or other serials.

Important with respect to volume and quality have been the new professional organizations and educational institutions. To the local statistical societies above noted were now added national economic and statistical associations in many countries: the Nationalekonomiska Föreningen (or Economic Society) launched in Sweden in 1877, the Royal Economic Society set up in England in 1888, the American counterpart founded the next year, down to the International Economic Association organized subsequent to World War II. In the field of business the launching of new institutions has been even more noteworthy, especially in the United States: the American Association of Public Accountants in 1887, the National Association of Credit Men in 1896, the Advertising Federation of America in 1905—and on down through the decades organizations of industrial advertisers and controllers, of sales executives and management engineers.

Schools of business have also manifested a capacity for publication. The area of business management possessed few established facts when the first schools of business were established. The Bureau of Business Research set up by the Harvard School and the Department of Industrial Research launched by the Wharton School were early responses to this situation.

Note should be taken of corporate research agencies, organized separate from governmental or educational institutions, and the financial foundations that have promoted research in the economic–business field. Both are largely the children of

the twentieth century United States. The research agencies have been varied in character. One early group—rather loosely organized—was devoted to the promotion of a series of studies in American economic history. The financial support came from the Carnegie Corporation of Washington, and the studies were published by it—of which the best known are Victor S. Clark's three volumes on our manufacturing industries and L. C. Gray's two volumes on Southern agriculture before 1860. Somewhat later came the International Committee on Price History, financed by the Rockefeller Foundation and constituted of representatives from several interested countries under the chairmanship of Sir William Beveridge. Institutions with centralized research staffs have arisen—the National Bureau of Economic Research, the Commonwealth Fund, and the like. Some are loosely connected with educational institutions as the Food Research Institute at Stanford or the Scripps Foundation for population research at Miami University. Their publications bear the implied and sometimes the explicit indication that the specific item has been developed with aid from the whole body of scholars attached to the institution, and perhaps issued only after criticism by another body of scholars. The day of the individual scholar has not passed, but such institutionalized research was unknown a half century earlier.

As for the financial foundations, all that one need note is that the funds supplied by the Rockefeller, Carnegie, Ford, and other such bodies have permitted and stimulated research and publication in a measure undreamed of prior to World War I. The impact has been largely in this country, but more recently moneys for these purposes have gone abroad from the same foundations.

Not only has the volume of economic–business literature expanded in an extraordinary degree, but the general complexion of that literature has undergone revolutionary changes.

In some measure, to be sure, there was persistence of trends, such as in the matter of continuity or accumulation. By the later decades of the nineteenth century, it had become an almost universal practice for writers in the economic–business field to consult previous writings. By the twentieth century it had become a test of scholarly quality that a man remember whence he had borrowed significant ideas or important statements of fact. The growth of national libraries, such as the British Museum or The Library of Congress, and of university and large public libraries comes chiefly in the past three-quarters of a century, especially in the United States. Cumulation has been promoted by large bibliographical works such as Gregory's *Union List of Serials*, Stammhammer's bibliography of socialism and communism, or Daniel C. Haskell's "check-list" of early European railroad literature. Cumulation has also been fostered by service departments of national governments, or private research organizations. Information is collected and hoarded in such governmental agencies as the American Bureau of Labor Statistics or Bureau of Agricultural Economics. It is also assembled and hoarded by organizations such as the National Bureau of Economic Research or the Brookings Institution. Now no one on its staff launching work on almost any historical theme need really "start from scratch."

There was also continuity from past eras in the persisting effort at measurement.

The statistical work of governments increased, and there was marked enlargement of activities on the part of private organizations. Here again the United States has taken the lead with such reporting agencies as Dodge on building construction, Cram on automobile production, Dun & Bradstreet on business failures, or Dow-Jones on stock market movements. The measurements recorded by the quasi-private, quasi-public Federal Reserve Banks make the expansion of recent decades even more striking.

Changes in the character of economic–business literature since 1880 may also be pictured correctly as proceeding from tranquility to profound disturbance. Optimism, general agreement on principles, calmness of exposition—this was the economists' "era of good feeling." Something of this spilled over into the twentieth century in the writing of such an economist as Thomas Nixon Carver. In the meantime, business had settled into a belief in the necessity of learning only by doing; experience was not merely the "best," but really the only teacher.

Of course troubles of various sorts were already brewing. Marx and Engels had formulated their "manifesto," and Marx was busy writing in the British Museum. More immediately important, Jevons, Walras, and Menger were introducing ideas of marginal utility. And still more unsettling, at least over the intermediate future, Walras was hatching his general equations, and with Pareto was introducing mathematics into the previously common-sense field of economic theory. In the same years, "practical" problems were causing controversy: bimetallism, the return of protectionism, social insurance, regulation of railroads, spread of labor unionism, and the like. The world of economics seemed to grow ever more complex.

Efforts to solve some of these problems gave encouragement to the advocates of measurement and to those who were moved to improve the science of statistics. On the whole, the protectionist-free trade controversy and that surrounding monetary affairs did not lend themselves to much quantitative handling. The field of social insurance was also somewhat infertile in this regard. However, the governmental bureaus charged with the supervision of railways in England and on the Continent collected statistical data with avidity. Some of the earliest treatises in the field, such as Gerstner's out of Austria or Audiganne's out of France, displayed a considerable bias toward quantification. And the Interstate Commerce Commission was issuing statistical volumes with its formation in 1887.

Sometimes a measurement-resisting subject would yield indirectly at least to quasi-statistical treatment in the hands of an intellectual innovator such as Professor Taussig who spoke of the "verification" of the theory of international trade under the "abnormal" conditions of dealings between a gold-standard and a paper- or silver-using country.

The study of business cycles represented most clearly the convergence of trends. Juglar demonstrated the existence of cycles in his examination of bank data from France and England (1860) in quantitative data. Subsequently the tendency in the treatment of the subject—by Jevons in 1875, the American Frederick B. Hawley, Hull in his handling of building-cost data, and pre-eminently Wesley C. Mitchell in his pathbreaking volume of 1913—was for an ever-increasing reliance upon meas-

urement. The literature concerned directly or indirectly with the business cycle would cover many running feet of library shelving, constituting a "bulge" from the trend line for this period.

Concurrently with the study of the business cycle had gone a considerable expansion in the exploration of population trends and of the associated field of actuarial science. International congresses, professional journals, a series of examinations for advanced standing, and the like have created a literature within a literature.

Not least important has been the development over the past few decades of statistical inference—with its literary products. The advances here have been linked closely with the name of R. A. Fisher of England, whose *Statistical Methods for Research Workers* (1925) and *Design for Experiments* (1935) led the way. Fisher asked what could be learned about a "universe" or aggregate from a sample out of it, and whether a sample could be selected out of the universe that would display the characteristics of the whole, or characteristics with recognized deviations from the whole. Out of this line of thought has grown quality control in business, opinion research in business and elsewhere, and the like—with another sizable addition to the volume of economic-business literature.

In the area of economic theory a noteworthy change has occurred—especially as far as the English-speaking world is concerned. In the preceding period, Cournot, Walras, and Pareto emphasized that the ideas of the theorists could be expressed clearly and precisely in mathematical language. Marshall, Edgeworth, Irving Fisher, and Pigou helped to introduce this language into England and the United States; while, more recently still, the developments in this area and in statistics have coalesced to produce econometrics, and these three in turn, with the ideas on national income stemming from Keynes, to yield model building, linear programming, and the like. By a more direct route from the mathematical "fathers" has come Professor Leontief's input-output analysis and the work that this innovation has promoted.

Twentieth century bibliographies in this field, Carpenter states, "have been compiled [to] cover all the subjects generally falling under the heading economics, rather than just the writings of economists or the literature of public finance [with] a greater emphasis on the ephemeral literature" (*16*). Henry Higgs, setting himself the goal of listing books in all western languages, produced the important *Bibliography of Economics, 1751–1775* (1935). Magdalene Humpert's *Bibliographic der Kamerelwissenschaften* followed in 1937 and a major French work, *Economie et population, les doctrines francaises avant 1800; bibliographie générale commentée*, was issued by the Institut national d'études démographiques in 1956. L. W. Hanson's *Contemporary Printed Sources for British and Irish Economic History, 1701–1750* (1963), reaches a new height in economic bibliographies, according to Carpenter.

Another significant aid to scholars is the *Catalogue* of the Kress Library of Business and Economics at the Harvard Business School, which has been issued in four volumes between 1940 and 1967.

A novel development of the era since the 1880s is the publication of "festschrif-

ten." Action of this sort suggests respect for the subject of the honor, and a high appraisal of the results of research. Such publications began to appear in Germany in the latter half of the nineteenth century, and the example was followed in Italy, Scandinavia, the Low Countries, the United States, and less so in France and England.

A second novelty was the publication of manuscript material. There had been printing of governmental materials for some time—national and local, administrative and legal—and some of the first publications in our field were so constituted, or were largely so: e.g., documents in Schmoller's study of the Strassburg cloth gild (1879), Hintze's compilation relative to the Prussian silk industry (3 Vols., 1892), Hayem's *Mémoires et documents pour servir a l'histoire du commerce et de l'industrie en France* (12 series, 1911–1929), even Bland, Brown, and Tawney's *Select Documents* (1914). The publication of private papers has come chiefly through the printing of documents from the archives of such historic institutions as the East India Company and the Hudson's Bay Company.

Literature which pertains specifically to the operation of business institutions had in these decades since 1880 been going through no less extraordinary an experience. There had been manuals that told the merchants how things *are* done—what weights, what types of money, what procedures, and the like; and occasionally a manual as to how things *should* be done. In the latter category would fall the books that linked religion with business activities. As early as the sixteenth century, John Browne's *Merchants Avizo* (1588) had given instructions to young merchants going to Spain and Portugal. Soon there were the manuals of Savary and Kruse, of Malachy Postlethwayt and Wyndham Beawes, descriptions of what was done and sometimes advice on the best among several possible practices. Even in the nineteenth century, with Babbage and Freedly and others of the midcentury, there was very limited conceptualization of business functions.

A break appears to have come in the 1880s. We know that Henry Varnum Poor and some of the American railroad executives had had ideas relative to their industry as far back as the 1850s. A new, broader, more vigorous start came in the 1880s, largely through the American Society of Mechanical Engineers. From this background came Frederick M. Taylor and what in 1905 rose to be labeled "scientific management." In these years, too, books of a new character were beginning to appear in England. There was J. Slater Lewis' *Commercial Organization of Factories* (1896), F. G. Burton's *Commercial Management of Engineering Works* (1899), and somewhat later, E. J. Elbourne's *Factory Administration and Accounts* (1914). In general the English approach was more largely accounting and commercial control than the American. In France, Faye was making a major contribution in his materials on the functional organization of business operations. And the Germans made at least an indirect contribution in the "line" and "staff" organization of their army.

These steps represented a forthright belief that generalizations, abstractions, perhaps "principles," were possible with respect to business structures and performances. The abstractions were those of business functions—marketing, production,

finance, etc.—which tended to make all business institutions into an "extended kinship group." if not into one closely knit family.

In step with the changing climate of opinion in the business world, there was the initiation of specialized training in business at the college–university level: the Wharton School of Finance at Pennsylvania, the Amos Tuck School at Dartmouth, and that on Business Administration at Harvard—with a rapid increase in popularity at other universities in the years after World War I. And a specialized literature began to flourish. Mr. Arch W. Shaw had launched *System, Business*, and other publications in the field. Other publishers kept close pace and books of professional character began to appear: Hatfield's quasi-classic *Modern Accounting* (1909), P. T. Cherington's *Advertising as a Business Force* (1913), and a small flood of items on scientific management.

Business literature has flourished most luxuriantly in the United States. Germany has been a rather distant second, though vigorous in the theoretical phases of the field, with England, France, and other countries less involved. The general attitude in England has been that one could not learn business out of books.

In the United States the growth of the literature has been notable for its increased sophistication and its changed time perspectives. Business literature reveals an increasing concern with the future. The introduction of budgeting, of market analysis, of employee training or executive development, etc., has turned businessmen's eyes increasingly toward the future; and a whole new stream of literature reflects this change. The field of business has also developed a sophisticated *historical* interest. Histories of individual business units and business functions had appeared intermittently over past centuries, but the conscious effort to create a new branch of historical study and writing relative to the operation of individual business enterprises may be regarded as a contribution of Dean Wallace B. Donham of the Harvard Business School—who brought Professor N. S. B. Gras to that institution to implement his ideas—and of their imitators and admirers of that period. An almost contemporary development—seemingly independent—occurred in Germany under the inspiration of Professor Kurt Wiedenfeld of Cologne.

A number of factors have encouraged the preparation of histories of companies: increasing longevity that makes possible semicentennial or other anniversary volumes, and improved sense of public relations. sometimes the aroused curiosity of scholars, sometimes the letter of the tax laws, etc. Increasingly, at any rate, the flow of company histories has broadened and the quality risen. Nor is the enhancement in volume and quality restricted to merely the United States and Germany. By and large England and France have lagged behind—except for histories of banking institutions in the former—but to their output must be added quite a flood from the Netherlands and Scandinavia.

Beyond businessmen's biographies there have been studies of business practices, and institutions other than individual houses: methods of dealing in foreign exchange, the commercial paper market, trade associations, and the like—even the businessman as a social creature.

This survey of the evolution of economic–business literature suggests that a narrowness in the concept has dominated the histories of economic thought. The wide-ranging literature reflects, for the Western world as a whole, the changes in the entrepreneurial and governmental systems over the centuries. Economic–business literature constitutes a connecting link between economic–business performance and the realm of ideas. It throws light, too, on the formation of public opinion and the relation of that opinion to social action. The differences in rates of economic change among nations are of increasing interest among scholars and here, too, a study of economic–business literature may prove of value. There is recognition that economic sophistication is a prerequisite to forward-looking public administration; and that there are forces and conditions in business life not adequately taken care of in the economists' abstractions. Again, the materials for a history of economic–business literature are those also for a history of economists, or of explorers and innovators among economic historians. No less than in medicine or natural science, this literature seems to manifest a tremendous increase in the volume of communication, an evolution and testing of new ideas, and a marked advance in sophistication.

The above article draws heavily upon a longer consideration of the topic by Arthur H. Cole, which was published first under the title "Conspectus for a History of Economic and Business Literature" in the *Journal of Economic History*, 17(3), (September 1957) and, in a slightly revised version, under the title *The Historical Development of Economic and Business Literature* (Publication #12 of the Kress Library of Business and Economics, Graduate School of Business, Harvard University, Boston, 1957).

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<div align="right">ARTHUR H. COLE
LAURENCE J. KIPP</div>

ECUADOR, LIBRARIES IN

In Ecuador and in the other Latin American countries, as in Europe in the Middle Ages, the monks were the first to establish libraries. The monks stocked their convent libraries with valuable, well selected books brought back from Europe.

As soon as Spanish dominion was established in South America, convents of the different religious orders were founded. Among them were the Franciscan, Dominican, Augustinian, and Jesuit orders that dedicated themselves to the spiritual and religious life of the colonies and to evangelizing the natives. The religious orders established the first centers for the education of children and young Indians, Spaniards, and Mestizos. Libraries were developed for the use of the monks, students, professors, and the general public.

The richest libraries in theological, scientific, and literary works were those of the Franciscans and Jesuits that included a selection of the best works available in France, Spain, and Italy. The collections in these *librerías* (originally "library," nowadays "bookstore") contained materials that had belonged to the Popes. Included were the best editions from Amberes, Lyons, Venice, Paris, and Turin; Bible commentaries, books in theology, canonical laws, philosophy, arts, natural sciences, mathematics, and miscellaneous areas. The collections are rich in incunabula, ancient, and rare editions.

The expulsion of the Jesuits from all Spanish dominions by the royal ordinance of King Carlos III, April 5, 1766, resulted in the confiscation of their property. The former religious libraries became the property of the state and were converted into the first public library in the Real Audiencia de Quito (today the Republic of Ecuador). The first librarian was Dr. Francisco Eugenio of Santa Cruz and Espejo, a great medical doctor and a precursor of American independence.

Several years after its founding the University of Saint Thomas became the leading university and replaced the San Gregorio University of the Jesuit Order. Part of the San Gregorio University Library was used as the nucleus for the newly founded university library. The University of Saint Thomas later became the Central University of Ecuador.

Among the written materials of the colonial period left by the Jesuits was a notable collection of textbooks, testimony to the cultural level of Ecuador at that time. Written in Latin by the faculty and students of the San Gregorio University between the years 1622–1769, the manuscripts have never been published.

The Jesuits were also responsible for the establishment of the first printing press in Ecuador in Ambato in 1754. Andán Schwartz, a Jesuit Brother from Hamburg, Germany, was the first printer. Books printed on this first press carried the imprint "Impresso en la Villa de Hambato" (Printed in Ambato City), and they are prized today as biographical rarities.

In 1759 this first printing office was moved to Quito and became part of the Colegio Máximo de San Luis. Books were printed in many subject areas including religious, literary, and scientific publications. The printing office served as a technical school for the first national printers, such as Mauricio de los Reyes and Raymundo de Salazar.

The early days of the nineteenth century were critical for Spain as well as for its American Colonies. The Napoleonic invasion, concomitant with civic depression and the struggle for liberty, left little time and energy for cultural matters. Political autonomy was the driving interest of the times.

In Ecuador the period from 1810 to 1830 was dominated by revolution and military tensions. In the fight for independence, all cultural interests and activities were set aside and, of course, library development was at a standstill. Only after 1830, when the independence of the Republic was more secure and when political and administrative life were better organized, were cultural activities resumed. Scholars and writers such as José Joaquín Olmedo, Pedro Fermín Cevallos, Juan León Mera, Gabriel García Moreno, Juan Montalvo, José Modesto Espinosa, Numa Pompillo Llona, and Julio Zaldumbide published their works, enriched national bibliography, and promoted cultural activity by the creation of popular libraries.

In 1833 the first printing law went into effect in Ecuador. The first newspapers, official gazettes of the local and central government, were published. Included were *El Quiteño Libre, El Ecuatoriano, El Nacional,* and *El Registro Municipal,* which became publications of great bibliographical significance in Ecuador in the 1830s.

After an era of national restructuring and organizing, the Republic of Ecuador entered a period of stability. Socio-political reforms were expressed in ideas, programs, and doctrinal principles that were widely publicized in books and the press of the day. The reading media kept the ideals of the republic before the public.

On January 27, 1862, the city of Guayaquil passed the first law to establish a public library, and many other cities of the country followed the example: Quito in 1886, and in 1900 the city of Loja. Between 1862 and 1925 forty public libraries were founded in various cities of the country, with most of them supported completely by the municipalities.

At the National Convention of 1869 a decree for public support of the National Library was issued. To make this feasible, a tax was placed on imported books and on the granting of university degrees. Legal deposit in the National Library of one

copy of all materials printed in Ecuador was also part of the law. However, the law was not enforced, and very little was ever deposited in the National Library.

The National Library as well as the municipal libraries, especially those of Quito and Guayaquil, serve an important educational and cultural function in Ecuador through their library services and especially through their library publications.

In 1910 the Municipal Library of Guayaquil was the first to publish a bulletin (*Boletín de la Biblioteca Municipal*, No. 1, Guayaquil, 1910–) devoted exclusively to bibliographical, historical, and archeological studies. It is one of the oldest library publications active today. The National Library of Quito, under the direction of Mrs. Zoila Ugarte de Landivar (1918–1919), and Dr. Cristobal Gangotena y Jijón (1920–1927), published a *Bulletin* devoted to information about the National Library, bibliography, cultural developments, and historical, literary, and scientific research. The publications were grouped into three series. The first included 19 numbers (August 1918–March 1919); the second, called the new series, included 15 numbers (October 1920–May 1921); and the third, also known as the new series, included 12 numbers (December 1925–October 1927).

In 1936 the first issue of *Revista de la Biblioteca Nacional* appeared with Enrique Terán as editor. After a few issues it ceased publication. In 1920 the Municipal Library of Quito, directed by Luciano Andrade Marín (1919), published a *Bulletin* that was suspended after four issues. Between 1959 and 1965, three issues of the journal appeared under the title of *Revista de la Biblioteca Municipal de Quito*.

Other libraries, such as the Library of the Central University of Quito in 1931 and the University of Cuenca in 1945, published bulletins for a brief period. Included were the *Boletín de la Biblioteca de la Universidad Central del Ecuador*, Nos. 1–2, January-March 1931–April-May 1931, *Boletín Bibliográfica de la Universidad de la Cuenca*, Juan Bautista Vazquez Library, Nos. 1–50, December 25, 1945–November 10, 1958.

The following three men were primarily responsible for the collection of Ecuadoriana and the development of Ecuadorian bibliography at the beginning of this century: Jacinto Jijón y Caamaño, outstanding politician, historian, and archeologist; Carlos A. Rolando and Miguel Angel Jaramillo, notable bibliographers. Natives of Quito, Guayaquil, and Cuenca, respectively, their libraries and information centers on the history and culture of Ecuador are geographically distributed in the three major cultural cities of the country.

The Jacinto Jijón y Caamaño Library has many bibliographical treasures of great interest to the American Continent and Ecuador, such as a collection of the first newspaper, *Primicias de la Cultura*, published in Quito during the decades of the colonial period. This library was closed to the public after the death of its owner and founder, Jacinto Jijón Caamaño.

The Carlos A. Rolando Library started in 1913 and in 25 years became one of the most important bibliographical collections of Ecuadoriana. In 1936 its collection contained more than 4,000 books 8,000 pamphlets, 125,000 newspapers and journals, 14,500 broad sheets, and 280 manuscripts. In 1932 it was donated to the

city of Guayaquil with the condition that Mr. Rolando remain as its director. This notable library continued to grow under his direction and care.

In addition to the creation and scientific organization of the Library of Ecuadoriana, Carlos A. Rolando contributed his own studies and works about bibliography and library science as well as those authored by others. In 1939–1940, in collaboration with Don Juan Antonio Alminate, he published the journal *Libros y Bibliotecas*, devoted to librarianship and bibliography in Ecuador. Mr. Alminate, a noted bibliographer, introduced the Dewey Decimal Classification Scheme into Ecuador.

The Miguel Angel Jaramillo Library is a testimony to the intellectual tradition of the city of Cuenca, Province of Azuay. Created by the most revered canon, Dr. Miguel Angel Jaramillo, it became a notable bibliographical collection of Ecuadoriana. The library's publication *Indice Bibliográfico*, issued in 1932, was an essay on Ecuadorian bibliography. When its founder died the library was donated to the city of Cuenca.

In the last three decades several public and private institutions have had the responsibility for promoting and developing the bibliography of Ecuador. The government created the Ecuadorian Cultural Institute in 1942. Two years later, as the Casa de la Cultura Ecuadoriana (House of Ecuadorian Culture), its function was to promote national culture and to encourage the publication and diffusion of Ecuadorian books. In 1948 the library, the museum, and the National Archives were annexed to the institute.

The House of Ecuadorian Culture is an autonomous entity. In accordance with a program for cultural development, it has branches in the various provinces with the most important in Cuenca and Guayaquil. The main house in Quinto has a twofold bibliographical service: it issues publications and acts as a public library for the members of the institute and the general public. The same services have been established in most branches of the provinces.

The National Library, even though it has been annexed to the House of Ecuadorian Culture since 1948, has not developed or functioned as such. Its building facilities are inadequate and its organization, development, and services are not up-to-date. It continues to be called the National Library and the only notable area in its limited collection is a group of rare books that belonged to the Jesuits in colonial times. There are valuable research tools for the history of Ecuadorian culture.

The following three private institutions house important Ecuadoriana materials: (1) the Aurelio Esponosa Pólit Ecuatoriana Library in Quito, (2) the Carlos Manuel Larrea Library also in Quito, and (3) the Miguel Díaz Cueva Library in Cuenca.

The Aurelio Espinosa Pólit Ecudoriana Library is most remarkable and comprehensive. Its collection includes, in addition to books, journals, and newspapers, sections devoted to archives, chartography, museums of art, history, and archeology of Ecuador. The complete holdings include about 30,000 volumes, 100,000 pamphlets, 1,400 journals, 1,800 newspapers, and more than 30,000 broad sheets. There is also a file of original documents and manuscripts corresponding to almost

every period of national history and culture. Several bibliographical files of important persons in the history and letters of Ecuador are part of the documentary wealth of this institution.

The compilation of comprehensive bibliographies of several Ecuadorian writers has been difficult in the past because a major portion of their literary, historic, and scientific output is in the form of short treatises, pamphlets, and articles in relatively unknown journals. However, the Aurelio Espinosa Pólit Library does have near comprehensive bibliographies of a great majority of Ecuadorian writers. A large number of little known literary and historical journals are housed in the library, making it an excellent resource center for scholarly research on national Ecuadorian culture.

This private institution belongs to the Jesuits who are known for their scholarly and cultural interests. The Jesuit priest, Aurelio Espinosa Pólit, humanist, critic, teacher, founder, and first rector of the Catholic Pontifical University of Ecuador, was the founder and the director of the library.

As a private institution, it has only limited economic resources and services. It is very much in need of government and foundation aid. Even when it is open to the public, the lack of trained personnel and inadequate organization and bibliographical services limit its effectiveness for research. Nevertheless, it is the leading center for Ecuadoriana for students and scholars.

The diplomat and historian, Dr. Carlos Manuel Larrea, founded and financially supported the Carlos Manuel Larrea Library. Dr. Miguel Díaz Cueva, a lawyer, bibliophile, and bibliographer from Cueva, founded the library named after him. Both of these libraries are up-to-date, well-endowed national documentation centers.

The Central University of Ecuador Library is the oldest and most important in Ecuador. Although it inherited most of the holdings formerly in the libraries of San Gregorio University and the Maximo College of San Luis, its collection is lacking in many ways. Through the years the many reorganizations of the library resulted in the loss of vital material. The policy of the library since the beginning of the century has been to serve the teaching function of the university primarily by acquiring new editions and current publications and by discarding older ones. As a consequence the collection consists mainly of modern textbooks and reference books with a limited amount of material relating to Ecuador's colonial era. This can also be said of other state university libraries such as those of Guayaquil, Cuenca, and Loja.

The Library of the Catholic Pontifical University of Ecuador, founded in 1946, has not followed the policy of the state university libraries. Instead, its collection has been allowed to develop. The retention of older materials gives it a more comprehensive character. Organized along the most up-to-date scientific and technical library methods with the assistance of the Point Four Program, its program is under the auspicies of the University of Saint Louis, Missouri, with Miss Eleanor Mitchell directing the work. In addition to its excellent organization, it has professionally trained personnel.

Since the beginning of the present century, the organization and administration

of the libraries in Ecuador has not been under the direction of trained librarians. Even today the most important libraries (e.g., Biblioteca Nacional de Quito, Biblioteca Municipal de Guayaquil, and Biblioteca Municipal de Cuenca) do not have the advantage of professionally trained personnel. In 1930 modern methods of librarianship and the Dewey Decimal System were introduced into the libraries of Ecuador.

It had been difficult for a newly developing nation such as Ecuador to expend the effort and the energy to incorporate modern methods of librarianship. Many socio-economic problems of the nation had first to be resolved. However, during the last 40 years there has been much awareness of the need to promote librarianship and modern library methods. Short courses of library training have been instituted for most library personnel and, in 1960, the first library school was founded at the University of Guayaquil. There have been a number of graduates from the school but as yet it is still in an experimental phase.

The Library Association was founded in Quito in 1964 as a professional and cultural organization with national and international interests. Its objective is to "promote and improve libraries in Ecuador to recruit able members to the library profession" (see the *Statutes of the Ecuadorian Library Association*, arts. 1-2, i, j). There are about 100 members in the organization at present and it operates as an independent legal entity.

A meeting of experts was held in Quito from February 7 through 14, 1966, for the planning of National Library Services in Latin America. *Report on a Planning Program for Library Services in Ecuador*, a report issued as a result of the meeting, contains the following conclusions:

> The Ecuadorian Government must provide a national plan for developing, establishing, and maintaining library services in Ecuador. The national government must share this responsibility with state and local governments and private organizations as well.

> Library services must be planned in conjunction with the general planning for education and the cultural, economic, and social needs of the country.

> To implement this idea the Ministry of Public Education will have the responsibility of relating library needs to educational needs. A wide-scale study is to be made of the present library conditions in the nation, and based upon its findings library planning for the future will be organized.

> The Department for National Library Services within the Ministry of Education will be designated as the official organ in the government with the responsibility for these services. The Ministry of Education will serve as a council for the Department.

> School libraries will be within the province of the Department. Where school libraries do not exist the local public library will serve in its place with both the city and the national government contributing to its support while the school library is in the process of development.

> National and municipal governments will cooperate in the development of public libraries on all levels. Extension library services will also be provided cooperatively in sparsely populated areas. If a school library is the only available library in a sparsely populated area it will be used as the public library as well.

University and special libraries should be developed cooperatively so as to benefit research, development, and higher education to the highest degree possible. Library budgets will be more efficiently utilized if bibliographical materials are cooperatively acquired and used.

The immediate completion of the new National Library building is of utmost importance to the development of effective national library services. The recommendations of a professional library consultant should be incorporated into the new building. Books and other materials printed in Ecuador will be collected in the National Library making it the prime bibliographical source for national material. It will also serve as the National Center for Publication Exchange.

Finally, it is suggested that the Government of Ecuador adopt at its earliest convenience a national plan for library services incorporating documentation centers into the plan.

The following "Structure of Library Organization" and the "Organization of Library Services and Documentation Centers" in Ecuador were recommended by the report issued as a result of the Meeting of Experts for the Latin American Program for National Libraries and Services.

I. Structure of Library Organization
    Library services will be structured as an integral part of the national plan for education and they will therefore be under the direction of the Ministry of National Education.
    A. A Department of the National Library Services will ensure the planning, development and extension services of libraries and documentation centers. This Department will have the following functions:
        1. Study the characteristics and present structure of the administration and the operation of the library services and of the various libraries existing in the country to determine the available resources, geographical distribution, bibliographical materials, building facilities, equipment, and personnel.
        2. Determine the needs and literacy levels of the mass population, as well as the demands for reading and information of the population group with higher educational attainment.
        3. Determine the needs that exist in the country in relation to the number of libraries, their resources, characteristics, and geographical distribution.
        4. Prepare plans for the development of library services and documentation centers.
        5. Determine the costs of these plans and how they will be financed.
        6. Implement the plans.
    B. The Department of the National Library will have the cooperation of a Council for the Development of Libraries, which will be integrated by the following:
        1. General Director of Education
        2. Director of Integral Planning of Education
        3. Director of the Department of the National Library Services.
        4. Director of the National Library.
        5. President of the House of Ecuadorian Culture.
        6. One representative of the Ecuadorian Association of Librarians.
        7. One representative of the University Schools of Library Service.
        8. One representative of the Ecuadorian Chamber of the Book.
        9. One representative from each of the different types of libraries: university, specialized, public, school, and documentation centers.
    C. To facilitate the organization and administration of the library services, a Regional Administration must be created under the Department of National Library Services.

D. The Department of National Library Services will be in charge of organization and administration of the libraries. It will also try to employ the best professional, cultural, and technical improvement for the libraries. The periodical evaluation of this plan for development of the library services will constitute an efficient means for technical and administrative inspection.

E. The planning and development of library services will require the promulgation of a law incorporating rules relating to the organization and administration of libraries, interlibrary lending, international and national exchange, and other matters.

F. The preparation and execution of library development plans requires the employment of qualified personnel. To insure a supply of such personnel the Department of National Library Services plans to promote library science schools in one or more of the universities.

G. The activities of the Ecuadorian Library Association are important for the successful development and extension of library services.

II. Organization of the Services of Libraries and Documentation Centers.

With respect to the organization of library services and documentation centers, the suggestions resulting from the Meeting of Experts for a National Plan for Libraries and Services referred to the national, school, public, university, special libraries and documentation centers. Each type has its specific functions, organization, and specialization.

A. National Library
  1. Functions
     a. Collect and conserve the national bibliographical production, depending upon compulsory legal deposit as an important instrument for building the collection.
     b. Provide users on a national and international basis with library resources and services.
     c. Compile the national and other bibliography as required for its functions and services.
     d. Maintain the national and international exchange of materials.
     e. Centralize interlibrary loans on a national and international basis.
     f. Acquire monographic, periodical and other material as specified in its policy and plans.
     g. Centralize the cataloging and classification of materials, print and distribute catalog cards, and acquire the printed catalogs available from other libraries.
     h. Collaborate to extend and improve the services of school and public libraries.
  2. Reorganization of the Library
     a. Construct new building.
     b. Reorganize the library's methods of cataloging, classification, and registration.

B. School Libraries
  1. Functions
     a. Assist primary and secondary school teachers in their work.
     b. Assist pupils to complete and improve their education.
     c. Act as a public library in regions where they are lacking.
  2. Implementation
     a. Create 85 new primary school libraries each year until a maximum of 850 libraries have been created.
     b. Create 200 primary school level reading centers each year until a maximum of 2,000 centers are created.
     c. Circulate books to teachers and students.
     d. Increase the budget in the secondary schools for the acquisition of books for the library.
     e. Acquire the following audiovisual materials: 200 copies of 300 educational film series, 10 copies of 300 educational records, 50 projectors, and 50 portable record players.

3. Organization of services

    a. The Department of National Library Service advises, regulates, and supervises school libraries and assists with initiating of extension library services.

    b. The municipalities cooperate in the establishment and maintenance of school libraries and extension library services.

    c. The department selects, acquires, and prepares library catalogs and cooperates with the library schools in the training of teacher-librarians.

C. Public Libraries

  1. Functions

    a. Offer free reading services to all members of the community.

    b. Participate actively in cultural programs for the community.

    c. Offer reading services to the schools that lack libraries.

    d. Participate in teaching illiterates to read.

  2. Implementation

    a. Create 113 new public libraries at the rate of 11 per year in localities with a population of 3,000 to 5,000.

    b. Create 500 reading centers at the average of 50 per year.

    c. Establish bookmobile service for localities without adequate libraries.

  3. Organization

    a. The Department of the National Library Services is in charge of counciling, regulating and supervising public libraries, and establishing extension library services.

    b. The Provincial Council or the House of the Ecuadorian Culture in each province will serve as liaison between the Department of the National Library Services and the Public Libraries.

    c. Each city that has a library will nominate a committee that will represent the main interests of the community. Its function will be to supervise library services.

    d. The Department of the National Library Services, with the collaboration of the provincial and municipal governments, will administer the selection, acquisition, and cataloging of library materials.

    e. The Department is in charge of development and growth of library schools for the education of new librarians, as well as for the improvement of personnel now in service.

    f. A pilot public library will serve as center for research and development for library methods and techniques for the training of personnel.

D. University Libraries

  1. Functions

    a. Ensure adequate bibliographical information and control to serve the teaching and research needs of the university.

  2. Implementation

    a. Provide modern and adequate books.

    b. Provide buildings and materials.

    c. Initiate coordination and cooperative programs.

    d. Compile union catalogs.

    e. Improve reference services, circulation, and exchange programs.

    f. Increase the budget allotment.

    g. Increase the quantity and quality of library personnel.

    h. Acquire additional duplicating machines and audiovisual materials.

    i. Incorporate modern and efficient library techniques and methods.

  3. Organization

    a. Utilize resources more efficiently and economically

      (1) Coordinate book and specialized material acquisition.

      (2) Provide a centralized catalog.

(3) Provide cooperative reference services.
(4) Encourage interlibrary loans.
   b. Standardize methods and techniques in all the university libraries.
E. Special Libraries
   1. Function: to serve the institution to which they are attached with adequate materials and services to further research and development.
   2. Organization: because these libraries are few in number, poorly staffed and in need of financial support they should cooperate with the university libraries in every way possible.
F. Documentation Centers
   1. Since university and special libraries at present are in a preliminary stage of development, documentation centers that depend upon them for sustenance will have to wait until they are strengthened to be established.
   2. When university and special libraries are in a more advanced stage of development, documentation centers can be initiated.
      a. A center for scientific and technical documentation will eventually be developed with the cooperation of university, special libraries and technical schools such as the polytechnical schools of Quito and Guayaquil.
      b. A center for economic and social documentation will also be developed with the cooperation of university and special libraries in that field.
G. Bibliographical Services
   1. In conjunction with the National Library an Ecuadorian Commision for Bibliography will be created.
      a. Functions
         (1) Compile and publish national bibliography both present and retrospective.
         (2) Compile bibliography related to Ecuador.
         (3) Compile bibliographies about particular subjects of national interest.
         (4) Compile lists of materials acquired through the copyright acquisition office.

For additional material relating to the planning of library services in Ecuador, see the *UNESCO Bull. Lib.*, **20** (November–December 1966).

If the outlined plans for the development of national library services in Ecuador are implemented, the cultural advantages of libraries for all will be assured. Development of libraries has been slow and sporadic, but there are now good prospects for the long awaited progress.

JULIAN G. BRAVO
(Translated by Savina A. Roxas)

EDINBURGH BIBLIOGRAPHICAL SOCIETY

Founded in 1890, the Edinburgh Bibliographical Society was the first society devoted specifically to bibliography to be formed in the English-speaking world. There were many reasons why the initiative should have been taken in Edinburgh at that time. Apart from its long literary traditions, the city was an important center of the book trade: papermaking, typefounding, and bookbinding all contributed to

the importance of this trade; printing was one of the city's major industries; and Edinburgh was still the home of a number of publishers. Its many large libraries included such notable ones as the Advocates' Library, Edinburgh University Library, and the Signet Library. The Advocates' Library especially, founded 2 centuries earlier, and 35 years later to become the National Library of Scotland, one of the four largest libraries in Great Britain and possessor of the statutory privilege of copyright deposit, was a natural focus for bibliographical research.

The story of the founding of the society has been told by George Pyper Johnston, its honorary secretary and treasurer for the first 42 years of its existence, and is printed in the society's *Publications*, Vol. 15. The originator of the proposal to found such a society in Edinburgh was George Waterston, a director of the family firm of printers and stationers, George Waterston and Sons, who became the Society's second president in 1891. The inaugural meeting, attended by thirty members, was held on January 16, 1890, in the Board Room of the Philosophical Institution, 4 Queen Street (where meetings continued to be held until 1939). A committee was elected consisting of a president (Archibald Constable, director of the printing firm of T. and A. Constable), a vice-president (Thomas Graves Law, librarian of the Signet Library), an honorary secretary and treasurer (G. P. Johnston, who was an antiquarian bookseller in Edinburgh), and three other members.

The formulation of a Constitution and Rules was a matter that received careful consideration by the new society and its committee. There was much discussion on the question of the name to be adopted; an alternative, that of Scottish Bibliographical Society, was rejected as tending to confine the scope of the society too narrowly within national limits in favor of the title chosen. The objects of the society were declared to be:

(1) The discussion and elucidation of questions connected with books, more especially Scottish,
(2) The compilation of special lists with a view to the formation of a complete Scottish bibliography,
(3) The noting of books printed in or relating to Scotland which are not to be found in the Edinburgh Public Libraries,
(4) The exhibition of rare or remarkable books, printed or in manuscript,
(5) The occasional issue of selected Papers, Reprints, and Facsimiles.

The number of ordinary members was limited to 70, with corresponding members to a number not exceeding 12. The number of copies of Papers to be printed on each occasion was limited to that of members on the roll at the time, and the subscription was fixed at 10s. 6d. Meetings were to be held once a fortnight (later changed to once a month) from November 1 to March 31.

The issue of Papers, which later received the series title *Publications*, began in 1891. The selection of papers to be printed was in the hands of the committee but the main editorial work was done by G. P. Johnston. Some other bibliographies were offered and accepted for printing in *Publications*, in some instances the expense of printing being borne by the contributors. Many of the facsimiles that accompanied the printed papers were presented to the society by individual members. It was in

this way that the society, with a small annual subscription and limited membership. was able to print so much.

By December 1892, "with a view to carrying out in a systematic manner," the second object of the society, a list of subjects allotted to particular members or to groups of members had been drawn up and circulated. The main heads were (1) Scottish printers after 1600, in continuation of Dickson and Edmond's work (*Annals of Scottish Printing*, 1890), (2) publications of Scottish local presses, (3) books printed in Scotland before 1640, (4) Scottish books printed abroad before 1640, (5) condemned books connected with Scotland, (6) books with spurious Scottish imprints, (7) Napier of Merchiston, (8) heraldic manuscripts, (9) collections in manuscript of popular Scottish ballads, and (10) cartography of Scotland. The list was not comprehensive, since it was based upon work already in progress. Members were invited to submit material to those in charge of the subjects and to undertake others not yet appropriated. A handlist of Andro Hart's prints accompanied the circular, and it was intended that other handlists should be circulated from time to time.

In 1896 T. G. Law proposed that a handlist of Scottish books printed before 1700 should be prepared as a preliminary to the projected bibliography of books printed in Scotland before 1700. The compilation of the handlist was undertaken by Harry Gidney Aldis, and in 1904, when the work had reached a stage at which it was thought that the printing of the handlist "would facilitate further progress and co-operation by shewing what titles were still unrecorded or defective," *A List of Books Printed in Scotland before 1700* was issued as *Publications*, Vol. 7. The *List*, which contained 3,919 entries, was of short titles, each entry restricted as far as possible to one line and including particulars of size, place of publication, printer or bookseller, whether a full collation had been obtained, and, if known, a library in which a copy was to be found. It was arranged in chronological order, and lists of printers, booksellers, and stationers in both topographical and alphabetical order, with brief notices accompanying entries under the latter arrangement, and an alphabetical index of authors was added. Three hundred additional copies were printed, of which sixty-six were presented to libraries in Great Britain, North America, and the Continent.

The society's efforts toward accomplishing its main original object of producing a Scottish bibliography were unable to go beyond the Aldis *List*, itself a considerable achievement. Aldis, since 1899 secretary of Cambridge University Library, continued to collect titles and to prepare the bibliography for a time, but official duties and, eventually, illness compelled him to hand over the work to G. P. Johnston, and although Johnston in 1928 could still speak optimistically of progress towards the completion of the full bibliography, it was not until the work was taken over by the professional staff of the National Library of Scotland under the direction of its librarian, Professor William Beattie, who had continued it himself while Keeper of Printed Books in the National Library and secretary of the society, that a greatly augmented reprint of the *List* could be published in 1970 [1971] by the National Library of Scotland as a photographic reprint, with additions, including entries for

books published in 1700, price £4.50. The catalog slips, which contained the short-title entries and, where they had been obtained, the full bibliographical descriptions for the bibliography, were deposited in the Advocates' Library after Aldis's death in 1919.

The fifteen volumes of *Publications* represent the realization of the work outlined in the circular of 1892 and a great deal more. Besides the Aldis *List*, *Publications* contain bibliographical contributions on individual Scottish printers or presses from Thomas Finlason to Peter Buchan and much else that relates to the history of printing, particularly of early printing, in Scotland: contributions to the bibliography of Scottish books printed abroad like that of P. J. Anderson on Duncan Liddel or of Edward Gordon Duff on the first two books to be printed in Scots; bibliographies of an assortment of authors from Andrew Fletcher of Saltoun or James Hogg to William Mitchell the Tincklarian doctor; William Cowan's *Bibliography of the Book of Common Order and Psalm Book of the Church of Scotland*; bibliographies of particular persons or special subjects such as John Scott's *Bibliography of Works Relating to Mary Queen of Scots, 1544–1700*, Scott and G. P. Johnston's *Printed Documents and Books Relating to the Darien Company*, and John Ferguson's *Witchcraft Literature of Scotland*; and lists of the fifteenth-century books in all the large libraries in Edinburgh and in Aberdeen University Library.

The conclusion of G. P. Johnston's long term of office as honorary secretary marked the end of an era in the society's history, during which it had been one of limited membership and its ultimate aim had been the compilation of a Scottish bibliography. A proposal by A. W. Pollard in 1898 that libraries might be permitted to subscribe to *Publications* was rejected and the annual subscription was not increased until 1920, when it was raised to 1 guinea. Much had been accomplished with limited membership and exiguous resources.

In 1935 the rules of the society were altered. Limitation of the number of members was abolished and membership was also opened to institutions. Reference to the projected Scottish bibliography was deleted from the objects of the society, its place being taken by "The promotion and encouragement of bibliographical studies," and "The printing of bibliographical studies, in particular of a series of *Transactions* in annual parts" replaced the fifth object. William Beattie (joint honorary secretary with Johnston from 1930 and honorary secretary and treasurer from 1932) became editor of the new series.

Transactions, in a larger format than that of *Publications*, found room for more extensive contributions and more elaborate work. Important contributions to Scottish bibliography continued to appear in it: on printers and presses, the handlist of the productions of John Wreittoun by William Beattie, George Hay Forbes's Pitsligo Press by J. B. Primrose, William Perry's Academy and Printing Press by Alexander Law, among other works; on special classes of books such as the St Andrews University theses by R. G. Cant; bibliographies of authors like that of Sir George Mackenzie by F. S. Ferguson or of the poetical works of Sir Walter Scott by William Ruff; and relating to libraries, such as the survey of the first 20 years of the National Library of Scotland by M. R. Dobie and W. Beattie, and Philip

Ardagh's St Andrews University Library and the Copyright Acts. But the editor was now able to take advantage of the broader aims of the society to encourage work in a neglected area of bibliographical research, namely that of music, and the society can therefore claim credit for the important contributions to the bibliography of music that have appeared in *Transactions,* much of it the work of two pioneers, Cecil Hopkinson and C. B. Oldman (*Thomson's Collections of National Song, with Special Reference to Haydn and Beethoven* and *Haydn's Settings of Scottish Songs in the Collections of Napier and Whyte*) or of Hopkinson alone (*Eighteenth-Century Editions of the Keyboard Compositions of Domenico Scarlatti* and *Handel and France: Editions Published There During His Lifetime*). Others are Eleanore B. Murrie's *Notes on the Printers and Publishers of English Song-books, 1651–1702,* F. C. Eeles and J. H. Arnold on *Some Leaves of a Thirteenth-Century Missal Probably from Jedburgh Abbey,* and Helena M. Shire's survey *Court Song in Scotland after 1603: Aberdeenshire.*

The latest part of *Transactions* to be issued is Vol. 4, Part 5. The series was edited by J. H. Loudon in succession to William Beattie from 1950 to 1968. The present honorary editor is L. J. G. Heywood.

In 1950 the society published its most ambitious facsimile of early Scottish printing, *The Chepman and Myllar Prints,* with a bibliographical note by William Beattie. This was followed in 1966 by another facsimile of an early and rare book, *The Taill of Rauf Coilyear* (Lekpreuik, St Andrews, 1572), also edited by Beattie. The society's special encouragement of music bibliography was manifested by the publication under its imprint of Cecil Hopkinson's *Bibliography of the Musical and Literary Works of Hector Berlioz, 1803–1869* in 1951.

Some five or six meetings of the society are held during each session, normally in the National Library of Scotland, with an average attendance (in recent years) of over thirty members. Membership is approximately 220. The present office-bearers are Alexander Law, O.B.E., Ph.D. (president), D. M. Lloyd (vice-president), J. R. Seaton (honorary secretary), and M. A. Begg (honorary treasurer). The annual subscription for membership was increased in 1971 to £1.10 ($3.50 if paid in foreign currency), payable to the Honorary Treasurer, c/o National Library of Scotland, George IV Bridge, Edinburgh EH1 1EW, Scotland.

J. R. SEATON

EDINBURGH UNIVERSITY LIBRARY

Edinburgh University Library can be said to anticipate the university itself by 2 or 3 years. In 1580 Clement Little (or Litil), advocate, bequeathed to Edinburgh and its Kirk his 300 books, for a "public library." His collection was of serious books, legal and theological, and he intended it to serve the college which he and his brother, Provost William Little, sought to establish in the city. In 1583 the college's

J. 6. 22.   *ffff*

DEFENSIO ORTHODOXAE
fidei de facra Trinitate,côtra prodigio-
fos errores Michaelis Serueti Hifpani:
vbi oftenditur hæreticos iureGladii co-
ercendos effe,& nominatim de homine
hoc tam impio iuftè & meritò fumptú
Geneuæ fuiffe fupplicium.

Per Iohannem Caluinum.

Oliua Roberti Stephani.
M. D. L I I I.

I AM GEVIN TO EDINBVRGH & KIRKOF
GOD BE MAISTER CLEMENT LITIL
THAIR TO REMAN. 1580

FIGURE 1. *Book from the Clement Litil collection.*

first classes were held, and in the following year the Town Council decreed that the books should be transferred and "set up in the Town's College in a house conven-ient." For a century the collection remained both the college's library and the sole public library in the town. Most of the books remain in the University Library to this day; they bear Clement Little's heraldic stamp and a block stamp: "I am gevin to Edinburgh & Kirk of God be Maister Clement Litil, thair to reman. 1580" (see Figure 1).

From this auspicious if hardly frivolous beginning the library increased slowly, chiefly by single gifts of books from graduands.* But in 1626 it received what is still one of its most important single benefactions. William Drummond of Hawthornden

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*For readers in the United States: this term refers to those about to graduate.

— poet, friend of Ben Jonson, European man of letters — gave to the library more than 500 of his own books. These reflected his own intellectual interests: poetry, history, the classics, mathematics, and all that concerned the Later Renaissance. Drummond's original gift of 1626 included two Shakespearean quartos and other contemporary literature which was scarcely represented then in other learned libraries. A catalog was printed in 1627. In subsequent years Drummond gave further books of similar quality.

This redoubtable accession led the Town Council (which then firmly governed the college) to consider seriously the need for adequate library accommodation: not before time, for the existing premises were not weatherproof. In 1642 a new and separate building was put up.

Meantime (in 1635) the Town Council had appointed the first librarian, Kenneth Logie, with the title of "Keeper of the Library." He was ordered to keep the library open for 6 hours a day in summer and 4 hours in winter; at that time, no books in the library could be borrowed from it and stringent conditions were imposed upon all users. Logie's salary was, however, only 400 marks (ca. £22 10s. in contemporary English money) and he left in 1641. He had nine successors until in 1667 William Henderson was appointed. Henderson was the first librarian of stature. He was succeeded by his son Robert, who held office till 1747. In the century of the Hendersons' care the library prospered, catalogs were made, scholars were served — and their records survive to answer unpredicted equiries in the twentieth century. There is evidence that Robert was not unaware of his duty to future scholars; anyway, he was notably reluctant to approach a certain part of the original college wall which, according to tradition, would one day collapse upon the most learned man in the college.

The collections increased slowly, still chiefly by gifts of books, or money to buy books, from graduands. Purchasing grants in the seventeenth and early eighteenth centuries were virtually nonexistent, but from 1710 a regular source of accessions appeared. The Copyright Act of 1709 entitled the library to claim a free copy of all British books. (The earliest claim records under the Act are preserved.) The books claimed were, naturally, mostly those of academic interest. While nowadays one wishes that the library had also claimed all the ephemera of the day, a great deal that would never have been bought at the time was secured and remains in the library. By 1826 about 850 books a year were received under the Act. In 1837, however, under another Act, all Scottish University libraries lost the privilege of legal deposit, and received instead a fixed annual sum of money in compensation. The university first made funds available for library purchases in 1737, and Principal William Robertson established such provision on an annual basis in 1763.

The growth of the university was reflected in that of its library. There were seven professorships in the sixteenth century; five more were created in the seventeenth, thirteen in the eighteenth, and seventeen in the nineteenth century. There were 3,000 books in the library in 1641, 11,000 in 1695, 70,000 in 1825, 140,000 in 1883, 250,000 in 1910. The nineteenth century was marked by the gift and bequest of several collections of great importance and a brief period of deliberate purchase of

fine books, but not by any outstanding professional developments. From 1747 the office of librarian was held by a succession of professors, until John Small was promoted to the post in 1854; he died in office in 1886. As assistant librarian first appointed in 1880 was Alexander Anderson, who later held the office of librarian until his death in 1909. He was a colorful if unacademic figure. Originally a railway platelayer, he published successful verse under the pseudonym of "Surfaceman" and, though wholly self-taught, pursued a literary life. In 1910 Frank C. Nicholson was appointed librarian. He transformed the library, reorganized it, and brought it up to date. He was responsible for the outstanding *Catalogue of Printed Books,* published in three volumes 1918–1923, for the preparation and publication of other catalogs, and for the development of the whole service on sound professional lines. Dr. L. W. Sharp succeeded Nicholson in 1939 and steered the library through the difficult years of World War II and the more difficult postwar years when the university expanded very rapidly without a corresponding increase in resources for its library. It is particularly due to Sharp that the library took a leading part in cooperative activities with other libraries, both bibliographic and general. He died in office in 1959.

The present administration of the library is founded upon two Ordinances approved by the Privy Council in 1891 and 1895. They first established a Library Committee "charged with the immediate superintendence of the University Library, and of the contents thereof, and of any libraries acquired, or to be acquired, for the use of the University or of any class therein." The later Ordinance regulated in considerable detail the administration of the library, stated who may use it and who may borrow books, the penalties incurred by failure to observe the regulations, the appointment of staff, and other matters.

The university teaches all major academic subjects, and has departments and other units throughout and beyond the City of Edinburgh. For this reason the University Library is inevitably fragmented. By the early 1960s there were about 100 separate libraries, all financed by the Library Committee; fifteen of these had full-time library staff.

In 1965 the Library Committee decided on a three-tier structure for the whole system. First the Main Library, at that time being built on the new humanities campus which would serve the Faculties of Arts and Social Sciences, contain the manuscript and historical materials in all fields, and house central processing and library administration. The second tier comprises the sectional libraries each serving a Faculty situated some distance from the Main Library. Third are the departmental libraries, each situated in and serving isolated teaching or research units. The future of the very small "class libraries," duplicating collections in the major libraries, is uncertain.

The largest sectional library is New College Library. Opened in 1846, this was deposited with the university by the Church of Scotland in 1962; it contains nearly 200,000 volumes and is being reorganized as primarily the university's theological library. The Central Medical Library was established in 1930 and the Law Library in 1959, both by the transfer of relevant books from the Central Library. The Reid

Music Library and the library of the Royal Dick School of Veterinary Studies have been upgraded from the category of departmental libraries, and are now self-contained libraries for both students and researchers. The departmental libraries in Science and Engineering will merge to form a Science Library in a new building on the science campus. Each sectional library has its own budget, acquires and processes its own materials, and has the benefit of a Faculty Library Advisory Committee on which the university and sectional librarians serve. The library's truck maintains daily schedules between the various units of the system.

A union name catalog is maintained in the Main Library. A new format and style, in typed volumes, was devised in 1958–1959; progress in revising the whole catalog has accelerated and the new catalog is now (1970) 55% complete.

The Dewey Decimal System was adopted for classifying additions to the Main Library in 1925, but a large proportion of books remain to be classified; the resources for this work are limited. The Sectional Libraries use various classifications including UDC, Barnard, and Union Theological Seminary.

The total bookstock is a million volumes, to which 30,000 volumes are added annually. Nearly all library funds come by annual allocation from the university's general funds. In recent years about 3.5% of the university's total recurrent income has been spent on the library.

There are now 160 library staff of all grades (compared with sixteen in 1939). Apart from technical, craft, and janitorial staff, the grades are designated: Librarian, Deputy Librarian, Sub-Librarian, Assistant Librarian, Senior Library Assistant, Library Assistant, Library Typist.

The library participates in many cooperative activities, including interlibrary loans and various schemes operated under the auspices of the Standing Conference of National and University Libraries, Standing Conference on Library Materials on Africa, National Central Library, Office of Scientific and Technical Information, etc.

As already mentioned, the library was moved into its first separate premises in 1642. In the mid-eighteenth century it was transferred to the upper hall of the college building. The foundation stone of an entirely new college was laid in 1789. The architect was Robert Adam and the concept and design were lavish. But in 1792 Adam died, and in 1793 the building funds were exhausted and work stopped. Work started again in 1815 to revised plans by William Playfair. The library portion was the last to be occupied (in 1827) and its design was wholly Playfair's. The principal feature is the magnificent Upper Library, a galleried hall 180 feet long, with shelving for about 70,000 volumes (see Figure 2).

These were the last premises specifically designed for library use in the university until 1967, when the Main Library building was occupied. This is said to be the largest single academic library building in Europe (298,000 square feet) and has accommodation for 2 million books and 2,500 reader-places. The architect was J. Hardie Glover, of Sir Basil Spence, Glover and Ferguson, Edinburgh, and the Royal Institute of British Architects awarded its medal to the building in 1968 (see Figure 3).

FIGURE 2. Upper Library, Old College. (Photograph by Edwin Smith.)

Special Collections

Until very recently there was no settled policy for the acquisition of rare books and manuscripts, except for materials relating to the University. Books were bought because they were needed, and gifts were received unpredictably. Because the library has been exceptionally fortunate in its benefactors, it possesses a rich variety of
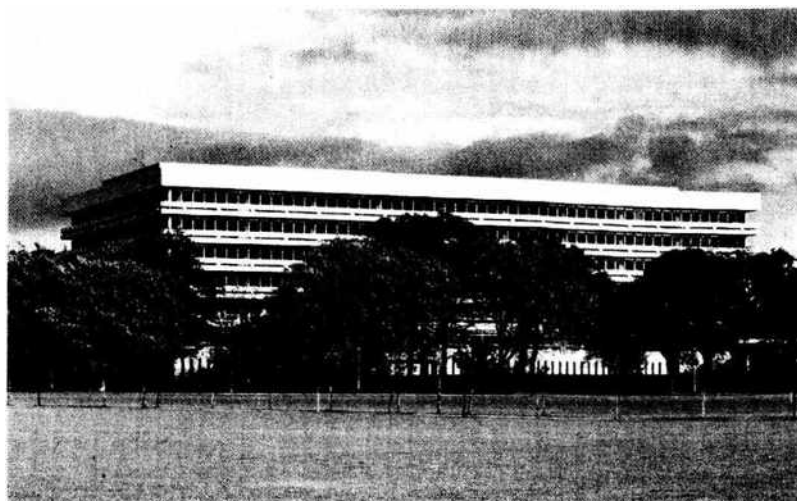
FIGURE 3. Main Library, 1967. (Photograph by A. L. Hunter.)

magnificent books and manuscripts, given singly and as collections. Many of these had no particular relevance to current academic activities; the first Chinese book was given to the library in 1628, more than 3 centuries before Chinese was taught, and the acquisition of the library's few Persian manuscripts of prime importance had no connection with the scholarly preoccupations of the day (see Figure 4).

On the other hand, many books acquired as ordinary current academic materials in the sixteenth to nineteenth centuries are now of great value and rarity. One of the strongest areas of the collections is in the history of science and medicine. Until very recently no systematic collecting in this field was attempted, but the library already possesses most of the great classics, many of them in two or even three copies. Examples of other books acquired on publication and subsequently preserved are the works of Piranesi and Audubon's *Birds of America*. The list of these is a very long one.

The Clement Little and Drummond of Hawthornden collections have already been mentioned. A few others may be briefly mentioned.

James Nairne bequeathed over 1800 books in 1678; Nairne was Minister of Wemyss and Chaplain to Charles II and his books included royal bindings and the poems of Donne.

David Laing bequeathed in 1879 his vast collection of manuscripts, chiefly historical and Scottish, but included medieval illuminated manuscripts and literary documents. Laing was one of the most learned Scots of the day, secretary to the Bannatyne Club, and appointed librarian of the Signet Library in Edinburgh in 1837. He was one of the most enthusiastic hunters, savers, and collectors of manuscripts, even in the nineteenth century.

Adam Smith. Professor W. B. Hodgson's collection of books on economics and economic history was given to the library by his widow in 1880. It included many

FIGURE 4. *Jonah and the Whale*, *from* Jāmi al-Tawārīkh, A.D. 1306. (Persian ms. no. 20.)

books from Adam Smith's library; but the largest surviving portion of Adam Smith's books — more than half — is in New College Library.

Halliwell-Phillipps Collection [*1*]. In 1872 J. O. Halliwell-Phillipps offered to the university most of his Shakespearean collection, which was eagerly accepted. The library had lent him the only copy of the 1600 quarto of *Titus Andronicus* then available for his edition of Shakespeare. Later, he asked David Laing whether he should give his own collection to Edinburgh or Glasgow. Laing replied, "The more I think of the matter, I have the less hesitation in recommending you to give Edinburgh the preference. No doubt Glasgow has a great building in progress, but so far as literature is concerned, it is like Liverpool compared with Oxford."

Halliwell-Phillipps Collection [2]. In 1866 Halliwell-Phillipps presented to the Penzance Library, in southwest England, a collection of (non-Shakespearean) dramatic works, mostly of the seventeenth century. In 1964 this was sold at auction, and the library secured all but a few items, with special support from the university, the Friends of the National Libraries, and the Friends of Edinburgh University Library. With over 600 plays in original editions, allied to the previous holdings of the library and the Bute Collection in the National Library of Scotland, Edinburgh is now one of the chief centers for study in the history of British drama.

General John Reid bequeathed £50,000 to the university in 1807, chiefly for the endowment of a Professorship of Music but also for "making additions to the

Library." From 1846, for some years, £400 a year was spent on buying rare and expensive books (including, for example, the bird books of John Gould as they were published). The purchases were largely directed by the remarkable bibliophile, Principal John Lee. Among the purchases was a notable collection of early tracts of the German Reformation, which came on the market from the Duke of Sussex's library in 1844–1845. The library has over 440 sixteenth century editions of Luther's works, alone, quite apart from the collection in New College Library.

In the last few years the decision was made to concentrate acquisitive effort on the library's strongest fields. In addition to those indicated above, these include Edinburgh scientists (Joseph Black's papers were recently received on deposit) and medical men, the Scottish literary renaissance of the twentieth century (important manuscript collections of Hugh MacDiarmid, Edwin Muir, Sidney Goodsir Smith, George Mackay Brown, and others are already in the library), and earlier Edinburgh writers, among others. The funds available for purchase are not great, being chiefly those from the library's own small endowments and the funds of the Friends of Edinburgh University Library.

An unexpected and unbudgeted development of the very recent past has been the acquisition of commercial and industrial archives. These, partly secured on deposit by the interest of the university's economic historians, include the records of important shipping firms, distillers, tweed manufacturers, and publishers.

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E. R. S. FIFOOT

EDUCATION INDEX

Education Index is a publication of The H. W. Wilson Company. It is a subject and author index to the contents of periodicals, proceedings, yearbooks, bulletins, and monographic series published in the United States, Canada, and Great Britain, and selected for indexing by the subscribers to *Education Index*. It includes material on adult education, business education, curriculum and curriculum materials, education of minority groups, educational administration, educational psychology, education research, exceptional children, health and physical education, higher education, international education, preschool and elementary education, religious education, secondary education, teacher education, and related subjects. Book reviews are indexed under one subject heading. All entries are in one alphabet and each entry contains complete bibliographical information. *Education Index* is thoroughly cross-indexed with references, enabling the user to move from general headings to specific headings, and to related headings without consulting a separate thesaurus.

Published since 1929, it is sold on the service basis with issues appearing ten times a year and cumulated in a permanent annual.

<div align="right">GEORGE F. HEISE</div>

EDUCATION LIBRARIES

Education libraries have normally come into being in academic settings. Their history is inextricably linked with the development of their parent institutions—schools concerned with teacher preparation, with education as a subject of study, and with educational research.

The first significant American book resources associated with the subject of education appeared in the libraries of the early liberal arts colleges. For the education of college teachers, as well as for the preparation of organizers and administrators of colleges and academies, the liberal arts colleges before 1860 were professional schools. The education books in their libraries reflected the dominance of the classical tradition in the curriculum and included such works as Quintillian's *Institutes of Oratory*, which was an exhaustive treatise on the education of an orator for Roman life, Cicero's *De Oratore*, which dealt with the education necessary for entering public life, Plutarch's *Morals*, which dealt in part with the training of children, as well as the educational writings of Aristotle, Plato, Tacitus, Zenaphon, Lucan, and Philostratus the Elder (*1*). In the colonial period any one library may have had as many as a dozen of these "professional" works, and before 1840 they numbered a few dozen at most. In comparison, the University of Halle in Germany listed 628 titles under Pedagogy in its 1822 catalog (*2*).

A second period of education library development is associated with the formation of normal schools. The first of these was established in 1839 in Lexington, Massachusetts. Initially, these were nondegree granting institutions which varied greatly in the length of the curriculum offered as well as in the quality of their libraries. In the course of a century these institutions developed into 200 teachers colleges. By 1889 the State Normal School at Terre Haute, Indiana reported 25,000 volumes, the largest such library in the United States (3). The information contained in responses to a questionnaire indicated that three schools had libraries of 15,000 volumes, six had 10,000, eighteen had 5,000, nineteen had 2,000, and four had about 1,000 volumes. Many had less than 1,000 volumes. These libraries were supported by legislative appropriations but in some instances students were charged a special library fee. As a general rule books were selected by heads of departments or by a faculty committee. Very few of the schools used any appropriated funds for periodicals and newspapers.

Twenty-four of fifty libraries reporting on this topic had copies of textbooks in general use in the state; thirty-two out of forty-two reported purchasing duplicate sets of books needed for special research or study; twenty out of forty-six gave students practice in making a catalog; five had a short course in bibliography; twelve gave instruction in how to use the library; twenty-two prepared lists of "sources of information"; thirteen allowed seniors to volunteer their services for library work; seventeen permitted alumni to use new books; fifty-three libraries permitted students to take books for home use; and forty-seven permitted students access to the shelves.

These nineteenth century normal school libraries were criticized for their failure to provide sufficient breadth of literature to adequately support professional studies. And the schools themselves were criticized for not making the student an independent learner free from enslavement to textbooks and rote learning.

An indication of the size and scope of an ideal collection in an education library before the end of the century was developed by Professor Will S. Monroe of the State Normal School in Westfield, Massachusetts. In 1892 he brought together 1,200 books and pamphlets of particular use to the practicing teacher or superintendent. In his bibliography of 1897 he listed 3,200 books and pamphlets as being of interest to librarians to help them complete their collections (4).

Paralleling the development of the normal school libraries in the last quarter of the century was the establishment in a number of universities of chairs of pedagogy, departments of education, and graduate schools, each with a supporting book collection. These collections were built by segregating the education books and building on this base. The largest of these new collections was the Bryson Library at Teachers College, Columbia University which had its beginnings in 1887. Nicholas Murray Butler made it America's most important collection, second only to the library in the Bureau of Education in Washington. He transferred to it 13,500 titles from the Columbia Libraries (5).

Later, in the years after 1900, the beginnings of research in education also required supporting collections of documents and books which led to the formation

of education libraries as, for example, that at the University of Ohio. In the same period a number of city and state school systems and administrative organizations formed education libraries for their professional staffs.

The collection in the Bureau of Education in Washington was begun in 1870. Before the end of the century it held over 50,000 books and 150,000 pamphlets. Its collections were particularly strong in government reports, current periodical literature, and the more important foreign periodical journals.

In Europe by 1900 the Central Pedagogical Library at Leipzig had 67,000 books and pamphlets on education. The Musée Pédagogique at Paris, founded in 1879 by the French government, contained 50,000 books. The national pedagogical libraries of Belgium, Switzerland, and Russia each contained 15,000 volumes. In the city of Berlin there were two special libraries—one containing 16,000 and the other 14,500 volumes. In the South Kensington Museum in London there were 10,500 books on the subject of education, and the Teachers' Guild of Great Britain and Ireland had a pedagogical library of more than 6,000 volumes.

By 1929 the significant institutions numbered about 200 and were almost evenly divided between normal schools and the more rapidly growing number of collegiate, degree-granting institutions. This third stage in the development of education libraries was summarized in the study of education libraries undertaken under the supervision of the American Association of Teachers Colleges by Georges W. Rosenlof, and published in 1929 as *Library Facilities of Teacher-Training Institutions* (6). Rosenlof's work was oriented toward establishing a basis for "standards" and dealt with book and periodical holdings, the departmental and seminar library, the textbook exhibit library, the training school library, the library staff, and the library budget. It did not deal with physical plant, equipment, and some other elements of the library.

His finding was that, with exceptions, the library in both degree-granting and nondegree-granting institutions was little short of "tragic." The number of books reported by sixty-three degree-granting institutions showed a wide range of from 5,335 to 101,414 books, the average being 16,939. Over 42% of the libraries reported less than 10,000 volumes. For nondegree-granting institutions the number of books reported by their librarians ranged from 2,097 to 40,545 books with an average for all schools of 9,859 volumes. Sixty-two and one-half per cent of the schools reported holdings of less than 10,000 volumes. Rosenlof also found that library training was not uniformly a prerequisite to appointment to staff positions in the library save in the case of the head librarian. And in regard to the budget the evidence suggested that neither the administrative heads of the libraries nor the administrative executives of teachers colleges had given to the library budget and its making the thought and consideration that it should have received if the library was to render its full share of responsibility in the training of teachers.

The Negro college libraries, all of which had a particularly heavy commitment to teacher preparation programs, were even poorer in resources than those described by Rosenlof in his study (7).

The most recent comprehensive study of education libraries was sponsored by the

Committee on Standards and Surveys of the American Association of Teachers Colleges in 1942 (8). The committee sought information upon which to base a new standard for libraries in teachers colleges. The data assembled by questionnaire dealt with the way the libraries were housed, the scope and nature of the libraries holdings, the size and caliber of the library staffs, financial practices, library schedules, and types of service rendered.

More than half of the institutions which responded had a central or main library, and a separate library for the training (laboratory or demonstration) school. Typically the library shared a building with other educational or administrative functions. The holdings in the main library ranged from 10,400 to 171,000 volumes. In the 104 libraries reporting, the largest number of books were in language and literature (16.2 median per cent), and the second largest in education (13.0 median per cent). Many also had large numbers of uncataloged pamphlets, and substantial collections of pictures, photographs, prints, and maps, and a significant number had phonograph records and some slides and stereographs. Dividing library funds between books dealing with the content of various subjects taught in the normal school or college and professional subjects had always been a matter of tension in the administration of education libraries.

Most training school libraries consisted of 3,000 to 4,000 books, largely children's literature and only a small number education books.

Since World War II the transformation of teachers colleges into general academic colleges as well as into universities with a wide range of graduate offerings has left education as a subordinate section of a larger library apparatus with the result that library statistics assembled by the federal government no longer reveal the condition of the education collections. Developing these special collections has been left to individual institutions and to accrediting agencies. In this period two libraries have maintained a particular distinction for their holdings: the Harvard University Library and the Teachers College Library at Columbia University.

Since 1952 the National Council for Accreditation of Teacher Education has been responsible for formulating "policies, standards, and procedures" for the accreditation of teacher education programs and for establishing standards for the libraries which support these programs in both colleges and universities. It is questionable whether these standards have helped raise the level of education libraries (9).

Library schools and professional organizations have played only a peripheral role in the development of education libraries. At present no library school in the United States offers a course especially devoted to work in education libraries. Some consideration is given to the subject in course work in social sciences or school librarianship.

In June of 1969 education librarians formed the Educational and Behavioral Sciences Subsection of the Association of College and Research Libraries within the American Library Association. This step provided official recognition for the subject specialty but an annual meeting is not adequate to meet the needs for interaction among the members.

Nor has the education library of the Office of Education provided leadership to the world of education librarianship. Its collections have been incorporated in a library for the Department of Health, Education, and Welfare which now limits its concern to an archival responsibility for the publications of the U.S. Office of Education. The Office of Education has, however, decided to develop a national educational information system called the Educational Resources Information Center (ERIC) (*10*). This was in response to the problem of disseminating the findings which resulted from research and development supported by federal funds. Research workers published more than 50,000 reports and thousands of journal articles which individual education libraries could not systematically control or bring to their users.

ERIC information system products now affect the library services in the 470 colleges and universities libraries in institutions which offer accredited teacher preparation programs and include the following:

1. *Research in Education* (RIE), the monthly announcement journal for reports.
2. *Current Index to Journals in Education* (CIJE), a monthly index journal to nearly 14,000 periodical articles appearing annually in over 500 English-language journals.
3. ERIC reports on microfiche.
4. ERIC master magnetic tapes for computer use.

The development of ERIC which involves computerized and mechanized retrieval systems has had international impact and influenced the planning of the Documentation Centre for Education in Europe sponsored by the Council of Europe (Brussels) as well as the library of UNESCO's International Bureau of Education in Geneva.

Modern information science, the computerization of information storage and retrieval, has also affected the other important education libraries of Europe such as that at the Institute of Education, University of London; the Institut Pédagogique National in Paris; and the Ushinski State Library in Moscow.

For the future, education libraries evidence a trend of involvement with computer services, multimedia resources, and facilities for independent study using up-to-date technology and equipment.

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EDUCATION IN LIBRARY AND INFORMATION SCIENCE

Education for Librarianship

The desire for the preservation of records was the original purpose of the ancient libraries. The lack of tools for recording and the elementary state of the written language necessitated having a custodian for the few available records.

Early librarians, however, were intellectual leaders. In the ancient Babylonia, Egypt, India, China, Greece, and Rome, the librarians were either priests, kings, or teachers. They had many duties, but the keeping of records was the main one. The multiplication of library duties and the specialized work of the present day librarians simply evolved from the keeping of official documents. The process of training and the function of the libraries of the past leading to the present situation suggests Spencer's law of evolution "from the initial state of simplicity to the ultimate state of complicity." Therefore, approaching the past is proper in order to understand the present, and studying the present is a means of predicting the future.

The ancient period begins with recorded history and ends with the fall of the Roman Empire in A.D. 476. The first libraries known during this period were in China as early as 2650 B.C. (*1*), and the first Chinese librarian was Laotse, who was appointed keeper of the royal archives of the Chou Dynasty around 554 B.C. (*2*).

In the Near and Middle East, the Babylonians and Assyrians had libraries. The oldest and most important one was the private library of Assurbanipal, King of Nineveh, which consisted of clay tablets. These tablets were arranged under six subjects: history, law, science, dogma, magic, and legends (*3*). All evidence indicates that there was a keeper and that he was probably a priest, as they were the learned men at that time. However, in the normal process of evolution the priests were supplanted by learned teachers, and as the intellect of the ancients advanced other people were able to read the records.

Two distinctive functions started to become part of the librarian's duties in this period, and they are considered the starting points of professional education for librarianship. First, the compilation of bibliography and the making of the library's catalogs, which started in the Alexandrian Library (4). Second, the encouragement of scholars to use the library and to draw books out of it (5). This led to an increase of the librarians' duties and necessitated the introduction of different levels and different qualifications for the library's staff members (6). Knowledge of Greek and Latin books, intellectuality, and library efficiency were the important qualifications for the Roman library administrators. Assistants, clerks, and scribes were locally trained in library technique and were mainly well-educated slaves (7).

The splendid Roman public libraries, however, started to decline after repeated invasions of the barbarians. Library activities started to collapse, and books were either burnt or destroyed and librarians were not needed. This marks the end of library development during the ancient period.

The medieval and early modern period starts with the fall of the Roman Empire and ends with the eighteenth century. The first part of this period covers the growth of the monastic libraries which were stacked mainly with biblical literature, theological dogma, and biographies of the saints and martyrs. The Christian orders (e.g., Benedictines and Augustinians) contributed to the development of the training of librarians, and the cataloging, repairing, binding, and loaning of books (8). Many phases of late nineteenth century library training can be traced to the practices of the monastic libraries of the Middle Ages. The Williamson's report has indicated that many duties of the early twentieth century librarian are simply the inherited traditions of the past (9). This was reflected in the courses given in the early schools (e.g., binding and library hand).

By the fifteenth century the European monasteries, cathedrals, and universities were competing with each other in collecting books and building libraries. The development, however, was arrested in the sixteenth century by the Huguenot movement in France and the suppression of the monasteries in England. Many monasteries were pulled down and their books and manuscripts burned or scattered (10). This setback prepared the ground for a new and forceful development of the library movement.

The second part of this period covers the great strides made by libraries in educational institutes after the invention of printing and the multiplication of the number of books produced during the seventeenth and eighteenth centuries. The freedom of thought budded forth as the new philosophy of the Renaissance and the Reformation along with the concept of making the libraries free to all.

During this period the management of libraries gradually passed into the hands of secular scholars and clergymen who have contributed much to the foundation of the modern library science (e.g., Gabriel Naudé and David Hume). The standards and qualifications prescribed by the learned librarians of the seventeenth and eighteenth centuries set a fine scholarly standard for their successors, and the useful service rendered by them in the first half of the 19th century paved the way for training in library work (11).

During the first half of the nineteenth century many libraries were built and hundreds of books were bought and used. A typical librarian of that time was a "bookworm" who read everything. In the second half of that century, however, the literature on various subjects multiplied in number and in size so that it was impossible for an individual to read them all. Therefore, the compilation and use of bibliographies and the introduction of new methods in library techniques came to the fore.

Also, the people began to ask their governments to supply free schools and public libraries. As a result many libraries were opened to the young, the old, and the uneducated as well as the scholars. The situation demanded a new type of librarians who, in addition to being scholars, had organizing and business abilities. Anthony Panizzi and Charles Jewett are good examples of that new breed of librarians during this transitional period. By the mid-nineteenth century many prominent individuals were stressing the importance of proper training for library administrators. Articles were written and associations were formed to publish journals to help advocate the establishment of training agencies. In 1829 Martin Schrettinger (of Munich) emphasized the value of training in special library schools. He wrote:

> No man with a literary education, however highly educated he is, even if he is a great scholar, is fitted to be a librarian without a special study, preparation and practice. . . . There should be a kind of librarian's training school connected with a national library; from that the other libraries could be supplied with its able graduates. Thus the methods of administration could be carried on in a uniform way (*12*).

Though Schrettinger did not outline any definite program or suggest any schedule of courses to be offered, he was probably the first to suggest special schools for training librarians (*13*).

University professors also became interested in the newborn profession after Anton Klette made his extensive plea for library training in Germany in 1871 (*14*). In 1874 Rullman (librarian of the University of Freiberg) outlined a 3-year university course in library science (*15*). He also suggested a meeting of librarians to discuss the formation of an organization of German librarians and the establishment of a library school. The meeting never took place because the suggestions were criticized as being too theoretical. Though Rullman pointed out the success of the Philadelphia conference and the formation of the ALA in 1876, the time was not yet ripe for the German librarians to comply with Rullman's suggestion. The question of education, however, was settled by the creation of a professorship of library science in Göttingen University in 1886 and the formation of the German Library Association in Dresden in 1900. Italy and Sweden followed the example of Göttingen University and established library schools around the time Dewey started his school at Columbia (*16*).

The author will concern himself with American library education and will compare it with other countries when it is deemed appropriate. However, detailed information regarding education for librarianship in other countries can be found in the separate articles covering these countries in different volumes of the En-

cyclopedia and in the major article on *International and Cooperative Library Education*.

Three early methods of learning library science were pointed out in 1901 by Mary Wright Plummer, Director of the Pratt Institute Library School, in her outline of the history and trends of professional training:

> First, by main strength, each librarian evolving a system of his own from his inner consciousness and that of his board, committing the same natural mistakes committed by the majority of librarians before him, and finally sitting down helplessly in the confusion thus created, solving each difficulty as it came up according to the inspiration of the moment, and occasionally finding the inspiration good. . . .
>
> [Second] Then there was management by imitation. The board of the new library sent the librarian for two or three weeks to some large city library to pick up what he could by observation and by working in some of its departments. Naturally, he took the large library's system bodily back to the small new library, and found out only by long and hard experience that the so-called best is sometimes too good, and that he had to modify, prune, and generally make over the system for a period of years before it fitted the circumstances of his library.
>
> [Third] There was also the opportunity, though a rare one, to learn certain parts of the work of a library by tuition. This was chiefly in college libraries, where one might learn the principles of cataloging, for instance, under excellent catalogers(*17*).

The most popular method, however, was seeking guidance through apprenticeship. This point of view was supported by Justin Winsor in 1870 when he justified the expenditure of his time as Superintendent of Boston Public Library as a duty of his office to share his experience with other libraries and librarians (*18*). He also reflected the trends of his time when he advised the new librarians to learn "by doing it" (*19*). This trend led to emphasis on experience as the major qualification for library positions.

Reading was another method of acquiring the knowledge needed for library work. Other than the catalogs and the annual reports of public and university libraries, there were few books or articles on librarianship. Yet by 1887 several new publications were devoted to library economy and the history and statistics of libraries. Several journals (e.g., *Publishers' Weekly* and *Library Journal*) made their debut around that time, giving the librarians a medium for exchanging ideas and a broader insight into their profession.

The exchange of ideas was the underlying principle behind the third method of acquiring knowledge and experience in librarianship. Several attempts were made during the mid-nineteenth century to arrange a formal meeting for librarians. This did not materialize until 1876 when formal steps were taken to establish the ALA

> for the purpose of promoting the library interests of the country and of increasing reciprocity of intelligence and good will among librarians and all interested in library economy and bibliographical studies (*20*).

A Cooperative Committee was formed in ALA and served as a centralized agency to achieve uniformity in equipment and procedures. Its reports on rules

of lending, size of catalog cards, and forming of shelf lists served as an instructional manual for librarians (21).

Winsor spoke about the need for training for librarianship but not in a formal sense, and in the 1881 conference the "Need for Trained Librarians" was the major theme.

The beginning of systematic library training in the United States is due to Melvil Dewey who foresaw the growth of education, industry, and the general progress in America which would result in new libraries different from those of the Old World. He realized also that the traditional "jailer of books" will never understand the meaning of the modern public libraries as the "people's university." He noted in 1879 that ". . . physicians, lawyers, preachers, and even our cooks have special schools for special training. But the librarian, whose profession has been so much exalted, must learn his trade by his own experiments and experience" (22). He did not, however, propose the immediate establishment of a library school but suggested as a first step the arrangement of a "systematic instruction and apprenticeship in connection with some of our best managed libraries under the charge of our most enterprising librarians" (22). Dewey's proposal, however, did not get any response and accordingly he assumed a personal responsibility for the establishment of a school and accepted, in 1883, as a first step, an appointment as librarian of the Columbia College Library after he was assured of strong support by the college for the creation of the School of Library Economy (23). In the Buffalo Conference held in 1883, Dewey tried to gain approval of the ALA for a formal training program. Though his proposal was met with severe criticism from William Poole and others, Dewey managed to obtain a favorable resolution which he transmitted to the Columbia College's Board of Trustees. Finally, the latter approved of the establishment of the school which was opened officially on January 5, 1887, with an enrollment of twenty students (three men and seventeen women). While a college degree was desired as a prerequisite for admission, Dewey accepted "any person of good moral character . . . who had sufficient natural fitness . . . to engage successfully in library work" (24). The courses were entirely practical (library hand, classification, accessioning, typing, etc.) and included history when its study contributed to the current problems. The length of the study was a 3-month course complemented with 2 years actual experience in various kinds of library work and ended with the 3-month course taken again in review (25).

The school was, from the beginning, close to failure because of Dewey's insistence on admitting women in opposition to Columbia's Board of Regents (26). The feud ended by depriving Dewey of the school in 1888, and it is understood that he manipulated the transfer of the school in the following year to the New York State Library at Albany where he regained his directorship.

The school continued in the same previous pattern with thirteen of the students who had completed their lecture course at Columbia. Later two changes took place in the program: (1) An entrance examination was required mainly to conform to the pattern followed in other schools in the university; and (2) the awarding of the degree of Bachelor of Library Science to college graduates completing

the 2-year course, and the degree of Master of Library Science to those completing the 3-year program.

By 1891 the training program's continuity was assured, and it is interesting to note that Dewey was able to accomplish all this with minimal support of ALA. It is equally interesting to note that Andrew Carnegie, who proclaimed in 1890 that he would direct his philanthropic efforts towards the building of free libraries, was not convinced at that time of the value of training of librarians. Despite Dewey's letters and visits, Carnegie refused to extend any financial help to the school in Albany, as he was under the impression that "there is no difficulty in getting persons naturally adapted for library work" (27).

The program at Albany, though original, was purely technical, or as Dewey himself called it, "systematic apprenticeship." There is no doubt, however, that the technical education offered immediate results to meet the changes in American life and laid the foundation for modern librarianship.

It was natural that other schools should be established once the school at Albany had proven its value to the profession and to libraries. The Pratt Institute School of Library Science started in 1890 under the directorship of Mary Plummer (a graduate of Dewey's school). It started with a 6-month course and a term of apprenticeship, and by 1896 it extended its program to 2 years. The school, however, did not award any degrees (28). The Amherst Summer School was organized by William Fletcher, librarian of Amherst College, in 1891. The idea was not new as Dewey had proposed the summer school concept in 1888 as an extension of the School of Library Economy. The Amherst School was established to give brief courses to acquaint beginners or librarians with modern methods and enough instruction to answer their immediate demands (29). Fletcher was the sole instructor, and his method was to read aloud from rules, and to give practice work in cataloging (30).

The Los Angeles Public Library was a pioneer in offering a training class in 1891. The class, which was offered only to women, was for 1 year and was similar to Pratt's. By 1914 the training class was transformed into a professional school.

In 1892 two technical institutes, Drexel at Philadelphia and Armour at Chicago, the latter established by Katherine L. Sharp also a Dewey graduate, followed Pratt in establishing training programs to give the students a practical skill along their line of work. Both had a 1-year program; however, Armour offered a second year of advanced work. Drexel awarded certificates and Armour, which transferred to the University of Illinois with Miss Sharp's move there in 1897, offered a Bachelor in Library Science to those completing the entire course which consisted of 4 years of university studies, the last two of which were to be devoted to library work.

Several schools were established in academic environments, and training programs were started in some public libraries. The following list cites the important ones and the year of establishment:

1897   Syracuse University Library School, Syracuse, New York
1900   Carnegie Library School, Pittsburgh, Pennsylvania
1902   Simmons College, School of Library Science, Boston, Massachusetts

1904   Western Reserve University Library School, Cleveland, Ohio
1905   Library School of the Carnegie Library of Atlanta, Atlanta, Georgia
1906   University of Wisconsin Library School, Madison, Wisconsin
1911   Library School of the New York Public Library, New York City,
       New York
1911   University of Washington Library School, Seattle, Washington
1914   Library School of the Los Angeles Public Library, Los Angeles, California
1917   St. Louis Library School, St. Louis, Missouri

Near the end of the 1883 ALA Conference, a committee was appointed "to take into consideration all projects and schemes for the education of librarians and to report in detail at the next meeting." By 1900 the three-member Committee on Library Schools and Training Classes, headed by John Cotton Dana, suggested that ALA assume a stronger position in library education and help the schools to improve their standards, and that the committee should be able to "give or withhold its endorsement of schools and training classes." This was the first suggestion for ALA to become an accrediting agency. Dana suggested also that the committee should be enlarged to five members and that regular visits should be made to the schools to investigate and report on their courses and instructors. The suggestion was adopted and the committee reported annually to ALA on the progress of the library schools.

In 1905 the committee, headed by Mary Plummer, presented the *Report on Standards of Library Training,* in which they suggested 2–3 years of college should be required for admission to library schools, or an entrance examination should be administered in lieu of a college background, and that at least one third of a school's instructors must have been trained in a recognized library school.

In 1902 Dewey pointed out that the standards of library training had steadily advanced; however, there were several instances where programs had offered very inadequate instruction and had no financial support. He thought that there was "great danger that the cause will be more harmed than helped." Thus he suggested the establishment of an association of the few properly equipped schools "to protect themselves against these pretentious announcements by some form of recognition for instruction that is worthy of the name" (*31*).

It was not until 1915, responding to a call from Phineas L. Windsor of the University of Illinois, that the Association of American Library Schools (AALS) was formed and earned the recognition of ALA. The constitution adopted at the first meeting in June 1915 included the requirements for membership, which was limited to those schools which admitted only high-school graduates (or equivalents); which offered at least one full academic year in preparation for general work in the profession, and which had at least two full time qualified instructors (*32*). Of the ten schools that applied for membership, only eight met all the requirements. However, the remaining two schools were admitted after the constitution was amended. Though AALS did not claim any accrediting power, its membership was recognized as "accreditation."

It was hard for the AALS to develop a set of standards with the existing varying standards of the individual library schools. It was also pointed out in 1923 that

the simple requirements for membership made is difficult to elevate the standards in professional education, and that outside hands might undertake the job of setting these standards. This was in reference to Dr. Charles Williamson, who was at the time conducting his investigation of library education under the sponsorship of the Carnegie Corporation. By 1923 Williamson published his report and. as a result, the Board of Education for Librarianship was formed to examine and accredit library schools according to minimum standards which were adopted by ALA in 1925. Since that date AALS has been used as a medium among library schools for the advancement of education for librarianship.

In contrast, until 1946 there was only one library school in the United Kingdom (School of Librarianship and Archive Administration). However, after World War II other schools were established and it became apparent that they should get together to discuss several issues of common interest. In 1952 the Schools of Librarianship Committee was formed and chaired by J. C. Harrison. Due to their small number, the members did not see any need for a constitution at the time. Yet with the growing membership, the committee adopted a constitution and became the Association of British Library Schools (ABLS) in 1962 (*33*). Harold Lancour, Associate Director of the University of Illinois Library School, was the first library educator to go to England as a Fulbright Scholar in 1950–1951. He lectured in each of the British schools of librarianship and was largely responsible for stimulating the schools to a more positive role. He invited both J. C. Harrison, head of the Manchester School of Librarianship, and Roy Stokes, Loughborough School of Librarianship, to teach at Illinois for several successive summers to acquaint them with education as it was developing in the United States.

The ABLS concerns itself mainly with the problems and possibilities of professional education and has never assumed the role of an "accrediting" agency, as in the case of the early period of AALS, because accreditation (or certification) pertains in England to the individual librarian and not to the British library schools.

In 1903, 13 years after declining to help Dewey's school, Andrew Carnegie became aware of the serious problem of ineffectual service in the several libraries he had built or financed (more than 108 library buildings) (*34*) and granted Western Reserve University $10,000 to help the educational program for librarianship. This was followed by a $5,000 annual contribution for 3 years to the Training School for Children's Librarians (Carnegie Library of Pittsburgh) and a lesser amount to the training programs of Carnegie Library of Atlanta and New York Public Library.

In 1915 the Carnegie Corporation authorized Alvin Johnson to study the results of the provision of free library buildings and to "inquire into library schools and the adequacy of the output of trained librarians" (*35*). Johnson recommended the continuation of erecting library buildings. He also called the corporation's attention to the need to shift its emphasis to library service and training. The corporation rejected the first part of the recommendations and discontinued its grants for buildings in 1917. The second part of the recommendations triggered the interest of the corporation in planning for a second inquiry, and it asked Charles C. Williamson (Librarian. Municipal Reference Library in New York City) to probe the situation.

In 1918 Williamson published the results of his study in an article "The Need for a Plan for Library Development," which was a warning to the profession that it was failing in its provision of service and that it should "assume the duty of working out some plan of professional education that would be adequate for the needs of every branch of library service (*36*).

In 1919 Williamson was appointed by the Carnegie Corporation to direct a detailed study of the problems of training librarians. In 1921 he completed his survey of fifteen library schools in Albany, Atlanta, Berkeley, Boston, Brooklyn, Cleveland, Los Angeles, Madison, New York City, Pittsburgh, Seattle, St. Louis, Syracuse, and Urbana. In 1923 his report on "Training for Library Service" was published, and the summary of its eleven recommendations is as follows:

1. There is a difference between professional and clerical work in libraries and education, and library schools should train only professionals.
2. There was little agreement among the schools as to the relative importance of subjects, and courses should be standardized.
3. A standardized entrance examination was needed.
4. Many instructors were not qualified to teach graduate students, and quality could be raised by better salaries. More full time instructors (at least 4 for each school) and more textbooks were needed. Field work is important.
5. Financial support for schools was inadequate, and each school needed an independent budget.
6. Recruitment of students was hindered by the low salaries and poor working conditions. There was no need for new schools, and the existing ones should offer scholarships to attract good students.
7. Library schools should be organized as a department of a university to maintain prestige, proper standards, and good people.
8. Library service is growing highly specialized. Schools should offer 2-year courses: the first year for general principles and the second for specialization.
9. Library workers should seek continued professional growth and improvement. Correspondence studies should be developed.
10. There were no standards for fitness for library work. A system for certification for librarians should be developed, and library schools should be standardized through accreditation.
11. Special courses should be developed to train librarians for small libraries with limited budgets (*37*).

The report had a tremendous impact on the profession and is considered a turning point in the history of education for librarianship in the United States. It was, according to Louis Wilson, a bold analysis that defined the profession, described its limitations, pointed out the possibilities of improvement, and charted the possible course for development (*38*).

The report was widely discussed and accepted, and as a result preceding studies of the ALA and the appointment of a Temporary Board of Library Training in 1923, many of Williamson's recommendations were carried out at Columbia and many other schools.

During the following 10 years the Temporary Board (which became the Board of Education for Librarianship in 1924) advised several schools, prepared and

published textbooks, helped allocate funds granted by the Carnegie Corporation for existing schools, and established the American Library School in Paris (later Institut Catholique). Also, as a result of the board's work, the ALA Council, in July 1925, adopted the first minimum standards for five types of schools: junior undergraduate, senior undergraduate, graduate school, advanced graduate school, and summer school courses (see Appendix A). In 1933 the council approved a revision of the standards which changed them from a quantitative to a qualitative basis in order to "give greater flexibility to the schools in setting up special objectives and engaging more generally in experimental programs" (*39*) (see Appendix B). The new revised standards defined three classes of library schools (see Vol. 2, p. 22):

> Type I comprises library schools which require at least a bachelor's degree for admission to the first full academic year of library science, and/or which give advanced professional training beyond the first year.
>
> Type II consists of library schools which gave only the first full academic year of library science, requiring 4 years of appropriate college work for admission.
>
> Type III consists of library schools which give only the first full academic year of library science, not requiring 4 years of college work for admission. These schools might be part of a library or other institution approved by the Board of Education for Librarianship.

The board, naturally, had evoked some opposition and criticism in its function as an accrediting office. Yet the profession, in general, supported the board and suggested more funds be allocated to its activities. The board, however, had its pitfalls due to the lack of familiarity with university organization and the attitude of the graduate faculties concerning professional studies and degrees. A case in point is the board's dealing with the Association of American Universities regarding the degree to be awarded upon the completion of the fifth year. The board accepted the association's ruling that a certificate or a second Bachelor's degree be awarded rather than a professional or Master's degree. This has been responsible for much of the confusion concerning the proper content of the preprofessional, professional, and graduate-professional curriculum and for the salary discrimination against holders of second Bachelor's degrees, since it was not clear what the degree stood for (*40*).

The recommendations of Williamson and the Board of Education for Librarianship were implemented by the generous help of the "Ten Year Program in Library Service" of the Carnegie Corporation. The latter's contributions helped finance the programs of the board, aided in merging the Albany School with the New York Public Library Program at Columbia in 1925, and supported the new school for the following 10 years. The corporation also helped in establishing new schools (e.g., at the University of North Carolina), provided a number of fellowships, and in 1926 founded and endowed the Graduate Library School at the University of Chicago.

The establishment of the Graduate School at Chicago is considered one of the most significant developments in the history of education for librarianship in the United States. It was intended to be, as the president of the Carnegie Corporation

put it, "a graduate library school of a new type which occupies for the librarian's profession a position analogous to that of Harvard Law School and the Johns Hopkins Medical School" (41).

The composition of the initial faculty (including its head) of the new school created a controversy as they were drawn from disciplines, other than that of librarianship. This contributed to the fact that the school did not apply for accreditation until the Board of Education changed from quantitative to qualitative standards in 1933. The school, however, was enriched with the experience brought to it from other fields of knowledge (e.g., education, sociology, psychology, and history). This helped "jar the profession out of the prolonged devotion to the practical techniques set up by Dewey" (42).

Also, for the first time, the school functioned autonomously from the university library, which contributed to the freedom of the dean to devote his time solely to the formulation of suitable programs to meet the changing needs of librarianship.

Another value of the Chicago school was its encouragement of academic discussions, writing, experiments, and publishing (i.e., Library Quarterly). The most important value, however, was its contribution to the development of a philosophy of librarianship and the introduction of the Doctoral program in 1928 which made the school an example for others to follow.

There presently are two roads to the doctorate degree in the field of librarianship. One is the Doctor of Philosophy, which is a research degree in preparation for a career of teaching and research, as in other academic fields. The other is the Doctor of Library Science (D.L.S.), which is a professional degree similar to degrees offered in other professional fields (e.g., M.D., Ed.D.). It requires research, but more suitable for the practitioner who can apply his research orientation toward library problems. The beclouded distinction between the two degrees is a reflection of the confusion between library science with library service. Some schools offer the research degree (e.g., Pittsburgh), others the professional degree (e.g., Columbia) and a few offer both (e.g., Berkeley). There is no significant difference between these programs as both degrees are interpreted as training for research, in that both culminate in dissertations (43). The difference, however, occurs in the required credits and in the lack of the language requirement for candidacy for the D.L.S.

During the period 1936–1946 six outstanding studies, several of which were funded by the Carnegie Corporation, contributed effectively to the improvement of library education.

In 1936 Ralph Munn's report on Conditions and Trends in Education for Librarianship (44) criticized the schools for not being sufficiently aware of the profession's needs, for not producing leaders, and noted that some schools were teaching routines instead of principles. It also remarked that no new schools should offer Doctorate degrees and that the Library School in Chicago sufficed.

In the same year Ernest Reece published his study on The Curriculum in Library Schools (45), in which he discussed the courses, specifically the main ones,

and the methods of teaching library science. He noted that fundamental changes had taken place in the curriculum since Dewey.

In 1937, Louis Round Wilson recognized in "American Library School Today" (46) the improvement in the schools' budgets since Williamson; that there were better qualified instructors and more selectivity in student admissions. He also noted the influence of the Williamson Report on the library schools of that time.

In 1943 Metcalf, Russell, and Osborn (47) realized, like Reece, the fundamental changes in library school curriculum. They suggested that the courses should make clear the principles according to which libraries function, and should promote professional understanding. They also suggested the use of new techniques in teaching library science, and several means of evaluation.

In 1946, J. Wheeler published his study *Progress and Problems in Education for Librarianship* (48) in which he stressed that "Administration" as a subject, needed more emphasis in library schools, and that the curriculum in general was too theoretical and elementary, and not based on the needs of the field. He also discussed the conditions that influenced recruitment of good students (e.g., poor salaries, low status, and over-feminization).

In the same year Danton published his study *Education for Librarianship: Criticisms, Dilemmas and Proposals* (49). He accused the existing schools of "teaching all things to all students" and of the overemphasis of techniques. He pointed out, accordingly, that the Master's degree was actually a glorified Bachelor in Library Science. He distinguished in his study among three levels of librarianship (technical, middle service, and administrative), and suggested ways of separating the clerical activities from professional librarianship.

During that period, pressure was exerted upon library schools. Underlying it was the dissatisfaction of many who felt that library schools inadequately prepare students to grasp the opportunities of modern librarianship. This feeling was strengthened at the end of World War II due to the critical reappraisal of many social institutions and the breakup of the traditional ways of thinking following the end of the war. Other pressures were the immediate demand for librarians and the dissatisfaction of the school librarians with the fifth year professional Bachelor's degree which they received instead of a Master's as would be the case in most other subject fields.

Though acknowledging these pressures, many schools were reluctant to institute major changes. They did not even use the hiatus during the war years to formulate progressive programs for veterans upon their return to the campuses. Not until 1947 did the first sign appear in the announcement of the University of Denver Library School of its 5-year program leading to the Master's degree. As a result, the 1948 ALA mid-Winter Conference in Chicago adopted the following recommendations:

1. The Master's degree is the first professional degree to be earned.
2. Professional library education should be only on the graduate level, and that library technicians should be trained in other institutes.

3. Advanced studies leading to Doctoral degree should be offered.
4. Curriculum should be broad and general.
5. Specialization is necessary.

In response many schools (e.g., Chicago, Columbia, and Illinois) adopted the new approach and developed a 5-year Master's program.* Nevertheless, some schools (i.e., Illinois) still retained and offered the Bachelor's degree. The latter did not imply, however, preparation for professional library work, but was simply a terminal degree at the end of the normal 4 years of college representing the completion of undergraduate courses in library science (50). The Canadian schools, until recently, were and are still offering the Bachelor's as the first professional degree.

It was necessary, therefore, to revise the 1933 Standards to represent the new concept and in 1951 the board presented to ALA the new Standards for Accreditation "conceived on the premise that the basic professional program for library science encompasses a minimum of five years of study beyond the secondary school leading to a Master's degree" (51) (see Appendix C). The same board was still the official accrediting body for the professional library school, leaving the undergraduate programs' accreditation to the National Council for Accreditation of Teacher Education. Late in 1955 the board's role as accrediting agency was transferred to the new Committee on Accreditation as a result of the restructuring of ALA. However, the several State Certificate Boards were, and still are, responsible for evaluating and accrediting school librarians' programs.

At that time some felt that any attention to the undergraduate programs would be a negation of the new concept that professional library training should be at the graduate level. The Conference on Library Education (Princeton, 1948), however, recommended that the Board of Education for Librarianship undertake a study of the several types of undergraduate library education (52). Later the board under Jack Dalton (Chairman, 1952–1953) and Harold Lancour (Chairman, 1954–1956) felt that it should give guidance to these programs (over 500) as many graduate library schools considered such training a prerequisite for admission; also there were, and still are, many positions in library work that do not call for more than undergraduate instruction. Accordingly, Lancour appointed Florinell Morton, Director of Louisiana State University Library School, chairman of a committee to develop standards, and the Board of Education for Librarianship proposed the "Standards for Undergraduate Training" which was approved by the council in 1959 (see Appendix D). Both the undergraduate standards and the "Standards for Accreditation" are still in effect (to date forty-seven schools are accredited in the United States and six in Canada). Recently, however, the Committee on Accreditation of ALA has been in the process of revising the 1951 Standards and expects

* The program requires a minimum of five academic years of study beyond the secondary school level, where the professional library content constitutes approximately one-fifth of the 5-year program. Such content may be concentrated in the final year or distributed over the later years of the program.

to submit the revision to the ALA Council at the Annual Conference in Chicago in 1972 (see Appendix E).

The ALA Commission on National Planning for Library Education was appointed in 1962 with Richard Logsdon as chairman. Its objective was "to reassess the needs of American Libraries and related institutions for professional personnel in the years immediately ahead, and to make recommendations appropriate to those needs for the selection, education and utilization of professional personnel" (53). In 1964 the commission recommended the establishment of an office for research and experimentation in library education, and in 1966, with the aid of a grant from the Council on Library Resources, the ALA Office for Library Education was opened to coordinate the association's activities in library education, to carry out or stimulate programs, make suggestions, and conduct research in library education (54). Dr. Lester Asheim was appointed director and Dr. Agens Reagan assistant director.

This marked the beginning of an era of new graduate schools and of a change in the objectives of librarianship, which was reflected in the curricula. At the level of the first professional degree, the ultimate goal of the schools was the development of a dynamic definition of "Professional Librarianship" and an over-all philosophy of librarianship itself. Such schools exist to produce generalists who then have a background from which to develop into specialists to the degree to which it becomes appropriate in specific situations.

The concept of core curriculum was provided and was generally defined by Carter Good as "A course required of all students, giving instruction in minimum and basic essentials of living" (55).

Library educators, however, prefer the more fundamental concept emphasizing the required aspect without too much regard for the "center of knowledge idea." It is, in the opinion of most, the basic or required courses that are considered essential for all students as a background for areas of specialization. This was further defined and supported in 1962 by the Institute on the Future of Library Education, held in Cleveland:

> It is recommended that the core program, consisting of that element of the curriculum basic to all specialists, should be strictly limited to the level of principle and the development of flexibility and judgment, and that techniques and skills are not proper objectives of such basic program.
>
> By freeing the core program of content not appropriate to professional education, the curriculum can be continually re-examined and strengthened to meet changing library and social needs (56).

It is surprising to learn upon examination of the literature what little change has actually taken place in library school curricula in the last 80 years. The original Columbia School of Library Economy included practically the same subjects in 1886 as the present day curricula, but consisted of a series of lectures and practices listed under categories such as general libraries, reading and aids, and literary methods. Additional courses in typewriting and handwriting represent the extreme

practical nature of the program. It is still not uncommon for graduate schools today to require typewriting as a desirable ability. By 1905 the curriculum bore a remarkable resemblance to the present core courses, although administration was known then as library economy. With the Williamson Report in 1921 the core courses were clearly established and consisted of administration, bibliography and reference, book selection, and cataloging and classification (57). A primary difference, however, was in the approach. The early period was characterized by its apprenticeship methods that were in common vogue at that time. American education, especially librarianship, was going through a growing period with apprenticeship giving way to practical education supplemented by formal instruction. The library schools were applying the newest methods of instruction to train personnel not for a profession, but rather as general library workers with no distinction as to clerical or professional tasks. Williamson concluded that very little change had taken place as far as subject matter was concerned and suggested that the library schools confine themselves to the training of the professional type. He noted that a course in the history of libraries, or libraries, books, and printing, was becoming popular in addition to those formerly mentioned, and was considered as a required or core course by many schools between 1921 and 1946.

In 1943 Metcalf, Russell, and Osborn reported that the curricula were almost identical to those of the former study. Electives now included courses in special library areas and advanced book art courses. The methods of instruction were still being criticized and the extent of preparation had been discussed thoroughly (58). In 1947 a major step was taken by the University of Denver Library School under its director, Ethel Fair, who initiated a program leading to the Master's degree in Library Science which was eventually adopted by all of the accredited library schools.

Present day library school curricula support the core concept almost universally, with all programs having core courses at one level or another.

A cursory survey by the author of the catalogs of twenty-nine ALA accredited graduate library schools revealed a striking similarity in course offerings. A variety of course titles, often misleading, are used to indicate many of the basic courses. The following were the majority of the required courses although all were not considered a part of the core program:

Introduction to Library Science, etc.	20
Cataloging and Classification	29
Bibliography and Reference	28
Book Selection	22
Administration	24
Research Methods	12
History of Books and/or Libraries	8

The considerable variation in course titles tends to make difficult any categorization of library school curriculum. In the light of the later development, certain weaknesses became apparent:

1. A broadening of the required courses is needed to include one or more of the literature areas: Social Science, Humanities, and Science.
2. Two courses in administration or library management are needed, one dealing with administration in general and the other in a specific type of library.
3. Courses such as book publishing, communications, readers guidance, supervised practice, government documents, and information science are found in some curricula and not in others, as required or core courses.
4. The lack of research courses as professional education is certainly contingent upon research.
5. Integration of courses, primarily book selection, with bibliography and reference, and occasionally with cataloging, is needed to form such general areas of study as "organization, evaluation and use of library materials."

Great variations also were found in the prerequisite requirements of many graduate schools. A 1965 survey (59) indicated that sixteen ALA accredited library schools had prerequisite courses. Eleven suggested they be fulfilled before admission but did allow them to be taken concurrently with graduate courses. Five did not permit such a practice and stipulated their completion before admission. Ten offered an examination to determine competency in the area, permitting those who received a satisfactory score to elect an equal number of courses in an area of their choice. Lack of agreement was apparent in the length, content, courses, number, and kinds of requirements. They are:

1. Hours required:
   a. 12 ranged from 18 to 4 semester hours.
   b. 4 ranged from 10 to 8 semester hours.
2. Courses required:
   a. All required cataloging and classification.
   b. 11 required selection of books and related materials.
   c. 13 required reference service.
   d. 4 required librarians and society.
   e. 4 required library administration.
   f. 2 required the use of books and libraries.

Two types of core curriculum organization are practiced in American library schools today. The most prevalent is the separate course concept, consisting generally of four or five basic courses required of all students. Next is the integrated method which generally takes two forms. One pattern is to teach basically separate courses by sections, arranging them under broad areas of content such as organization of materials. This is designed to integrate the various aspects of each subject. The second approach is to group the subjects into two or three broad areas without regard for traditional subjects but rather to place emphasis on broad bodies of knowledge which serve as operating centers. White advocated library instruction centering around three broad areas: library backgrounds, library materials, and library methods (60). Noyes developed his suggestion into a sequential method which seems to embody many of the principles that are being practiced in public school education. It provides for three broad areas to be taught by the faculty working as a team rather than as individuals (61).

All of these approaches have been or are being used by library schools. For example, book selection has been fused with reference and bibliography and occasionally even includes cataloging and classification. This approach was formerly called the "book arts" courses. A recent survey (62) indicated that of twenty-six library schools the following practices were employed in the teaching of book selection:

1. Selection of materials as a separate course with additional special subject courses also available. This method is used at Illinois and Rutgers.
2. Selection of materials was included with subject courses without a separate selection course. This method is used at Columbia.
3. The subject approach, added to a selection of materials course with or without a separate subject course. For example: Indiana teaches a major unit on subject selection within a general course on selection.

One of the greatest problems of the core, and for that matter the library school curriculum itself, has been the restriction placed by only 1 year of graduate study for the Master of Arts degree. Under this arrangement the core must be limited to a minimum number of courses if the areas of specialization are to be properly covered. Many schools have relegated the core courses as prerequisite undergraduate requirements, but the lack of common agreement here creates more difficulty. The problem of how to get more into the curriculum could be alleviated to some degree if the courses at the core level were more closely integrated. For example, several courses could be included in broad areas such as those suggested by White. Only the basic fundamentals and current concepts of each would be taught. From there the student would concentrate in his area of specialization. Librarians planning to be employed in conventional libraries would take advanced courses dealing with the most applicable concepts for their future positions. All must agree that it is impossible to fully train a student to work in any library at any time, although it is conceded that general basic concepts will be of value.

The majority of library schools offer a Master's degree and the university offers, in addition, a doctoral degree. Very little, however, is offered at the intermediate level.

The 6-year programs of library education have started in a few library schools, the oldest of which is at Columbia University (1961) (63). They vary from reasonably well-organized programs, with some kind of structure, to a do-it-yourself amalgamation of credits. There are a number of discouraging similarities between them, the most obvious being that no recognized degree is awarded in any of these programs. In some institutions the 6-year program is regarded as a terminal degree (e.g., Western Michigan). In others, it is regarded as a first step toward the doctorate (e.g., Maryland and Pittsburgh).

There are two main objectives related to these programs. First, they offer an opportunity for some form of specialization. Second, they also offer an equal opportunity for the professional librarians to advance their knowledge. These programs, however, should not merely allow the practicing librarians to pick up additional

credits to qualify for promotion. Neither should they create a kind of limbo between the basic course and the doctoral programs. They should have a clear objective and a life of their own (64).

One of the objectives of the 6-year program is finding an answer to the classical dilemma of theory vs. practice. Many conceive that the general basic curriculum (i.e., theory) should be offered in one year and the specialization (i.e., advanced practice) in another year. The question is whether or not the sixth year might also be aimed at the clarification and advancement of theory itself. Swank suggested that if theoretical studies could start early in the fifth year, then an option might be offered to students who want to prepare for careers of teaching and research as against practice—i.e., "an option for library or information *science*, as against library and information *service*" (65). If the distinction between education for research and education for practice were drawn in the fifth-year curriculum, students might then be offered continued programs in specialization in library service in addition to more advanced theoretical courses in the sixth year. On the other hand, the 6-year program could be used as a transition to doctoral programs in librarianship for people who have advanced degrees in other fields (e.g., sociology and economics) and who do not expect to enter library practice but are only interested in research on library problems (66).

The 6-year program is an effective potential solution to the problems of specialization and continuing professional education if it is coordinated, beforehand, with the basic 5-year program.

After World War II the federal government began to be aware of the important role of libraries in society, mainly in relation to education. Congress came to recognize that it was in the national interest to improve and expand library service. It demonstrated its concern of the nation's growing needs for the service by developing an array of grant-in-aid programs where federal spending has stepped up from less than 1 billion dollars in 1946 to nearly 15 billion dollars in 1966. It is expected, hopefully, that that figure will quadruple by 1975 (67).

The four major federal acts are:

> The Library Service and Construction Act (1965)
> The Elementary and Secondary Education Act. Title II (1966)
> The Higher Education Act. Title II (1966)
> The Medical Library Assistance Act (1966)

Both HEA Title II B and MLAA provide for grants to institutions mainly for training of persons engaged in, or about to engage in, the practice of librarianship. These pointed out that top students should be recruited to obtain federal funds, qualified faculty members with research ability are lacking, and specialized courses to strengthen the profession should be developed (68).

The federal government interest was further manifested in 1970 by the establishment of the National Committee on Libraries and Information Science as a continuing federal planning agency.

MANPOWER CRISIS AND ITS EFFECT ON EDUCATION FOR LIBRARIANSHIP

The increase in the number of libraries and the increasing demand for librarians created a crisis in library manpower during the 1960s. Among the factors contributing to this situation were the federal grants for library service, the public and research libraries' minimum standards, the less than adequate library education programs, and the shortage of qualified faculty members.

In 1966 the University of Maryland Library School launched its project "Manpower Blue Print" (69), the result of which is still pending, and in 1967 the ALA held a conference in Washington, D.C. on "Library Manpower Needs and Utilization" to identify what is done, what needs to be done, and who can do it. It was clear that multilevel library educational programs must be developed as the library technician concept was accepted, as a solution, to perform the part of library work that needs skill. This necessitated the call for an evaluation of the librarian's job to identify present and future educational needs. On the other hand, the conference called the library administrator's attention to the need to be realistic in hiring and promotion policies and to use professionals only for professional library work. The recommendations of the conference emphasized the need for new guidelines, for training at all levels, and for more research in training (70). As formulated in the conference's final meeting, the first priority steps to be taken to attack the manpower problem are:

1. Identify the role of the library in the society of the present and the future.
2. Define this role for understanding and acceptance by the profession, the public, and government officials.
3. Identify, within this role, the functions of the librarian; i.e., determine what structure and organization of services we need to play this role.
4. Identify supporting functions, including those which may be contributed by other professions, through task analyses and redefinition of jobs.
5. Define and foster a spectrum of training and education to cover the range of activities encompassed in those functions which are unique to libraries.
   a. Two-year technician programs
   b. Four-year undergraduate programs
   c. Master's programs
   d. Post-Master's programs
   e. Informal and short-term training programs
6. Establish and implement standards for programs at all levels.
7. Establish the economic justification for these levels, through classification and pay plans drawn up by the pertinent associations.

It was clear that the subprofessionals were being advocated as a way out of the crisis through relieving the professionals from doing the routine work, and thus eliminating the need for hiring more of the latter. This would ease the problem of shortage of professional librarians and upgrade, as a side effect, the graduate programs. A third category had to be created to fill the gap between professionals and library clerks, and accordingly a career ladder had to be established.

In 1969 the ALA Office of Library Education proposed the new policy "Library Education and Manpower" which was adopted at the 1970 Annual Conference in Detroit. The policy noted in its introduction that "the library profession has responsibility for defining the training and education required for the preparation of personnel who work in the libraries at any level, supportive or professional" (71). The comments on the categories of library personnel-professionals (see Appendix F) indicated that:

28   The objective of the master's programs in librarianship should be to prepare librarians capable of anticipating and engineering the change and improvement required to move the profession constantly forward. The curriculum and teaching methods should be designed to serve this kind of education for the future rather than to train for the practice of the present.

29   Certain interdisciplinary concepts (information science is an example) are so intimately related to the basic concepts underlying library service that they properly become a part of the library school curriculum rather than simply an outside specialty. Where such content is introduced into the library school it should be incorporated into the entire curriculum, enriching every course where it is pertinent. The stop-gap addition of individual courses in such a specialty, not integrated into the program as a whole, is an inadequate assimilation of the intellectual contribution of the new concept to library education and thinking.

30   In recognition of the many areas of related subject matter of importance to library service, library schools should make knowledge in other fields available to students, either through the appointment of staff members from other disciplines or through permitting students to cross departmental, divisional, and institutional lines in reasoned programs in related fields. Intensive specializations at the graduate level, building upon strengths in the parent institution or the community, are a logical development in professional library education.

31   Library schools should be encouraged to experiment with new teaching methods, new learning devices, different patterns of scheduling and sequence, and other means, both traditional and nontraditional, that may increase the effectiveness of the students' educational experience.

32   Research has an important role to play in the educational process as a source of new knowledge both for the field of librarianship in general and for library education in particular. In its planning, budgeting, and organizational design, the library school should recognize research, both theoretical and applied, as an imperative responsibility.

33   Continuing education is essential for all library personnel, professional and supportive, whether they remain with a position category or are preparing to move into a higher one. Continuing education opportunities include both formal and informal learning situations, and need not be limited to library subjects or the offerings of library schools.

34   The "continuing education" which leads to eligibility for Senior Librarian or Specialist positions may take any of the forms suggested directly above so long as the additional education and experience are relevant to the responsibilities of the assignment.

35   Library administrators must accept responsibility for providing support and opportunities (in the form of leaves, sabbaticals, and release time) for the continuing education of their staffs (71).

The policy reflects the new trend in education for librarianship and sets forth the course for planning in the coming years. On the other hand, some believe that the difference in supply and demand has clearly narrowed and it seems, as Frarey put it, that "there is no longer any acute shortage of Librarians" (72). In fact, some believe that the figure 100,000 for needed librarians was conceived on an unscientific basis and was influenced by the various standards for staffing libraries with the assumption that there were 100,000 budgeted positions available (73). This has been manifested, in relation to education, in the review that is taking place in many library schools concerning the number of students admitted and the more relevant and in-depth training courses given to them (74).

The introduction of information science as a new concept to the library training programs is discussed, along with other concepts, in the following article.

APPENDIX A

MINIMUM STANDARDS FOR LIBRARY SCHOOLS, ADOPTED BY THE COUNCIL OF THE AMERICAN LIBRARY ASSOCIATION AT SEATTLE, JULY 7, 1925

(Reprinted from the First Annual Report of the Board, 1925)

MINIMUM STANDARDS FOR JUNIOR UNDERGRADUATE LIBRARY SCHOOLS

ORGANIZATION

A junior undergraduate library curriculum or school shall be connected or affiliated with an approved library, college, or university

ADMINISTRATION

The executive officer shall have sufficient authority, delegated from the governing body, to administer the school in accordance with the general policies of the institution
Secretarial assistance shall be available for keeping adequate personnel and other records

INSTRUCTIONAL STAFF [1]

Number:
For a school of fifty students, four full-time [2] teachers. (The executive officer may be included in this number if full time is given to the school.) The majority of these teachers in academic institutions shall have professional rank, one at least being a full professor, and in other institutions shall rank with heads of departments. In addition there shall be an adequate number of part-time [2] teachers, and the necessary assistance to cover the revision of student work and other duties
Qualifications: [3]
1. Academic preparation
Degree representing four years of work in an approved college or university, or an equivalent acceptable to the Board of Education for Librarianship

[1] Effective after September 1927
[2] Teaching schedules should not exceed 15 class hours per week per instructor, the laboratory hours for cataloging and classification to count as class hours. A part-time teacher is one who teaches at least 9 class hours per semester
[3] It is desirable that the staff shall have had varied preparation including library experience

2. Professional preparation

Completion of one year of work in an accredited library school, or an equivalent acceptable to the Board of Education for Librarianship

3. Experience

Practical knowledge of the subjects taught, and efficiency in teaching

FINANCIAL STATUS

The financial provision for the school shall be such as to guarantee a faculty adequately salaried and sufficient in number to allow for research, and to ensure an environment which shall meet the approval of the Board of Education for Librarianship

LIBRARY FACILITIES, QUARTERS, AND EQUIPMENT

Library facilities, quarters, and equipment shall meet the approval of the Board of Education for Librarianship

The school shall be situated where various types of libraries are readily accessible for practical work and observation, thus making possible the proper correlation of theory and practice

REQUIREMENTS FOR ADMISSION [1]

One year of work acceptable for admission to the sophomore class of an approved college or university, evidenced by a transcript of the college record

Two months of satisfactory general experience in an approved library, or its equivalent

Aptitude and personal qualifications for library work and evidence of ability to pursue profitably the curriculum

LENGTH OF CURRICULUM

One academic year

CERTIFICATE

Certificate for the satisfactory completion of the professional curriculum

MINIMUM STANDARDS FOR SENIOR UNDERGRADUATE LIBRARY SCHOOLS

ORGANIZATION

A senior undergraduate library curriculum or school shall be connected with an approved degree-conferring institution

ADMINISTRATION

The executive officer shall have sufficient authority, delegated from the governing body, to administer the school in accordance with the general policies of the institution

Secretarial assistance shall be available for keeping adequate personnel and other records

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[1] The school should reserve the right to refuse to admit an applicant who meets the first two requirements but who fails in the third; and the right to admit an applicant who does not meet the first two requirements but who satisfies the faculty that he can carry the work without a lowering of the standards of instruction. In general an applicant over thirty-five years of age should not be encouraged to enter the school

INSTRUCTIONAL STAFF [1]

Number:

For a school of fifty students, four full-time [2] teachers. (The executive officer may be included in this number if full time is given to the school.) The majority of these teachers shall have professional rank, one at least being a full professor. In addition there shall be an adequate number of part-time [2] teachers, and the necessary assistants to cover the revision of student work and other duties

Qualifications: [3]

1. Academic preparation
   Degree representing four years of work in an approved college or university, or an equivalent acceptable to the Board of Education for Librarianship
2. Professional preparation
   Completion of one year of work in an accredited library school, or an equivalent acceptable to the Board of Education for Librarianship
3. Experience
   Practical knowledge of the subjects taught, and efficiency in teaching

FINANCIAL STATUS

The financial provision for the school shall be such as to guarantee a faculty adequately salaried and sufficient in number to allow for research, and to ensure an environment which shall meet the approval of the Board of Education for Librarianship

LIBRARY FACILITIES, QUARTERS, AND EQUIPMENT

Library facilities, quarters, and equipment shall meet the approval of the Board of Education for Librarianship

The school shall be situated where various types of libraries are readily accessible for practical work and observation, thus making possible the proper correlation of theory and practice

REQUIREMENTS FOR ADMISSION [4]

Three years of work acceptable for admission to the senior class of an approved college or university, evidenced by a transcript of the college record

Two months of satisfactory general experience in an approved library, or its equivalent

Aptitude and personal qualifications for library work and evidence of ability to pursue profitably the curriculum

LENGTH OF CURRICULUM

One academic year

---

[1] Effective after September 1927

[2] Teaching schedules should not exceed 12 class hours per week per instructor, the laboratory hours for cataloging and classification to count as class hours. A part-time teacher is one who teaches at least 9 class hours per semester

[3] It is desirable that the staff shall have had varied preparation including library experience

[4] The school should reserve the right to refuse to admit an applicant who meets the first two requirements but who fails in the third; and the right to admit an applicant who does not meet the first requirement but who satisfies the faculty that he can carry the work without a lowering of the standards of instruction. In general an applicant over thirty-five years of age should not be encouraged to enter the school

DEGREE:

B.A. or B.S. (with or without the qualifying phrase "in library science") for the satisfactory completion of the professional curriculum

SUGGESTED CURRICULUM [1]

15 semester hours of work (three of which may be field work) to be selected each semester; on approval of the faculty full-time students may be admitted to additional courses as auditors

	Semester hours	
Required courses:	1st Sem.	2d Sem.
(Students presenting satisfactory equivalents may substitute a corresponding number of hours from the elective group)		
Book selection and allied topics	2–3	2–4
Children's literature (for the general worker)	1	
Reference and bibliography	3	3
Cataloging, classification, subject headings, etc.	3	3
History and administration of libraries	2–3	
Field work, observation and visits (108 clock hours minimum)	1	
Library work as a profession	1	1
Elective courses:		
Cataloging, classification, etc.[2]	2	2
Field work, observation and visits	1	1–2
Children's literature		3
Library work with children	2	
Story telling		1
Medium-sized libraries		2
Small public libraries		2
School libraries		2
Special libraries (including hospital, medical, etc.)		2
Library extension work		2
	18–20	26–29

SPECIMEN PROGRAM SELECTED FROM THE SUGGESTED CURRICULUM

	Semester hours	
Required courses:	1st Sem.	2d Sem.
Book selection and allied topics	3	2
Reference and bibliography	3	3
History and administration of libraries	2	
Field work (general)	1	
Library work as a profession	1	1
Elective courses:		
Cataloging, classification, etc.	2	2
Field work (children's rooms and story telling)	1	1
Children's literature		3
Library work with children	2	
Story telling		1
School libraries		2
	15	15

[1] The Charter's Curriculum Study now being made eventually will give definite facts upon which to base a curriculum. Until then the "Suggested curriculum" may be helpful
[2] May be substituted for required course on approval of the faculty

MINIMUM STANDARDS FOR GRADUATE LIBRARY SCHOOLS

ORGANIZATION

A graduate library school shall be connected with an approved degree-conferring institution

ADMINISTRATION

The executive officer shall have sufficient authority, delegated from the governing body, to administer the school in accordance with the general policies of the institution

Secretarial assistance shall be available for keeping adequate personnel and other records

INSTRUCTIONAL STAFF [1]

Number:

For a school of fifty students, four full-time [2] teachers. (The executive officer may be included in this number if full time is given to the school.) The majority of these teachers shall have professional rank, one at least being a full professor. In addition there shall be an adequate number of part-time [2] teachers, and the necessary assistants to cover the revision of student work and other duties. The development of varied curricula should involve the addition of further full-time teachers

Qualification: [3]

1. Academic preparation
   Degree representing four years of work in an approved college or university, or an equivalent acceptable to the Board of Education for Librarianship
2. Professional preparation
   The majority of the teachers shall have completed two years of work in an accredited library school, or an equivalent acceptable to the Board of Education for Librarianship. Graduate study and training in research equivalent to that required for the doctor's degree are urgently recommended [4]
3. Experience
   Practical knowledge of the subjects taught, and efficiency in teaching

FINANCIAL STATUS

The financial provision for the school shall be such as to guarantee a faculty adequately salaried and sufficient in number to allow for research, and to ensure an environment which shall meet the approval of the Board of Education for Librarianship

LIBRARY FACILITIES, QUARTERS, AND EQUIPMENT

Library facilities, quarters, and equipment shall meet the approval of the Board of Education for Librarianship

The school shall be situated where various types of libraries are readily accessible for practical work and observation, thus making possible the proper correlation of theory and practice

---

[1] Effective after September 1927

[2] Teaching schedules should not exceed 12 class hours per week per instructor, the laboratory hours for cataloging and classification to count as class hours. A part-time teacher is one who teaches at least 9 class hours per semester

[3] It is desirable that the staff shall have had varied preparation including library experience

[4] Compliance with this recommendation should not present difficulties after advanced graduate library schools (see page 23) are established

REQUIREMENTS FOR ADMISSION [1]

Graduation from an approved college or university, evidenced by a transcript of the college record

Two months of satisfactory general experience in an approved library, or its equivalent

Aptitude and personal qualifications for library work and evidence of ability to pursue profitably the curriculum

LENGTH OF CURRICULUM [2]

One academic year

CERTIFICATE

Certificate for the satisfactory completion of the professional curriculum

SUGGESTED CURRICULUM [3]

12 to 15 semester hours of work (three of which may be field work) to be selected each semester; on approval of the faculty full-time students may be admitted to additional courses as auditors

	Semester hours	
Required courses:	1st Sem.	2d Sem.
(Students presenting satisfactory equivalents may substitute a corresponding number of hours from the elective group)		
Book selection and allied topics	2–3	2–4
Children's literature (for the general worker)	1	
Reference and bibliography	3	3
Cataloging, classification, subject headings, etc.	2–3	
History and administration of libraries	3	3
Field work, observation and visits (108 clock hours minimum)	1	
Library work as a profession	1	1
Elective courses:		
Cataloging, classification, etc. [4]	2	2
Cataloging for the university and scholarly library		2
Field work, observation and visits	1	1–2
Advanced work in courses already named		3
Children's literature		3
Library work with children	2	
Story telling		1
Medium-sized libraries		2
Small public libraries		2
School libraries		2
Special libraries (including hospital, medical, etc.)		2
College and university libraries		2
Library extension work		2
	18–20	33–36

[1] The school should reserve the right to refuse to admit an applicant who meets the first two requirements but who fails in the third; and the right to admit an applicant who does not meet the first requirement but who satisfies the faculty that he can carry the work without a lowering of the standards. In general an applicant over thirty-five years of age should not be encouraged to enter the school

[2] A second year of work may be offered leading to a master's degree providing that this work is conducted under conditions requisite to strictly graduate instruction

[3] The Charter's Curriculum Study now being made eventually will give definite facts upon which to base a curriculum. Until then the "Suggested curriculum" may be helpful

[4] May be substituted for required course on approval of the faculty

SPECIMEN PROGRAM SELECTED FROM THE SUGGESTED CURRICULUM

	Semester hours	
Required courses:	1st Sem.	2d Sem.
Book selection and allied topics	2	3
Children's literature (for the general worker)	1	
Reference and bibliography	3	3
Cataloging, classification, subject headings, etc.	3	3
History and administration of libraries	2	
Field work (general)	1	
Library work as a profession	1	1
Elective courses:		
Cataloging for university and scholarly libraries	-	2
Field observation (catalog departments)		1
College and university libraries		2
	13	15

MINIMUM STANDARDS FOR ADVANCED GRADUATE LIBRARY SCHOOLS

ORGANIZATION

An advanced graduate library school should be an integral part of a university which meets the standards for graduate study laid down by the Association of American Universities

ADMINISTRATIVE AND INSTRUCTIONAL STAFF [1]

The standards observed in the other graduate schools of the university shall apply as to educational qualifications, professional experience, efficiency in teaching, numerical strength, titles of positions, and rights and privileges. It is highly desirable that the executive officer give full time to the library school

FINANCIAL STATUS

The financial provision for the school shall be such as to guarantee a faculty adequately salaried and sufficient in number to allow for research, to ensure an appropriate environment for graduate study and otherwise to meet developments in the library profession

LIBRARY FACILITIES

Library facilities adequate for research

REQUIREMENT FOR ADMISSION [2]

Graduation from an approved college or university and in addition the successful completion of an accredited one-year professional curriculum [*]

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[1] The faculty shall be on salary for at least one year in advance of the opening of the school, inasmuch as travel, research and study are needed for the organization of such courses as may be under contemplation

[2] A school should reserve the right to refuse to admit an applicant who meets this requirement, but who has not had successful library experience or who has not demonstrated his ability to carry the work profitably; and the right to admit an applicant who does not fully meet the requirement but who satisfies the faculty that he can carry the work without a lowering of standards

[*] It is desirable that such a curriculum be offered at the university

Length of Curricula

One academic year leading to a master's degree

The advanced work beyond the master's degree should be limited to those students who by their previous study have demonstrated their ability to pursue a high type *either* of professional study *or* of scientific research. The standards should be informal; the work personal; the end, the achievement of a certain scholarly and professional result rather than the summation of credits. Upon the achievement of the desired result the Ph.D. degree should be granted

Program of Study

A student will choose a program of study, subject to faculty approval, along the line of his special interest from courses offered in preparation for administrative and executive positions in libraries of various types, for expert bibliographic work, and for teaching in library schools

Degrees

M.A. or M.S. for the satisfactory completion of one year of professional study strictly graduate in character [1]

Ph.D. to be conferred under the university regulations governing the granting of this degree

MINIMUM STANDARDS FOR SUMMER COURSES IN LIBRARY SCIENCE. ADOPTED BY THE COUNCIL OF THE AMERICAN LIBRARY ASSOCIATION AT CHICAGO, JANUARY 1, 1926

Type One

Summer courses [2] in library science for which credit is given by an accredited library school toward the completion of its professional curriculum shall be governed by the Minimum Standards for Library Schools adopted by the Council of the American Library Association, July, 1925.

Type Two

Summer courses in library science for which credit is given by an institution other than an accredited library school toward a certificate for the completion of work equivalent to the professional curriculum in an accredited library school shall be governed by the Minimum Standards for Library Schools [3] adopted by the Council of the American Library Association, July, 1925.

Type Three

Summer courses in library science for which credit is given toward the completion of an academic curriculum shall be governed by the following standards:

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[1] It is desirable that courses be so offered that the degree may be obtained also by attendance at summer sessions only

[2] The term "course" is used throughout these standards to refer to instruction in a single subject or in a group of subjects under an inclusive heading

[3] See the preceding parts of this Appendix

ORGANIZATION

Summer courses in library science¹ for which credit is given toward the completion of an academic curriculum should be conducted at an approved normal school, college, or university²

ADMINISTRATION

The executive officer should have sufficient authority, delegated from the governing body, to administer the session in accordance with the general policies of the institution
Secretarial assistance should be available

INSTRUCTIONAL STAFF

Number:

One full-time³ teacher to approximately twenty-five students in any course which requires instruction in technical methods, e.g., cataloging, subject headings, etc. One full-time³ teacher to approximately thirty students in all other courses except in lecture courses which need not be limited. In addition there should be the necessary assistants to cover the revision of student work and other duties

Qualifications:⁴

1. Academic preparation
   Degree representing four years of work in an approved college or university, or an acceptable equivalent
2. Professional preparation
   Completion of one year of work in an accredited library school, or an acceptable equivalent
3. Experience
   Practical knowledge of the subjects taught, and efficiency in teaching

FINANCIAL STATUS

The financial provision for the session should be such as to guarantee a faculty adequately salaried⁵ and sufficient in number

LIBRARY FACILITIES

Library facilities adequate for reference and practice work shall meet the approval of the Board of Education for Librarianship
The session should be conducted where libraries of the type needed for observation are readily accessible

QUARTERS AND EQUIPMENT

Quarters and equipment especially adapted to courses in library science should be available. There should be sufficient office space and class rooms including one room equipped for individual study, the latter reserved for library science students only

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¹Summer courses should be governed by the standards and general requirements that apply to similar courses given during the academic year at the same institution provided always that these are as high as the Minimum Standards

²An institution accredited by generally recognized agencies for accrediting colleges and universities, or an institution not so accredited but whose work is accepted in hour for hour transfer of credit by the local state university or by another university with standards at least as high

³A schedule for a full-time teacher should not exceed 30 hours per week, this total to cover all class room instruction, labratory or other supervised study, conference hours, and all other work connected with teaching. Schedules for part-time teachers should be based on this maximum

⁴It is desirable that the staff shall have had varied preparation including library experience

⁵Salaries comparable to those paid in other departments of instruction in the same institution

REQUIREMENT FOR ADMISSION [1]

One year of work acceptable for admission to the sophomore class of an approved college or university, evidenced by a transcript of the college record

Aptitude and personal qualifications for library work and evidence of ability to pursue profitably the courses chosen

LENGTH OF SESSION

Six or eight weeks

CERTIFICATE

Statement of the satisfactory completion of specific courses

SUGGESTED COURSES [2] (probably not all would be offered at any one time or place)

	Class hours [3]	Semester hours
Book selection and allied topics	30–40	2
Book selection and allied topics for the school library . .	30–40	2
Cataloging, subject headings, etc.	30–40	3
Cataloging, classification, etc., for school, special, and small public libraries	30–40	2
Children's literature and story telling	30–40	2
Classification, shelflisting, etc.	30–40	2
History and administration of libraries	15–20	1
Library extension work	30–40	2
Library work as a profession	15–20	1
Library work with children	30–40	2
Medium-sized public libraries	30–40	2
The place, function, administration, and opportunity of the library in the modern school	30–40	2
Reference and bibliography	30–40	2
Small public libraries	30–40	2
Special libraries (including hospital, medical, etc.) . .	30–40	2

The normal program in a six weeks' session should not exceed 6 semester hours with a possible maximum of 8 semester hours for a student of exceptional ability, the hours to be increased proportionately in an eight weeks' session

TYPE FOUR

Summer courses in library science designed to prepare librarians for small libraries and assistants for medium-sized libraries shall be governed by the following standards:

[1] The faculty should reserve the right to refuse to admit an applicant who meets the first requirement but who fails in the second; and the right to admit an applicant who does not meet the first requirement but who satisfies the faculty that he can carry the work without a lowering of the standards of instruction

[2] The Charters' Curriculum Study now being made eventually will give definite facts upon which to base a curriculum. Until then the "Suggested courses" may be helpful

[3] Each class hour is estimated here as a fifty-minute period. Two laboratory periods of the same length should accompany each class hour in cataloging and classification; class hours in other subjects presuppose two clock hours of preparation

ORGANIZATION

> Summer courses in library science designed to prepare librarians for small libraries or assistants for medium-sized libraries should be conducted at an approved educational institution

ADMINISTRATION

> The executive officer should have sufficient authority, delegated from the state library extension agency, or the educational institution, to administer the session in accordance with the general needs of the small or medium-sized libraries of the state or surrounding districts
>
> Secretarial assistance should be available

INSTRUCTIONAL STAFF

> Number:
>
> > One full-time [1] teacher to approximately twenty-five students in any course which requires instruction in technical methods, e.g., cataloging, subject headings, etc. One full-time [1] teacher to approximately thirty students in all other courses except in lecture courses which need not be limited. In addition there should be the necessary assistants to cover the revision of student work and other duties
>
> Qualifications: [2]
>
> > 1. Academic preparation
> >   Degree representing four years of work in an approved college or university, or an acceptable equivalent
> > 2. Professional preparation
> >   Completion of one year of work in an accredited library school, or an acceptable equivalent
> > 3. Experience
> >   Practical knowledge of the subjects taught, and efficiency in teaching

FINANCIAL STATUS

> The financial provision for the session should be such as to guarantee a faculty adequately salaried [3] and sufficient in number

LIBRARY FACILITIES

> Library facilities adequate for reference and practice work shall meet the approval of the Board of Education for Librarianship
>
> The session should be conducted where libraries of the types needed for observation are readily accessible

QUARTERS AND EQUIPMENT

> Quarters and equipment especially adapted to courses in library science should be available. There should be sufficient office space and class rooms, including one room equipped for individual study, the latter reserved for library science students only

---

[1] A schedule for a full-time teacher should not exceed 30 hours per week, this total to cover all class room instruction, laboratory or other supervised study, conference hours, and all other work connected with teaching. Schedules for part-time teachers should be based on this maximum

[2] It is desirable that the staff shall have had varied preparation including library experience

[3] Salaries comparable to those paid for work of like importance requiring the same qualifications

REQUIREMENTS FOR ADMISSION [1]

High school graduation
Definite appointment to a library position
Aptitude and personal qualifications for library work and evidence of ability to pursue profitably the courses chosen

LENGTH OF SESSION

Five or six weeks, providing for thirty class hours of each course

CERTIFICATE

Statement of the satisfactory completion of specific courses

SUGGESTED COURSES [2]

The following courses should be planned with the needs of small and medium-sized libraries in view so that students by carrying the three courses may be prepared for the majority of their duties in such libraries. Each student should be encouraged to carry as much of the work as possible, choosing that which will best prepare him to solve his own library problems

	Class hours [3]	
Cataloging, subject heading, etc.	18	
Classification, shelflisting, etc.	12	30
Book selection, including Children's literature, also Trade bibliography and Order work	30	30
Library administration	18	
Reference work	12	
		30
Total		90

APPENDIX B

MINIMUM REQUIREMENTS FOR LIBRARY SCHOOLS

The term "library school" is used to designate an agency which gives in a single academic year at least one coordinated professional curriculum in library science, for which credit for a full year of study is granted in accordance with the practice of the institution.

The character of the curriculum, efficiency of instruction, professional spirit and atmosphere of the library school, the professional achievement of its graduates, and the standards and general reputation of the institution of which it is a part, shall be factors in determining the eligibility of a library school for accreditation, in addition to the more quantitative factors

[1] The faculty should reserve the right to refuse to admit an applicant who meets the first two requirements but who fails in the third; and the right to admit an applicant who does not meet one or the other of the first two requirements but who satisfies the faculty that he can carry the work without a lowering of the standards of instruction

[2] The Charters' Curriculum Study now being made eventually will give definite facts upon which to base a curriculum. Until then the "Suggested courses" may be helpful

[3] Each class hour is estimated here as a fifty-minute period. Two laboratory periods of the same length should accompany each class hour in cataloging and classification; class hours in other subjects presuppose two clock hours of preparation

enumerated as requirements. The interpretation of these requirements by the Board of Education for Librarianship will be in accordance with the spirit of the qualitative standard movement.

CLASSIFICATION

The classification of library schools neither includes nor implies a comparative rating or grading of the schools. Provision is made for three classes of library schools, Type I, Type II, and Type III.

Type I comprises library schools which require at least a bachelor's degree for admission to the first full academic year of library science, and/or which give advanced professional training beyond the first year.

Type II consists of library schools which give only the first full academic year of library science, requiring four years of appropriate college work for admission.

Type III consists of library schools which give only the first full academic year of library science, not requiring four years of college work for admission.

ORGANIZATION

Type I and Type II library schools shall be a part of a degree-conferring institution approved by the Board of Education for Librarianship for giving professional instruction.

A Type III library school shall be a part of a degree-conferring institution or of a library or other institution approved by the Board of Education for Librarianship for giving professional instruction.

ADMINISTRATION

The executive officer shall have such administrative authority as shall enable him to conduct the library school in accordance with these requirements.

Secretarial and clerical assistance shall be provided for the performance of duties relating to the administration of the library school.

FINANCIAL STATUS

The adequacy of the financial provision for a library school shall be judged in relation to its program of professional education, the salary schedule of the institution, and necessary instructional facilities and equipment.

ADMISSION REQUIREMENTS

The selection of students for admission to a library school should be based on the ability and capacity of the candidates to perform satisfactorily the work which will be required of them in the library school and in library service.

Type I library schools, for admission to professional study beyond the first year in library science: evidence satisfactory to the institution and the library school of (1) graduation from an approved college or university representing study in fields appropriate to the requirements of librarianship and meeting specific subject and scholarship requirements for graduate study of the institution and the library school; (2) successful completion of one full academic year in an accredited library school and four years of appropriate college work; (3) aptitude and personal qualifications for library service; and (4) ability profitably to pursue advanced professional study.

Type I and Type II library schools, for admission to the first year in library science: evidence satisfactory to the institution and the library school of (1) graduation from an approved college or university representing study in fields appropriate to the requirements of librarianship and meeting specific subject and scholarship requirements of the library school; (2) aptitude and personal qualifications for library service; and (3) ability profitably to pursue the curriculum. A

reasonable period of satisfactory experience in a library of recognized standing is strongly recommended as highly desirable.

Type III library schools, for admission: evidence satisfactory to the institution and the library school of (1) successful completion of fewer than four years of college work appropriate in scope and content to the requirements of librarianship and meeting specific subject and scholarship requirements of the library school; (2) aptitude and personal qualifications for library service; and (3) ability profitably to pursue the curriculum. A reasonable period of satisfactory experience in a library of recognized standing is strongly recommended as highly desirable.

In conformity with the policies of the institution, a library school should reserve the right, first, to refuse to admit persons who present proper credentials but who fail to show evidence of aptitude and personal qualifications for library service and ability profitably to pursue the curriculum, and second, to interpret admissions requirements in favor of a few persons of exceptional ability who fail to meet formal requirements.

CURRICULUM

In judging a curriculum, the following factors will be considered: objectives of instruction, adequacy of courses to meet the objectives and the changing needs of the library profession, correlation of courses, and provision for specialization through elective courses or separate curricula.

The first-year curriculum shall be one full academic year in length and shall include courses providing instruction in the various aspects of librarianship; functions and administration of libraries, bibliography and technical processes. In accordance with the policies of the institution, a library school should reserve the right to accept elective courses in related fields and to admit to courses in library science qualified students who are enrolled in other schools or departments of the institution.

A library school may also give the same curriculum or curricula, as a whole or in part, in cumulative summer sessions under conditions equivalent to those obtaining in the regular college year.

Advanced study in library science, leading both to the master's degree and the doctorate, shall be conducted under conditions conforming to university graduate instruction.

CREDENTIALS

For satisfactory completion of the first year of professional training taken as a fourth year of an undergraduate college course: B.A. or B.S.; or a certificate if the first year of professional training is not taken toward completion of a degree.

For satisfactory completion of the first year of professional training following a bachelor's degree: if the first year offered to graduates is organized at least on a basis equivalent to an undergraduate major and if it constitutes a complete curriculum in itself which fits for general or specialized library service, and is approved by this board, a second bachelor's degree may be conferred in accordance with the general policy of the individual institution with respect to the granting of a second bachelor's degree. Or a certificate may be granted for satisfactory completion of the first year of professional training following a bachelor's degree.

It is recommended by the Board of Education for Librarianship that the second bachelor's degree be followed by the qualifying phrase "in library science."

For satisfactory completion of advanced professional study conducted in conformity with regulations for graduate study of the institution: M.A. or M.S. for successful completion of a minimum of one year beyond the first year of professional training, and Ph.D. for additional years which may include the second year.

FACULTY

The faculty should be adequate in number and in qualifications to determine and carry out the program of the library school in accordance with these requirements.

Qualifications

In general, teachers in library schools should have a degree representing four years of appropriate work in an approved college or university; they should have completed at least two years of work in an accredited library school, and have had sufficient practical knowledge of the subjects taught and demonstrated ability in teaching to satisfy the institution and the Board of Education for Librarianship. In lieu of these requirements, teachers may present equivalent academic and professional preparation and experience.

In addition, graduate study and training in research equivalent to that required for the doctorate are urgently recommended, particularly for teachers in library schools giving advanced professional instruction.

Number

The number of teachers required, whether full-time or part-time, shall be determined by the character of the library school, the number and content of required and elective courses, the average number of enrolled students and similar factors.

The majority of teachers shall have professional rank.

Necessary assistants shall be provided to cover the revision of student work and other duties.

Teaching Schedules

Teaching schedules shall be governed in general by the practice of the institution. In view of the professional nature of the courses, the widely scattered materials of instruction, the necessity for revision of student work and for conference with students, an unduly heavy teaching schedule for each instructor will be discouraged.

QUARTERS AND EQUIPMENT

Quarters and equipment shall be adequate and commensurate with those provided for other departments of the institution.

LIBRARIES

Adequate book and library facilities for study and practice shall be provided. The character and organization of the library of the institution, as well as the special collections provided for the library school itself, will be judged in relation to the curriculum offered. In addition, libraries of various types shall be readily accessible for practical work and observation.

APPENDIX C

STANDARDS FOR ACCREDITATION.[1] PRESENTED BY THE ALA BOARD OF EDUCATION FOR LIBRARIANSHIP AND ADOPTED BY THE ALA COUNCIL, CHICAGO, JULY 13, 1951

The Board of Education for Librarianship is authorized by the Council of the American Library Association to serve as an accrediting agency for programs of library education. The standards herein set forth provide principles for evaluating the basic program of education for librarianship covering five years of study beyond the secondary school.[2] A list of library schools offering

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[1] Prepared by the Board of Education for Librarianship assisted by the ALA Library Education Division and Association of American Library Schools.

[2] Standards appropriate for other types of programs will be given consideration later. Standards for undergraduate programs in school librarianship are now (1952) in preparation in cooperation with the American Association of Colleges for Teacher Education.

programs approved under these standards will be maintained. The term "library school" as used in these standards means a professional school or a department or division organized and maintained by an institution of higher education.

The standards of the institution which maintains a library school, its general reputation and its recognition by appropriate accrediting agencies shall determine the eligibility of a program of library education for consideration.

The board will determine the eligibility of a library school for inclusion on the approved list on the basis of evidence presented by the institution, of the report of a visiting committee appointed by the board, and of other pertinent information.

ORGANIZATION AND ADMINISTRATION

The library school responsible for the program of library education shall be an integral part of the parent institution and shall be assured of status and continuing financial support sufficient to carry out the program in accordance with these standards.

The program shall be administered by an executive officer empowered by the institution with sufficient authority to accomplish the objectives herein outlined.

The executive officer shall have qualifications similar to those required of the faculty and competence necessary to fulfill the additional responsibilities of his office. His academic status and title shall be appropriate to his position as judged in relation to the organization of faculty in the institution.

FINANCIAL STATUS

The institution must give evidence of genuine interest in the library school and of intention and ability to provide continuing financial support sufficient to develop and maintain professional education in accordance with the general principles set forth in these standards. The adequacy of the financial provision for a library school shall be judged in relation to the number of students, program of professional education, the financial support and salary schedule of the institution, and necessary instructional facilities and equipment.

FACULTY

The faculty shall be adequate in number, authority and competence to determine and to carry out a program designed to achieve the objectives stated in these standards and other objectives of the library school.

The instructional program must be the responsibility of a corps of full-time faculty sufficient in number to provide stability and continuity of instruction, to carry the major portion of the teaching load and to represent a variety of competencies.

ADMINISTRATIVE AND NONINSTRUCTIONAL STAFF

The administrative and noninstructional staff shall be adequate in number and competence to enable the executive officer and faculty to carry out the administrative and instructional responsibilities undertaken by the library school.

CURRICULUM

The basic program shall include (a) general education which comprises a systematic survey of the various fields of knowledge, concentration in one or more subject fields, background courses of special value in library service and (b) study of professional principles and methods common to the several kinds of libraries and of library service. A study of specialized service in general or special libraries built on a sound foundation of general academic and professional education may occupy a place in the basic program. This program shall require a minimum of five academic years of study beyond the secondary school level.

Professional library content should constitute approximately one-fifth of the five-year program. Such content may be concentrated in the final year or distributed over the later years of the program, and should be so placed that students have necessary prerequisite preparation. Undergraduate programs of library education shall be accepted as part of the five-year program insofar as they contribute to its objectives.

The curriculum should be characterized by the following underlying aims: It should be animated by a sense of purpose through emphasis on the significance and functions of the subjects taught; it should develop professional librarians grounded in the fundamental principles and processes common to all types of libraries and all phases of library service; it should stress understanding and ability to apply basic principles and methods; it should keep abreast of current trends in library development and professional education; it should stimulate continuous professional growth. The curriculum should show sound construction. It should be complemented by conferences of faculty with students as a means of helping each student to realize his potentialities.

Admission Requirements

Intellectual strength, personal balance and adjustment, aptitude for library service, and promise of professional purpose and development should be given primary consideration in admitting students.

Library schools which concentrate the professional library content of the five-year program in the final year shall base admission upon (a) graduation from an approved college or university, (b) adequacy of background in general and special subject education, and (c) scholarship to meet the standards for graduate study in the institution. Library schools which admit students at an earlier level shall establish (a) requirements that make possible the completion of the basic program as outlined under "Curriculum" in a minimum of five years of study, and (b) scholarship requirements to meet institutional standards for graduate study. Library schools shall be responsible for achieving over-all objectives of the curriculum through selection of students and/or requiring relevant course work subsequent to admission to the library school.

In conformity with the policies of the institution a library school should reserve the right to interpret admission requirements in favor of the occasional applicant of exceptional ability who fails to meet formal requirements. The school should have the right to refuse admission to persons who present proper academic credentials but who fail to meet standards indicating personal balance and adjustment, aptitude for library service and promise of professional purpose and development.

Degree

The appropriate credential for satisfactory completion of the five-year program is the master's degree.

Quarters and Equipment

Quarters should include classrooms, administrative, work and assembly rooms that are adequate and suitable for the program of the school. These quarters should be equipped for effective administration and instruction.

Library Facilities and Services

Adequate library facilities and services shall be provided. The character and organization of the library of the institution, the special collections for the library school, and other local library resources, will be judged in relation to the curriculum offered.

APPENDIX D

STANDARDS FOR UNDERGRADUATE LIBRARY SCIENCE PROGRAMS

GENERAL STATEMENT

The standards herein stated are intended to apply to all undergraduate programs in library science including those offered by institutions having graduate programs of education for librarianship.

The program in education for librarianship shall be based upon the following assumptions:

1. The full basic program of professional education for librarianship encompasses a minimum of five years of study beyond the secondary school culminating in a Master's degree.[1]

2. An introductory program of education for librarianship may legitimately be given at the undergraduate level but the amount of such work in library science shall not be so great as to limit seriously the amount of general education. Therefore the undergraduate programs shall total not fewer than 12 and not more than 18 semester hours.

3. The undergraduate program as conceived in this document may be planned by the faculties of individual institutions to serve as preparation of personnel for certain types of positions in various kinds of libraries.

4. There should be articulation between the undergraduate programs in library science and the graduate library school programs, at least in the same geographic region.

5. Courses shall be offered by extension only where personnel, materials and facilities are comparable to those on campus; such courses shall not form a major part of the student's program in education for librarianship.

6. No part of the introductory program may be given appropriately by correspondence because of the need for a variety of materials in support of the program and for the stimulation of class discussion and guidance.

OBJECTIVES OF THE LIBRARY SCIENCE PROGRAM

The general objectives of undergraduate library science programs are (1) to offer introductory preparation for library personnel for positions at levels commensurate with this preparation and, (2) to provide a foundation for graduate study in the field of librarianship. A further objective may be to provide in-service training opportunities for librarians. It is expected that specific objectives in relation to the needs of the geographic area and the type or types of libraries served will be formulated by the faculties concerned.

ORGANIZATION AND ADMINISTRATION

The program of library science instruction shall be located in a college or university approved by the appropriate accrediting association. It shall be an instructional unit within the academic framework of the institution rather than an adjunct of the library's administration.

The person in charge of this program shall have this function as his major responsibility. He shall have authority to select students, recommend faculty, plan the curriculum, and direct a continuously developing program with the cooperation of the faculty of the institution. Administrative relationships should be developed which will enable the library science faculty to work closely with supervisors of student teachers and other faculty of the institution.

Adequate clerical assistance shall be provided to the faculty and person responsible for administration of the program.

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[1] American Library Association, Board of Education for Librarianship, "Standards for Accreditation," *ALA Bull.*, **46**, 48–49 (February 1952).

FACULTY

There shall be at least one full-time instructor for the introductory program. Additional factors to be considered in determining the total number of faculty are areas of instruction, number of students, amount and kind of supervision, supplementary services such as in-service training, and non-teaching responsibilities.

Full-time instructors shall have at least a graduate professional degree in library science with specialization and experience appropriate to their major fields of instruction. Teaching experience is desirable.

Instruction may be given by similarly qualified members of the institution's library staff who have training and experience appropriate to the courses assigned and aptitude for teaching. Such instructors shall have released time from staff duties sufficient to provide for preparation and student and faculty conferences as well as for teaching. If librarians from other institutions are brought in to teach they shall fulfill the same requirements. In no instance shall the major instructional load be carried by a part-time faculty. Instruction may also be given by faculty members of related departments of the same or other institutions whose training and experience are appropriate to the courses assigned to them.

CURRICULUM

The program in library science should be planned in cooperation with the institution's faculty and in relation to the institution's program of general and professional education. The curriculum should undertake to begin the development in students of:

1. Understanding of the library as a social and educational agency, and its role in the development of communication.
2. Understanding of the role and objectives of the various types of libraries in relation to the needs of the community each serves.
3. Knowledge of materials: their content, evaluation, organization and use.
4. Knowledge of principles and practices of library organization and administration.
5. Knowledge of techniques and of competence in performance.

Observation in libraries shall be provided for all students as an integral part of the program. Appropriate supervised practice shall be required for school librarians in training.

The curriculum should undertake to provide a foundation for graduate study.

STUDENT PERSONNEL

Admission to the library science program shall be based upon high standards of scholarship and personality, with due regard for qualifications appropriate for library service.

There shall be specific provision for counseling library students on their programs, on opportunities for service in librarianship, and on the requirements for graduate study in the field.

The institution's placement and follow-up services shall include provision for graduates of the library science program.

FACILITIES AND BUDGET

Quarters for the library science program shall include classroom and office space furnished with appropriate instructional and office equipment.

Special materials needed for instructional purposes shall include a representative collection of professional books, periodicals and audio-visual materials suited to the particular courses offered. Both the general collection of the institution's library and the laboratory school library may provide some of the special materials needed in the library science programs. If courses in work with youth in school and public libraries are given, the institution shall provide a representative collection of books and other materials for children and young people in addition to the laboratory school library.

Libraries that are to serve as demonstration libraries shall meet professional standards of excellent library service.

An initial appropriation to secure equipment, instructional materials and library facilities shall be made by the institution establishing a library science program. Thereafter, an annual budget adequate to support the program of instruction and to secure its continuing development shall be provided.

GUIDE FOR THE DEVELOPMENT OF SUPPLEMENTARY INFORMATION BY INSTITUTIONS BEING EVALUATED BY THE NATIONAL COUNCIL FOR THE ACCREDITATION OF TEACHER EDUCATION FOR ACCREDITATION OF UNDERGRADUATE LIBRARY SCIENCE PROGRAMS

This supplement to the NCATE *Standards and Guide*[1] is designed to apply to all undergraduate programs in library science including those offered in institutions having graduate programs in librarianship. It is based upon the general assumption that an introductory program of education for librarianship may legitimately be given at the undergraduate level, provided the amount of such work in library science shall not be so great as to limit seriously the amount of general education; and that such programs, therefore, shall total not fewer than 12 and not more than 18 semester hours.

It recognizes, also, that the full basic professional educational program for librarianship, as established in the American Library Association's "Standards for Accreditation" (1951),[2] encompasses a minimum of five years of study beyond the secondary school culminating in a Master's degree.

This supplement indicates the kind of information, in addition to that requested in the NCATE general *Standards and Guide*, with reference to the undergraduate preparation in library science which the institution shall include in its report to the Council. The supplementary information requested below shall be placed with other information relating to preparation in library science at the appropriate points in the report. For example, all information relating to the faculty of the programs in library science shall be presented together as a part of the report on the professional education faculty. The same principle applies to curriculum, facilities, etc.

OBJECTIVES

1. Present a statement of objectives, both general and specific, relevant to the library science program. These objectives shall serve as a basis for appraisal of the total program.

2. Indicate the extent to which the library science program provides a foundation for graduate study in library science that will lead to articulation of the undergraduate program with graduate programs.

ORGANIZATION AND ADMINISTRATION

1. Be certain that the organization charts requested in the NCATE general *Standards and Guide* (p. 6, items 1-2) include the library science unit and show its relation to other units within the institution.

2. If the organizational structure for the control of the undergraduate program of library science differs from the control of other undergraduate programs within the institution, explain the difference.

3. Explain what policies may be determined by the library science unit, and what policies are determined by some other unit of the institution (see p. 6, item 2, a-g).

4. Explain the extent to which the policies and program for the preparation of librarians are determined by outside agencies such as the state department of education, the state library agency, or a professional association of librarians.

National Council for Accreditation of Teacher Education, *Standards and Guide for Accreditation of Teacher Education*, NCATE, Washington, D.C., 1957, 24 p.

American Library Association, Board of Education for Librarianship, "Standards for Accreditation," *ALA Bull.* **46**, 48–49 (February 1952).

FACULTY

1. Be certain to give the total assignment of all persons teaching courses or supervising field work in the curriculum for library science who are listed on the "Roster of Faculty for Professional Education" in the *Standards and Guide* (p. 14). Supplement this roster with a list and explanation of the total assignment of any person not included above who teaches courses in this curriculum. For persons devoting only a part of their time to the library science program indicate the nature and extent of their other duties. Indicate the proportion of part-time to full-time faculty in the library science program. Compare this with the institutional pattern.

2. If members of the institution's library staff teach in the program, indicate the amount of time from the normal library schedule released for teaching, preparation, and counseling.

3. Give evidence to indicate how well qualified by preparation and experience each library science faculty member is to handle his specific teaching assignment.

4. Give evidence that the rank and salaries of library science faculty are commensurate with those of other academic personnel of equal preparation and responsibility within the institution, and are sufficient to secure qualified personnel.

5. Describe the in-service growth program for the library science faculty, including a description of annual or sabbatical leave policies. Indicate the provision made for faculty members to conduct research.

6. Indicate how staff members in the library science program keep in close contact with the field.

7. Particular attention shall be paid to the section of the *Standards and Guide*, "Number and Teaching Load" and also to further information to be reported (p. 11; see also p. 12, item 1 e).

8. If summer faculty differs from that included in the roster and its supplementary list give the same information about persons teaching during the past two summer terms.

CURRICULUM

1. List objectives which have been developed for the library science curriculum.

2. Submit a statement of all library science courses with catalog descriptions and credit hours. Amplify these descriptions where necessary. Indicate how frequently these courses have been taught during the past four years, both regular and summer sessions.

3. Describe the program of observation and supervised practice in libraries.

4. Submit a statement which indicates program patterns and areas of specialization offered.

5. Indicate how these courses and patterns are designed to be articulated with graduate programs in librarianship.

STUDENT PERSONNEL

1. Present a statement describing practices in recruiting students to the library science program.

2. State by whom and at what point in the college curriculum students are advised as to the nature of the program, opportunities in, and qualifications required for the library profession.

3. Indicate who is responsible for determining admission to the library science program.

4. List the special scholarships, financial aid, etc., which are available to library science students.

5. Describe the placement and follow-up services for students completing the undergraduate library science program.

FACILITIES

1. Describe briefly the classroom and office facilities provided for the library science program.

2. Be certain that the report called for in the *Standards and Guide* (p. 24, item 6) includes

a statement covering professional books and periodicals, books for children and young people, audio-visual materials, and other special materials provided for the library science curriculum.

3. Estimate the amounts spent for the materials in each of these categories for the last three years.

4. If the program has been established within the last five years indicate the initial expenditures for materials and equipment.

5. Describe briefly the libraries that are used for demonstration and practice work.

APPENDIX E

TENTATIVE DRAFT OF REVISED "STANDARDS FOR ACCREDITATION"

INTRODUCTION

The American Library Association is authorized by the National Commission on Accrediting to serve as the accrediting agency for graduate programs in library education leading to the first professional degree. The Council of the Association has in turn designated the Committee on Accreditation to be the unit responsible for the promulgation and implementation of standards for accreditation. The following document sets forth these Standards.[1]

The intentions, assumptions, and limitations of the document should be clearly understood. These Standards are limited in their application to the evaluation of graduate programs of library education which lead to the first professional degree. While the Committee on Accreditation is also concerned with the quality of the institution of higher education which maintains such a program, it does not itself examine the total institution. It does require however, as a prerequisite to application by the library school for consideration by the Committee, that the parent institution meet the accreditation standards of the appropriate regional accrediting agencies.

The Committee on Accreditation seeks both to protect the public interest and to provide guidance for library educators. Prospective students wishing to make a wise choice of schools, libraries recruiting professional staff, the general public concerned about the kind of library service it receives and supports—all of these have the right to know whether a given program of library education is of good standing. By identifying those programs which have met recognized standards, the Committee offers such groups (together representing the "public interest") the means of quality control in the professional staffing of libraries.

These Standards describe the essential features of programs of library education which prepare librarians for responsibilities beyond those at the narrowly local level. The graduates of programs accredited by the American Library Association should be qualified to contribute to the advancement of the profession, rather than to serve only the purposes of one institution or locality. Within this context, the document seeks to identify the indispensable components of good library education without jeopardizing the schools' right and indeed obligation for initiative, experimentation, and individual difference in their programs. The document is a map, not a blueprint. The statement of requirements and recommendations emphasizes qualitative rather than

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[1] Throughout this document, wherever the term "librarianship" is used, it is meant to be interpreted in its broadest sense as encompassing the relevant concepts of information science and documentation. Whenever the term "libraries" is used, the current models of media centers, educational resources centers, information, documentation, and referral centers are also assumed. "Library service" is understood to be concerned with knowledge and information in their several forms—their identification, selection, acquisition, preservation, organization, communication and interpretation, and with assistance in their use. "Library school" means a professional school (department or division) organized and maintained by an institution of higher education for the purpose of graduate library education leading to the first professional degree.

quantitative considerations, and thus necessarily describes them in rather general terms. The Standards hence lend themselves to some variation in interpretation, since proper evaluation of any educational program in these respects (e.g., caliber of faculty, effectiveness of teaching methods) must depend on the judgment of experienced and capable observers.

The present document follows upon the "Standards for Accreditation" adopted by the ALA Council in 1951. In twenty years' application of the 1951 "Standards," the Committee on Accreditation gained a great deal of valuable experience. Much of this experience is incorporated in the present document as is also the consensus of the views which the Committee has solicited from educators, students, and practitioners. The many changes that have occurred in library service between 1951 and 1972 are reflected in the present Standards, while conversely many features of the 1951 document, which have shown that they could stand the test of time, are retained.

Each of the major sections in this document represents an essential component of a graduate program in library education. In each section the statement of the standard itself is preceded by the reasoning upon which the standard rests, and is followed by a list of the kinds of evidence that the library school is expected to present to demonstrate that its program meets the standard. The Committee determines the eligibility of a program for accredited status on the basis of evidence presented by the institution, and of the report of a visiting team. The evidence supplied by the institution in support of Standards II–VI is evaluated against the long-term objectives and specific program presented by the school in accordance with Standard I. While the Committee examines each of the component factors in its evaluation, the final judgment is concerned with the totality of the effort and the environment for learning in which it is carried on. The decision regarding accreditation is approached from an assessment of this totality, rather than from a consideration of isolated particulars.

The aim of the "Standards for Accreditation" is to provide guidance for the present which is sufficiently flexible to allow for future developments. The Standards are indicative but not prescriptive. As with the former Standards, the meaning and meaningfulness of the present Standards must lie in their application.

I. PROGRAM OBJECTIVES

Rationale for Standard: Clearly defined objectives and specific goals for the educational program are an essential frame of reference for meaningful internal and external evaluation. Programs are judged on the degree to which they contribute to the attainment of program goals.

Standard: The library school should have clearly defined, publicly stated broad objectives. It should also define explicit goals for its specific educational programs, stated in terms of the educational result to be achieved.

Program goals should reflect:

A. Consistency with the general objectives of librarianship and library education, including relevant policy statements of the American Library Association.
B. Responsiveness to the needs of the constituency which the school seeks to serve.
C. Sensitivity to emerging concepts of the role of the librarian in the library and the library in society.

If the school offers more than one program, the scope and nature of each should be clearly defined.

Sources of Evidence:

1. Published announcements of the school's purpose and objectives and descriptions of program goals in school catalogs, bulletins, brochures, etc.

2. Copies of program proposals and program justifications submitted to university committees, administrators, and grant funding agencies.
3. Statements obtained by the visiting team for administrators, faculty, students, and alumni of the school.

II. CURRICULUM

Rationale for Standard: The distinctive quality of a school is reflected in the nature of the experiences it consciously provides to assist the formal learning process. As defined in official ALA policy,[1] professional responsibilities require special background and education by which the librarian is prepared to identify needs, set goals, analyze problems, and formulate original and creative solutions for them, and to participate in planning, organizing, communicating, and administering successful programs of services to users of the library's materials and services. Professional library education at the graduate level is designed to provide that kind of educational experience.

Standard: The programs of the school should provide for the study of principles and procedures common to the several kinds of libraries and of library service. A study of specialized service in either general or special libraries may occupy a place in the basic program. Specialization should be built upon a foundation of general academic and professional education and should include interdisciplinary work in subject fields where pertinent to the program of the individual student. A library school offering a single specialization may satisfy the "Standards for Accreditation," provided that, in addition to its special curricular emphasis, it provides for the study of general professional principles and procedures prescribed by this standard.

The curriculum comprising the students' total learning experience should be based upon the school's statement of broad objectives and should provide both academic means and sufficient time for meeting the specific goals of the programs.

The curriculum should be a unified whole rather than an aggregate of courses and should reflect a consistent point of view regarding ends and means within librarianship. It should stress understanding rather than rote learning of facts, principles rather than skills. It should emphasize the significance and functions of the subjects taught; it should respond to current trends in library development and professional education; it should promote continuous professional growth.

The curriculum should be constantly under review and revision, and should be receptive to innovation. Means should be provided for the expression of views of students and practitioners in revision of the curriculum.

To be acceptable for credit toward a degree, a course should be characterized by the following conditions: (1) Students enrolled have the benefit of personal guidance by a skilled and experienced member of the faculty; (2) provision is made for class discussion, student–faculty conferences, and opportunities for exchange of ideas with other students; (3) adequate materials to support the course are readily available.

Sources of Evidence:

1. Bulletin or catalog of the library school.
2. Degree and program descriptions and justifications developed for administrative use.
3. Syllabi for courses, or descriptions of activities and outcomes for groups of courses arranged by major fields in the school's curriculum.
4. Minutes and reports of the school's Curriculum Committee.
5. Written course evaluations by students, if available.
6. Student papers or other evidence of class projects.

[1] *Library Education and Manpower: A Statement of Policy Adopted by the Council of the American Library Association, June 30, 1970.*

7. Records of achievement of graduates of the program.
8. Statements obtained by the visiting team from administrators, faculty, students, and alumni of the school.

III. FACULTY

Rationale for Standard: The success of the instructional and research programs of the school is dependent upon the ability of its faculty to teach, stimulate independent thinking, and provide stability and continuity. The size and caliber of the faculty reflect the nature of the school's objectives for library education and the values placed upon the student–teacher relationship in the learning process. Research enriches both teaching and learning and provides means for adding to a professional body of knowledge. Participation in professional organizations enables faculty members to contribute to the solutions of professional problems and to keep abreast of the concerns of the field.

Standard: The school should have a corps of full-time faculty members, academically qualified for appointment to the graduate faculty within the institution and sufficient in number to carry out the major share of the teaching and research requirements of the programs offered. Part-time faculty members may be appointed to complement the teaching competencies of the full-time faculty members when necessary or appropriate.

The faculty as a group should evidence a variety of subject backgrounds; a substantial and pertinent body of library experience; advanced degrees from a variety of academic institutions; specialized knowledge covering the subjects in the school's curriculum; a record of sustained productive scholarship; close and continuing liaison with the field. The qualifications of each faculty member should include interest, ability, and effectiveness in teaching; aptitude for research; competency in the assigned areas of specialization; and active participation in appropriate professional organizations.

The school should demonstrate the high priority it attaches to good teaching by its appointments and promotions; by its receptivity to innovation in methodology and educational technology; and by its solicitation of student reactions to faculty performance. Class size and teaching method should be appropriate to carry out stated course goals.

Allocation and distribution of faculty workloads should result in assignments related to the interests and competencies of individual faculty members and should insure that the quality of instruction is maintained at the same level throughout all sessions of the calendar year. In addition to hours for teaching and research, faculty workloads should allow ample time for student counseling, and for school, institutional, and professional responsibilities and activities.

Sources of Evidence:

1. Library School faculty personnel data forms.
2. Chart of major curriculum areas with an indication of the faculty members responsible for teaching and research in each of the areas.
3. Faculty load reports to ascertain student–teacher ratio, courses taught in the last two years, research and administrative responsibilities.
4. Report of norms for university salaries related to rank compared with salaries of library school faculty.
5. Observation of class instruction.
6. Syllabi, reading lists, and other instructional materials.
7. Examples of student work, including research projects directed by faculty.
8. Examples of faculty research and publication (e.g., theses and dissertations; articles and reports in professional journals; published monographs; work in progress; research conducted for various groups).
9. For teaching effectiveness and course quality, statements and documents obtained by the visiting team from administrators, faculty, students, and alumni of the school.

IV. Students

Rationale for Standard: The character and worth of any graduate program is directly related to the quality of its students.

Standard: The library school should formulate an admission policy that will insure the realization of the broad objectives and specific goals of the school's program, and that meets or exceeds the minimum standards of the parent institution for its graduate programs. The library school's admission policy should insure that students accepted for admission to the program evidence personal suitability, interest in a career in library service, and the aptitude for it. The school should be able to demonstrate that the criteria it has established are followed in the evaluation of applicants to the program.

Admission should normally be limited to holders of the bachelor's degree representing a broad liberal education from an accredited institution, comprising general background which may include major concentrations. The applicant's academic achievement should be equivalent to that required for entrance into the graduate programs of recognized universities. The normal academic prerequisites may be waived in favor of applicants of unusual ability or background, where grounds for waiver can be demonstrated. The standards of admission to the degree program should be applied consistently throughout the year; admission to special programs or courses should not imply automatic admission to degree programs unless the admission standards to special programs and courses are identical to those for degree programs.

Assessment of a student's application should be based upon a combined evaluation of academic, personal, and intellectual qualifications, recognizing qualifications suitable to the individual's career objectives and appropriate to the school's program.

Sources of Evidence:

1. Published and/or internal statements of admission policy and requirements.
2. Files on applicants admitted and rejected during the past two years.
3. Student transcripts and the school's analyses of them leading to the decision to admit or reject.
4. Letters of reference, notes on personal interviews and other documents relevant to an assessment of the applicant's personal qualifications.
5. List of enrolled students who do not meet officially stated requirements and explanation of reasons for their acceptance.
6. Statements obtained by the visiting team from administrators, faculty, students, and alumni of the school.

V. Governance, Administration, and Financial Support

A. Governance
(i.e., administrative relationship of the
library school to the parent institution)

Rationale for Standard: Librarianship, like other professions, comprises a body of knowledge and skills which makes its program distinct from other disciplines within an institution of higher education. The library school thus requires a high degree of autonomy. The school's financial support, staff, physical accommodations, ability to recruit students and attain the objectives of its program are dependent upon its status within the parent institution.

Standard: The library school should be an integral but distinctive academic unit within the institution, and its autonomy should be sufficient to assure that the content of its program, the selection and promotion of its faculty, and the selection of its students are controlled by the school within the general guidelines of the institution.

The school's executive officer should have the same title, status, and authority as the heads of other comparable units in the institution. His salary should be in keeping with his position. The

school's faculty and student body should have the same representation as those of comparable units on central committees or councils that are advisory or policy making for the institution.
Sources of Evidence:

1. Organization chart of the institution showing the relationship of the library school and its executive officer to the central administration.
2. Information to be supplied by the executive officer and central administration regarding the organization of the institution, salary structure for executive officers and faculty, policies and procedures governing faculty promotions and tenure, and involvement of faculty and students in institutional affairs.
3. Statements obtained by the visiting team from the executive officer, faculty, and students of the school.
4. Minutes of faculty meetings.

B. *Administration*
(i.e., the organization and management
of affairs within the school)

Rationale for Standard: The effective administration of the library school requires strong leadership on the part of the executive officer coupled with the active participation of the faculty in planning the academic program and formulating the academic policies. While the decision-making aspect of administration requires leadership on the part of the individual ultimately responsible for interpreting and applying those decisions, those decisions will be far more sound and effective if they have been reached through thoughtful deliberation by those most affected by them. Leadership and understanding of an academic enterprise and acceptance by an academic group requires of its executive officer a background of exposure to academic discipline as well as executive and administrative skills. Administrative effectiveness depends heavily upon the adequacy of the supportive staff.

Standard: The executive officer should have the administrative ability to fulfill the responsibilities of his office, as well as qualifications comparable to those required of the faculty.

Faculty should have a significant role in the major policy-making process which may include such areas as admissions and student aid, curriculum planning and development, faculty and student work loads and assignments, and faculty appointments, promotion, and tenure. Ample provision should also exist for the student body to communicate regularly with the executive officer and the faculty with respect to policies and operation of the school.

The non-instructional staff should be adequate in number and competent to relieve the executive officer and faculty of all clerical, technical, and routine duties which support the operation of the school.

Sources of Evidence:

1. Written communications from the executive officer to faculty and students and to his superiors (e.g., annual report, long-range plans).
2. Faculty minutes and minutes and reports of the school's committees, including the membership roster of those committees for the past two years.
3. Organization chart of the school.
4. Written reports and documents such as the faculty manual; student conduct code; publications of the student organization, including its constitution and bylaws; reports to alumni.
5. Statements obtained by the visiting team from the executive officer, faculty, students, and non-instructional staff of the school.

C. Financial Support

Rationale for Standard: The program of professional education in librarianship is a graduate program. The cost per student for such professional education is far greater than the cost of providing education at the undergraduate level. Support of a graduate program in librarianship entails substantially higher costs for every component.

Standard: The institution should provide continuing financial support sufficient to develop and maintain professional library education in accordance with the general principles set forth in these Standards. Support should be related to the size of the faculty required to carry out the school's program of education and research, the financial status and salary schedule of the institution, and necessary instructional facilities and equipment.

The salary schedule for the library school's faculty and executive officer should be comparable to that of other schools within the institution and to other library schools.

Adequate funds for research projects and faculty travel should be provided. Support for leaves with pay (e.g., sabbatical leaves) and other leaves should be available on the same basis as in comparable units of the institution.

Sources of Evidence:

1. Official financial records maintained by the school for the current year as well as those for previous years.
2. Complete budget of the institution and other institutional records that demonstrate the institution's financial commitment to the library school and other comparable units.
3. Statements obtained from administrative officials of the institution, and the executive officer, faculty, and students of the school.

VI. PHYSICAL RESOURCES AND FACILITIES

Rationale for Standard: The provision of appropriate resources, services, and facilities is necessary to realize maximum effectiveness of teaching and learning.

Standard: Instructional resources, services, and facilities should be provided to meet the needs of the specific programs. The general and special collections, staff, and services of the institutional library should be adequate to meet the general educational purposes and needs of the library school. The collection of materials in the field of library science should be adequate in size and content to support the goals and objectives of the school.

The facilities should include classrooms, laboratories, work rooms, and faculty and administrative offices adequate in number, size, and arrangement for the requirements of the programs.

The library school should have—or have access to, with demonstration capability appropriate to its program objectives—an adequate collection of multimedia resources, computer services, media production laboratories or agencies, and facilities for independent study using up-to-date technology and equipment.

Sources of Evidence:

1. Annual report of the institution's library.
2. Annual report of the library school library.
3. Floor plan of quarters of the library school.
4. List of special equipment and furnishings.
5. Description of additional resources pertinent to the program.
6. Results of the visiting team's inspection of physical resources and facilities.
7. Statements obtained by the visiting team from the executive officer, faculty, students, and library staff.

APPENDIX F

CATEGORIES OF LIBRARY PERSONNEL—PROFESSIONAL

Title			
For positions requiring library-related qualifications	For positions requiring nonlibrary-related qualifications	Basic requirements	Nature of responsibility
Senior Librarian	Senior Specialist	In addition to relevant experience, education beyond the M.A., as: post-Master's degree; Ph.D.; relevant continuing education in many forms	Top-level responsibilities, including but not limited to administration; superior knowledge of some aspect of librarianship, or of other subject fields of value to the library
Librarian	Specialist	Master's degree	Professional responsibilities including those of management, which require independent judgment, interpretation of rules and procedures, analysis of library problems, and formulation of original and creative solutions for them (normally utilizing knowledge of the subject field represented by the academic degree)

CATEGORIES OF LIBRARY PERSONNEL—SUPPORTIVE

Library Associate	Associate Specialist	Bachelor's degree (with or without course work in library science); or Bachelor's degree, plus additional academic work short of the Master's degree (in librarianship for the Library Associate; in other relevant subject fields for the Associate Specialist)	Supportive responsibilities at a high level, normally working within the established procedures and techniques, and with some supervision by a professional, but requiring judgment, and subject knowledge such as is represented by a full, four-year college education culminating in the bachelor's degree
Library Technical Assistant	Technical Assistant	At least two years of college-level study; or A.A. degree, with or without Library Technical Assistant training; or Post-secondary school training in relevant skills	Tasks performed as supportive staff to Associates and higher ranks, following established rules and procedures, and including, at the top level, supervision of such tasks
Clerk	Clerk	Business school or commercial courses, supplemented by in-service training or on-the-job experience	Clerical assignments as required by the individual library

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WILLIAM Z. NASRI

Education in Information Science

PURPOSE

The purpose of an education in information science centers around the following positions to be filled by graduates:

> *Education and research positions* for the designation and extension of principles about information, its acquisition, processing, utilization, and transfer.
>
> *Engineering positions* for the design and implementation of information systems.
>
> *Functional positions* to insure adequate use of automated storage facilities in information science environments (e.g., libraries, command-control centers, communication networks).

The foregoing purposes are reflected in the titles of positions correlated to these functions (*1*):

> *Information technologist*, training at the undergraduate level to provide support to information functions within information environments.
>
> *Information system specialist*, training at the master's level to provide support in the design and implementation of information systems.
>
> *Information scientist*, training at the doctoral level to support education and research conducted in academia, industry, and government.

TERMINAL SKILLS

The important dimension of an education in information science is the matter of recognizing required terminal skills which characterize the professional in the area. The question of terminal skills has wide reference in the information science literature. Unfortunately, it is this wide reference that weakens the perception of the information scientist as a specialist, and causes him to be considered a "jack of all trades and master of none." In discussing such skills, one report cites the following requirements (*2*):

> An understanding of the natural languages.
> An understanding of the behavioral sciences.
> An understanding of the library sciences.
> The use of techniques in document storage and retrieval.
> Computer science.
> Electrical engineering.
> Operations research.

Another report claims the following skills are fundamental (*1*):

Ability to understand the methods and way of thinking of other members of different disciplines in the attack on problems relevant to information science.

Ability to relate technology state-of-the-art in the application of such technology to contemporary information problems faced by the community at large.

Ability to systematically approach problem areas and to originate research proposals which creatively establish new concepts regarding the science of information.

An attempt to identify terminal skills for the information scientist is represented by a series of conferences supported by the National Science Foundation (3,4). Although the conclusions from these conferences do not specifically cite the terminal skills to be developed, the fact that courses are outlined for an education in information science implicitly infer such skills. Professional societies have also attempted to identify such skills (5–9).

The first apparent attempt to obtain and report the extent and character of information science education in the United States and to determine terminal skills was made by the George Washington University, Washington, D.C., in 1967.

The survey identified thirty-five schools which reported they were conducting advanced education and training in information science (10,11). The authors of the survey report, however, claim "not all of the schools that are known to be active in information education returned the questionnaire." Table 1 provides a tabulation included in the survey report.

Although it is tempting to surmise a growth in the schools that are now offering information science programs, data are not available to support such a claim. For example, the Curriculum Committee of the Special Interest Group in Education for Information Science of the American Society for Information (SIG-EIS/ASIS) identifies forty-five schools which responded that they had information science programs. Yet support for the growth in the number of programs cannot be claimed by virtue of the SIG-EIS/ASIS report because it covers both the United States and Canada, while the George Washington report covers only universities in the United States that were queried.

Supported by a National Science Foundation grant, the SIG-EIS effort of ASIS, chaired by Professor Jack Belzer of the University of Pittsburgh, stands, perhaps, as the most systematic effort conducted to determine the curriculum requirements for an academic program in information science. Motivated by a desire to establish standards for information science education, the committee proceeded to sample the views of approximately twenty scholars and administrators of information science groups from both the United States and Canada (4,12). Basically, the meeting provided considerable support to claims that the science of information was particularly difficult to define and that it was therefore particularly difficult to establish core areas of knowledge fundamentally related to the science. This is not to say that a spectrum of technical areas in science and engineering could not be bounded. It is simply that the spectrum devised was so broad as to vitiate any claims as to essential elements which would characterize information science as different from that of other scientists' spectrum of interests.

It is interesting to note from these early deliberations that certain generalities did emerge which found agreement, namely,

TABLE 1 [a,b]

Universities	Courses in information science	Undergraduate	Graduate	Prepare students research/teaching	Education of information system specialists	Computer system specialists	Subject information specialists	Library system analysis	Management information systems	Other	Languages	Programming	Mathematics	Linguistics	Data processing	Other	How many in program?	Practical training	Required part of program	Internship	In-service	Practical training	Other	Technical information center	Library	Computer center	Other	Libraries	Technical information center	Student's place of employment	Students employed outside university	Accepts foreign students
																								Training within university				Training outside university				
U. of Akron (A)	X	X	X	X	X		X	X	X		X	X				X	18	O	O		X	X		X		X		O	O	O	O	X
U. of Akron (B)	X	X	X			X	X	X	X		X					X	4	X	X									O		X	O	X
American U.	X	O	X		X			X	X	X						X	1,500	X	X					X							1,200	
U. of Cal. (Berkeley)	X	O	X	X	X		X	X		X							—	O	O													
U. of Cal. (LA) Bio-Medical Library	X	O	X	X			X	X		X								X	X						X	X		O	O	O	O	O
U. of Cal. (LA) Inf. Science	X	X	X	X	X		X		Lib.		X	X	X			X	4	X	X	X		X	X	X	X	X		O	O		X	X
Catholic U.	X	O	X	X	X		X	X	Lib.							X	7	X	X			O	X		X		X					X
U. of Chicago	X	O	X	X	X		X	X		X						X	70	X	O			X		X	X			X		X	30	X
U. of Dayton	X	X	X	X				X	X	X							95	O	O			O	X				X	O		X	6	O
Drexel Inst. Tech.	X	O	X	X				X									14	X	O			X	O		O							
Emory U.	X	O	X	X													80	X	X			X			X					X		X
Florida A&M U.	X	O	X	X	X			X	X			X	X			X	79	O	O						O	X			O		X	15	X
Florida Atlantic U.	X	X	X	X						X							81	X	X		X	X	X	X	X			O	X	X		O
Florida State U.	X	O	X	X	X			X									—	X	X													
George Washington U. BSCP	X	O	X	X		X		X	X		X		X			X	7	X	X			X	X	O		X		X	O	X	X	X
Georgia Inst. Tech.	X	O	X	X	X	X	X	X								X	4		O			X	O	X				O	O	X		O
U. of Illinois	X	O	X	X				X									55	X	X			X	X	X	O						15	X
Illinois Inst. Tech.	X	O	X	X						X							—	X	X									O				
Indiana U.	X	X	X	X	X	X	X	X		X	X	X	X			X	300	X	X		X	X	X	X	X	X	X		O	O		X
Kansas Sta. Tea. Co.	X	O	X	X	X				X								15	X	X		X	X	X	X	X		X					X
Kent State U.	X	O	X	X	X	X		X	X				X				50	O	O						O	X		X				
U. of Kentucky [c]	X	O	X	X	X					X	X		X			X	20	X	O				X	O	O	X		X	O	X		
Lehigh U.	X	O	X	X		X	X	X	Lib.								New		O											X		10	X
Ohio State U.	X	O	X	X	X			X	X		X	X	X	X		X	21	X	O	X	X	X		X	X	X	X	X	O	X	X	3	X
Peabody College	X	O	X	X	X		X	X			X	X	X			X	New	O	O													
U. of Pennsylvania	X	O	X	X	X			X	X								86	K	O	X	X	X	X	X	X	X		X	X	X		100	X
U. of Pittsburgh	X	O	X	X	X			X	X	Lib.	X	X	X			X	200	X	O	X	X	X	X	X	O	X	X	X	O	X	O	372	X
Rosary College	X	O	X	X	X			X									540	O	O						X				X				X
Rutgers U.	X	O	X	X	X	X		X		Lib.	X		X	X		X	350	X	O	X	O	O						X				100	X
U. of So. Cal.	X	O	X	X	X	X			X	X	X	X	X			X	370	O	O	X	X	X		X	X		O	X	X	X		100	X
U. of Tennessee Med. Units	X	X	X	X	X			X	X	Lib.							4	X	O													O	O
Washington U. Sch. of Medicine	X	O	X	X						X	X	X	X			X	3	O	X	X	O			X	X		X					O	X
Western Michigan U.	X	X	X	X	X		X	X	X		X		X	X		X		X	X	X		X			X	X	X			X			X
Western Reserve U.	X	X	X	X	X	X		X			X		X			X		O	X	X		X		X	X	X	X	X	X			O	X
U. of Wisc.—Madison	X	O	X	X	X		X						X			X	150	X	X	X		X		X	X	X	X					O	X
U. of Wisc.—Milwaukee	X	X	X	X	X		X										270	X														X
Consortium graduate program in biomedical communications	X	O	X	X	X		X	X	X	X	X		X			X	New	X	X	X	X			X	X	X		X			O	X	X

In order for information science to be a science we have to train individuals to be competent as scientists. This view held that rigor in inquiry (mathematics, logic, etc.) would be a fundamental skill held by such an "information scientist."

There needs to be a distinction in training practices for the information specialists who *service information systems* (for environments) and those who are searching for fundamental principles underlying information.

It is not desirable to formalize the field. Some license should be provided for individuals in the "discipline" to define it as they wish, and to allow the development of the science to proceed without preconceived prescriptions.

The 1968 conference did not lead to statements on specific curriculum requirements. However, the 1970 conference, again supported by NSF, provided the genesis of curriculum development, albeit diffuse.

By applying the Delphi technique for the investigation,* the courses in information science fell in areas identified for a masters' program, namely,

Psychology/Behavioral Science
Language/Linguistics
Management
Statistics
Library Science
Systems
Mathematics
Information and Communication Theory
Computer Science/Automata

The 1970 conference did not address the doctoral level curriculum, and this effort is destined for future studies of the committee.

HISTORICAL PERSPECTIVE

Almost anyone involved in information science will claim that information science is new—an undefined area of scientific pursuit—while in the next breath will proceed to claim its heritage in the library field, in documentation, in operations research, in linguistics, in psychology, etc.

Distinctions in terminology have been a major difficulty in attempts to define education in the information field. Professionals in the field have made clear that education in information *science* is not education in information *sciences*. Education in information sciences includes education in a basic science of information, but is not limited to it. Any discussion of education in the information sciences would include the present state of education programs in library science, computer

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* The Delphi method is a systematic approach for soliciting expert opinions without contaminating them with "bandwagon" effects, imposing personalities, and involving tendencies to conform to public opinions. By means of a carefully designed program of sequential interrogations, interspersed with feedback information of the entire participating group so each person knows exactly where he stands in relation to the group, consensus is obtained. Usually up to five interrogations are needed to reach consensus, but frequently three suffice.

science, and communication science, as well as information science. The literature on this subject is not always explicit, but clarity on this point appears necessary.

Terms such as information technologist, information system specialist, information engineer, and information specialist are distinguished from the information scientist by virtue of degree of training, not because of difference in *kind* of training. Library scientists, communication scientists, and computer scientists constitute different domains of interests in the information field, but essentially they represent variations and extensions of concern and interest in a common problem area, namely, information. The emphasis which reflects these variations and extensions of concern and interest defines the various training programs in information.

Information science is indeed new, for there is not yet a clearly established corps of people educated in information science. The present generation of individuals who identify themselves as information scientists have come to the field via other disciplines; e.g., chemistry, psychology, engineering, mathematics, linguistics, and philosophy. Because of the emergence of activities at several universities in establishing programs in information science during the 1960s, the present decade will see the emergence of a new generation of professionals who will contribute to the development of theory for information science.

Despite the many claims to the contrary, information science as a science was born out of the application of electronics to data manipulation and data depiction functions, as well as data transmission. This can easily be verified by tracing the usage of the term in the literature. Almost all of the discussions centering around information science include some reference to automation—whether automation of library procedures, automation of methods of handling documentation, or data organization (*6,13*).

The library profession as a whole has contributed substantially to the many efforts generated to reconceptualize information handling as an area meriting scientific attention (*14*). For one thing, the professional librarian was clearly identifiable as a professional in the matter of information–knowledge acquisition and storage. With the mushrooming of acquisitions, the availability of mechanized storage devices to handle the enormous production of publications, and the incessant demands for more carefully concern with user needs, the extension of the role of the librarian from a custodian of knowledge to an information disseminator was inevitable. The role of the librarian as an investigator of information utilization processes was appropriate and easily accepted by individuals inside as well as outside the library field. The librarian as a perceived information scientist was given considerable visibility in connection with the demands of the scientific community for the handling of their specific information problems. Faced with greater amounts of information possibly relevant to their needs, the scientists from the various disciplines made more stringent demands on librarians who applied computer techniques to the flow of data. As the result of this emphasis, several agencies emerged (STINFO, COSATI) which attempted to understand the needs of scientists for information and the ways these needs could be satisfied.

The influence of the librarian on information science must be joined with that

of the computer scientist who, in the development of new information systems, played a key role in stimulating interest in a science of information. Although concerned with the development of more powerful and sophisticated data manipulation technology, the major interests of the computer scientist remain centered around the better utilization of computers, and training in computer science reflects this objective.

In addition to the attempts by the various related disciplines to define information science and the education related to it, several activities of professional, government, quasi-governmental, and industrial agencies have contributed to the formulation of educational programs in information science.

In 1963 the MITRE Corporation, a nonprofit, quasi-governmental agency in direct functional relationship to the United States Air Force, established an institute to orient Air Force officers in the operation of computers. In a newly established facility designed as the System Design Laboratory, officers were given a week-long orientation in the use of computers in simulating conditions relative to military decision making. In addition to the use of computers, lectures covered data storage and retrieval, information system development and operations, and decision making.

Concurrently, the Department of Defense in connection with a naval facility in the Washington, D.C. area established in 1962 a Department of Defense Computer Institute offering a series of comprehensive courses in the use of computers for military purposes. High ranking military and civilian personnel were enrolled in courses dealing essentially with the same areas covered by the MITRE–Air Force course, possibly differing in style but not in emphasis, namely, the use of information systems for military operations.

From the industrial quarter, several large data processing equipment manufacturers offered short courses to orient management personnel in the use of data processing equipment for executive decision making.

Taylor (9) summarizes the chronological series of events which were directly related to the development of a concept for the training of individuals to be professionals in information (science or sciences):

1950	Two courses on documentation established within the library school at Western Reserve University by Helen Focke.
1951	Documentation courses established by Mortimer Taube at Columbia University.
1956	First academic research center at Western Reserve University.
1957	Office of Science Information Service established in the National Science Foundation.
1958	Publication: George S. Bonn, "Training for Activity in Scientific Documentation Work" (15).
1961	Publication: L. Cohan and K. Craven, Science Information Personnel, Modern Language Association of America, New York, 1961.
1962	Conferences on Training Science Information Specialists, Georgia Institute of Technology (6).
1964	29th Annual Conference of the Graduate Library School, University of Chicago.

1964 A. J. Goldwyn and A. M. Rees, eds., *The Education of Science Information Personnel*, Western Reserve Univ. Press, Cleveland, Ohio, 1965, based on a conference at Western Reserve University.

1964 Educational Symposium by American Documentation Institute (ADI), "Parameters of Information Science."

1965 ADI "Symposium on Education for Information Science." Warrington, Virginia (*16*).

1965 Conference of International Federation for Documentation (FID), Washington, D.C.

1967 "International Conference on Education for Scientific Information Work," Queen Elizabeth College. London (*17*).

1968 "Information Science Education Conference: Curriculum Development and Evaluation and Special Interest Group on Education, American Society for Information Science," Sponsored by the National Science Foundation, held at the University of Pittsburgh, Pittsburgh, Pennsylvania.

1970 "Second Information Science Education Conference: Curriculum Development and Evaluation Special Interest Group on Education, American Society for Information Science," Sponsored by the National Science Foundation, held at the University of Pittsburgh, Pittsburgh, Pennsylvania.

INTERNATIONAL PROGRAMS

Outside of the United States and particularly on the European continent and in Japan, movement toward the establishment of educational programs in information science has been largely directed toward documentation. By and large, such programs have been influenced by educational and social forces quite different than those found in the United States, and the priorities for development which dominate government policies are quite different from those found in the United States. Salton (*18*) has made it clear that research in the basic science of information has not been explored in foreign countries. It is in Sweden and Yugoslavia that some evidence can be obtained of research pointing to questions which concern the development of a science of information (*9*). The Asiatic nations are more oriented toward the development of better information services and, to some extent, classification theory.. It is only in Great Britain and Canada that we find interests in information science of the type that we see in the United States.

FEDERAL SUPPORT

The United States government has played a decisive role in the establishment of educational programs in information science. The National Science Foundation has, through its Advanced Science Education Programs, provided financial support to several universities for the programs in the training of information specialists and information scientists. Through the Higher Education Act of 1965, Congress provides for the support of training for individuals in librarianship. Information sciences training is included in the act. The Medical Library Assistance Act provides for the training of information specialists to serve the medical profession. Programs were identified through COSATI for the training of specialists to handle science information.

OTHER EDUCATIONAL PROGRAMS

In addition to the formal programs that lead to academic degrees, other educational programs exist which provide information technologists and information system specialists the opportunity to upgrade their skills. Upgrading can be achieved by the numerous seminars, symposia, conferences, etc., that are held annually and sponsored by private, profit, and nonprofit, industrial and academic activities. The fees for attendance at these courses range from no charge to a top figure of approximately 450 per seminar which may include literature as well as partial accommodation of living expenses for periods ranging from 1 to 2 weeks. It may be added that the upgrading of the information specialist is also achieved through professional societies which establish standards of professional conduct.

ACCREDITATION

Education programs in information science are too young for the application of accreditation standards and procedures applied to the more mature disciplines. Records of successes or failures of graduates of information science programs are not available. No attempt has been made to accredit existing programs, although the American Society of Information Science is investigating the possibilities in this direction.

It would seem that a particularly formidable aspect of accreditation will relate to the nature of syllabus development for interdisciplinary programs in general. Since not much is known about interdisciplinary pedagogy, it would seem that the initial investigative attempt would be an attempt to obtain experiences in dealing with interdisciplinary instruction to determine which parameters of teaching and experience insure competencies in integrating knowledge at various levels of complexity. Based on such experience, standards for interdisciplinary instruction could be forthcoming.

FUTURE OF EDUCATIONAL PROGRAMS

The 1970s will see a rapid growth in the number of educational programs in information science despite a lack of data on the job market. However, the rationale for initiating programs will be based on the following:

The nature of information handling problems requires greater understanding of the laws which govern the phenomena of information in general. This need will result in greater emphasis and greater support for research activities at universities. Research activities will require individuals motivated to conduct research and to advance the state-of-the-art.

The information scientists will be sought as essential members of interdisciplinary teams concerned with information problems facing the society at large.

The introduction of technology for handling information in many different ways is the responsibility of the professional information scientist. His training gives him

the understanding for introducing such technology wherever needed, providing a smooth transition from the old to the new.

New information systems in support of governmental management functions will require information technologists and information system specialists for operation. Such systems are now being developed by the Department of Housing and Urban Development programs and various agencies of the government. Developing information networks will provide more democratic access to such information files.

The greatest change in the educational environment for information science will be administrative. Some have pointed out that the late 1960s have seen a greater convergence of ideas towards a better definition of information science. There will be more of this in the 1970s *(19)*. Consequently, clarity will be achieved with regard to the distinction among information science, library science, and computer science. This clarity will result in modification of the administrative structure of professional schools. Schools of information sciences could first emerge with departments in computer science, library science, and communication science. Such schools will ultimately evolve as Colleges of Information Arts and Sciences wherein the information-related activities of man will be integrated, and wherein the academic function in such activities will find administrative as well as theoretical unity.

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ANTHONY DEBONS

EDUCATION LITERATURE

The "literature of education," perhaps more properly described as the "literature *on* education" or the "bibliography of education," includes guides to standard sources, indexes, abstracts, encyclopedias, directories, handbooks, government publications, annuals, lists of nonbook instructional materials, international and specialized references, and library book catalogs. And for those who are concerned with a particular piece of information even the recently developed computer tapes and information centers are embraced within the concept of the literature of education.

The most noteworthy development in the direction of bibliographical control of education literature is the Educational Resources Information Center (ERIC) system, developed by the U.S. Office of Education. This national information system, started in June 1964, has evolved into approximately twenty clearinghouses, each of which selects, abstracts, and indexes research documents in its specific subject area. These documents are then made available in 4 × 6 in. microfiche containing up to sixty pages per card. There are several ERIC research aides which

include the *Thesaurus of ERIC Descriptors* (*1*), *Research in Education* (*2*), the *Annual Index to Research in Education* (*3*), the *Office of Education Research Reports 1956–1965* (4), *Pacesetters in Innovation for Fiscal Years 1966 and 1967* (5), and others. The *Current Index to Journals in Education* (6) is commercially produced from the indexing work of the various ERIC centers.

The standard American guide to the literature of education is Arvid J. and Mary A. Burke's *Documentation in Education* (7). This is a continuation of Carter J. Alexander's *How to Locate Educational Information and Data* (8), first published in book form in 1935. This book explores various ways information is recorded, and describes various reference books, bibliographies, and government publications.

Another source book on educational research is Carl M. White's *Sources of Information in the Social Sciences* (9). This work contains a chapter on educational bibliography by William W. Brickman. A British equivalent to Burke's book is George Baron's *A Bibliographical Guide to the English Educational System* (*10*). This deals with English education from World War II through September 1964. A more recent handbook is Theodore Manheim's *Sources in Educational Research* (*11*), which is intended as an introduction to the research literature.

The "Bible of Bibliography," Theodore Bestermann's *A World Bibliography of Bibliographies* (*12*) contains much information on education. It deals with special categories of education as well as materials from most countries of the world. Barbara S. Marks, Librarian of the New York University School of Education Library, has compiled a bibliography of titles in education useful for public and college libraries desirous of building basic education collections. This is entitled the *New York University List of Books in Education* (*13*).

Indexes and Abstract Services. Since January 1, 1929 a basic index to the literature of education has been the *Education Index* (*14*). It is now a cumulative index by author and subject to more than 200 periodicals in education. It also indexes book reviews, some proceedings, yearbooks, bulletins, monographs, and materials printed by the U.S. Government. The June 1970 *Education Index* showed a total of about 250 sources indexed.

A competitive index to the literature of education is the *Current Index to Journals in Education* (6). CIJE provides detailed indexing for articles in over 530 education and education-related publications culled by subject experts in the ERIC clearinghouses. A companion reference to the CIJE is *Research in Education: a Monthly Abstract Journal* (2) which provides access to report literature in the field of education, also indexed by the clearinghouses.

The State Education Journal Index (*15*) was created in 1963 to cover one group of significant titles not included in the *Education Index* at that time. The *Education Index* now indexes some state journals, selectively, but the SEJI is still important for total coverage of those items.

The *British Education Index* (*16*), begun in 1961, is a cooperative labor by librarians of the Institutes of Education in the United Kingdom. It covers 100 journals, including such journals of British interest as the *West African Journal of Education* (*17*).

Important also are the *Canadian Education Index* (*18*), the *Australian Education Index* (*19*), and the *Indian Education Abstracts* (*20*). To supplement these special indexes one might be led to the *Social Sciences and Humanities Index* (*21*).

Psychological Abstracts (*22*), a very important abstract journal for education workers, regularly covers more than 300 American and Foreign journals and some monographs in the field of psychology. It is published monthly. The December issue has a cumulated author and subject index for the year. *Child Development Abstracts and Bibliography* (*23*) abstracts reports of research, conference reports, and theoretical papers in a section on education and educational psychology for more than 100 journals. Other abstract journals of interest to educational workers include *Educational Administration Abstracts* (*24*), *Sociological Abstracts* (*25*), and *Sociology of Education Abstracts* (*26*). *Dissertation Abstracts* (*27*), of course, continues to list many titles under various educational subject headings.

Related approaches to the literature of research in education include *Research Studies in Education* (*28*), 1941 to date. This is a subject list of dissertations, report, and field studies taken from the social science-education section of *Doctoral Dissertations Accepted by American Universities* (*29*).

A distinctive work of worldwide interest is the *Encyclopedia of Educational Research* (*30*), 4th ed. 1969, edited by Robert L. Ebel. This is arranged alphabetically by subject. Twenty-one "content areas" are listed in the introduction to the volume. These are broken down into over 150 subjects, each of which has an extensive bibliography. The volume also contains a subject index which supplies rather complete cross references to the articles. The three earlier editions of the Encyclopedia, 1940, 1950, and 1960, and Paul Monroe's earlier *A Cyclopedia of Education* (*31*) (1911–1913) plus the *Review of Educational Research* (*32*) form an invaluable historical sequence for research studies in education for a span of more than 50 years.

The *Review of Educational Research*, issued five times a year, publishes critical integrative reviews of research literature in a broad area of education. From its beginnings in 1933 through December 1969, the *Review* updated the *Encyclopedia of Educational Research* and had been publishing single issues devoted to selected topics. Beginning in 1970 the *Review* moved to unsolicited manuscripts reviewing important areas in educational research. An example of an annual compilation of comprehensive reports of significant advances in education is the *Britannica Review of American Education* (*33*). This is intended for school administrators and laymen.

Nathaniel L. Gage's *Handbook of Research in Teaching* (*34*) (1963) acts as a companion work to the *Encyclopedia of Educational Research*. Still useful is the *Encyclopedia of Modern Education* (*35*), edited by Harry Rivlin and Herbert Schuler (1943). More than 200 authorities contributed to this. It contains bibliographies.

The main British encyclopedia is Foster Watson's *Encyclopedia and Dictionary of Education* (*36*) (1921).

Directories and Handbooks. The first *Research Centers Directory* (*37*) appeared

in 1960. Since that time other such directories have appeared, including the *New Research Centers* (*38*) (1965) and the *A Directory of Information Resources in the United States* (*39*) which also includes state and federal government bodies (1965).

The *Encyclopedia of Associations* (*40*) arranges the national associations of the United States under eighteen broad categories. The *Yearbook of International Organizations* (*41*) lists organizations on an international basis starting with the United Nations.

Basic facts about education in the United States, England, France, and the Soviet Union may be found in the *Rand McNally Handbook of Education* (*42*), edited by Arthur W. Foshay in 1963. There are bibliographies throughout.

For biographical references there are a number of biographical dictionaries particularly pertinent to the field of education. These works have been published by American Education, Inc.: *Who's Who in American Education* (*43*), and *Who's Who in American Colleges and Universities* (*44*).

Government Publications. Access to U.S. Government publications is through the *Monthly Catalog of United States Government Publications* (*45*). This has an index with each issue, a cumulative annual index, and complete ordering information for each document listed.

The Jennings Wood listing (1964), *United States Government Publications; A Partial List of Non-Government Printing Office Imprints* (*46*), was necessary because a high percentage of these titles are never reported to the Superintendent of Documents.

The Monthly Checklist of State Publications (*47*), issued by the Library of Congress, is still the most complete list of these publications.

Annuals. The *Addresses and Proceedings of the National Education Association* (*48*), an annual first published in 1858 is a mine of bibliographical information. NEA has an annual listing of publications titled *NEA Catalog: Publications and Audio Visual Materials* (*49*). The *Education Book List* (*50*), published annually (latest in March 1970) lists English books in education either published or handled by the American book trade. It does not include some categories—e.g., publications under fifty pages and UNESCO publications. UNESCO, of course, publishes catalogs of its own output.

There are other annuals worth noting. The *World Yearbook of Education* (*51*), published jointly by the Institute of Education of London and Teachers College, Columbia University. This surveys education in various countries of the world. The *Yearbook of the National Society for the Study of Education* (*52*) is issued in 2 or 3 parts annually, and covers one subject for each volume.

Nonbook Educational Resources. For the educator for whom bibliographical listings are an instructional resource, nonbook materials are equally important. Among the important listings of nonbook materials are the *Film Evaluation Guide 1946-1964* (*53*) and supplement 1965 to August 1967, an annotated list published by the Educational Film Library Association (EFLA). UNESCO issued a film list titled *Selected List of Catalogues for Short Films and Filmstrips* (*54*), (1965), an an-

notated bibliography of films from various countries. Very important listings are the volumes published in 1969 by the National Information Center for Educational Media, founded by the University of Southern California and the McGraw-Hill Book Company. These are, so far, in a series of 4 volumes, titled the NICEM Media Indexes (*55*): Vol. 1, *Index to 16mm Educational Films;* Vol. 2, *Index to 8mm Educational Motion Cartridges;* Vol. 3, *Index to Overhead Tranparencies;* and Vol. 4, *Index to 35mm Educational Films.* Another source of information for instructional media, including much nonbook material, is the *Learning Directory (1970/71)* (*56*) issued by the Westinghouse Learning Corporation. This is a 7-volume set listing thousands of currently available items under specific topics, giving medium, grade level, title, size, price, source or publisher, and manufacturer's catalog number.

International References. UNESCO has issued the *International Guide to Educational Documentation* (*57*), covering ninety-five countries and territories of the world, also the 4-volume UNESCO *World Survey of Education* (*58*) (1955–1966) dealing with all aspects of education in over 200 countries and territories. There are extensive bibliographies. Walter C. Eell's work *American Dissertations on Foreign Education* (*59*) (1959), a 5,700-item list of American theses outside the United States and on the education of foreigners, is still a very useful work.

Specialized References. These are extremely numerous. An example would be the *Index to Education Testing Service Research Reports* (*60*) which lists all the series publications produced by the Educational Testing Service. This features a KWOC (Key-Word-out-of-Context) index. The ETS Library has also published the *KWOC Index to Current Periodical Titles* (*61*), an index to contents of periodicals received by the Carl Campbell Bingham Library. Another example of the specialized bibliography is Icchok I. Goldberg's *Selected Bibliography of Specialized Education* (*62*). There are innumerable others.

Published Library Catalogs. Teachers College Library, Columbia University, is the largest education collection in the world, providing a collection of over 400,000 books and 1,800 periodicals in many languages. The dictionary catalog of this library is now available in published form as *Dictionary Catalog of the Teachers College Library, Columbia University* (*63*). Supplements will be published from time to time. Another published catalog is *Author/Title Catalog of the Departmental Library, United States Department of Health, Education, and Welfare (Washington, D.C.)* (*64*). There is also *Harvard University Library. Education and Education Periodicals* (*65*). This shelf list lists over 30,000 works in the education collections housed in the Widener Library. The extensive holdings of the Harvard Graduate School of Education Library are not listed here. It is particularly rich in titles published before 1940.

Computer Tapes. The ERIC data base is also available in machine-readable form. The file now consists of about 40,000 report resumes, the extensive journal article files, and the complete Thesaurus of ERIC Descriptors from which subject indexing terms are selected for both report and journal article resumes. The tapes are available from the Leasco Systems and Research Corporation, 4833 Rugby Avenue, Bethesda, Maryland 20014.

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EDUCATIONAL FILM LIBRARY ASSOCIATION (EFLA)

History

Educational Film Library Association, Inc. (EFLA) began life as the Educational Film Library Lending Committee (EFLIC) in March 1942. It was created to help the government find distribution sources for war information, civilian morale, and training films. Films were deposited through EFLIC with ninety-eight cooperating educational film libraries for circulation among schools, colleges, and adult groups.

This original committee received many requests from other educational and cultural organizations to broaden its scope to include other types of colleges, public libraries, museums, etc., and was asked to expand its activities to promotion of production, distribution, and utilization of audiovisual aids in education.

A plan to incorporate these aims was worked out by Dean L. C. Larson of Indiana University and other interested people. EFLA was eventually incorporated as a nonprofit group in April 1943 in Indiana.

From the beginning the executive offices have been in New York City. Originally these were a corner of the American Film Center offices in Rockefeller Center. When the Film Center collapsed in 1947, EFLA was obliged to find its own offices and set up programs to become financially independent.

A membership dues structure was set up beginning with 327 institutions in 1947 and growing to approximately 1,500 by June 1970. A number of programs were developed over the years. Some are available to members only but most can be purchased separately.

Publications

Publications were an important service from the beginning. A membership bulletin was published from 1943 until 1967. Service Supplements were begun in the Fall

of 1946. These two items were combined in a periodical *Sightlines* which began in October of 1967. This is published five times a year in October, December, February, April, and June. The magazine, as well as providing members with current EFLA information, contains a number of other important features. "Film List" is a regular section which includes information on new films released. "Film Review Digest" gives brief quotes from film reviews in other magazines. "Film Review Index" is a twice yearly index of reviews in all the periodicals in the educational film field. *Who's Who in Filmmaking* has covered forty people from Robert Flaherty to William Greaves. The general criteria for inclusion has been filmmakers who have worked on several films that would generally be found in the collections of major colleges, schools, and public libraries. In addition to these regular departments, *Sightlines* publishes articles of general value to the nontheatrical field. A number of bibliographies and film lists are available.

Evaluation Program

Despite the wide use of film as an educational tool, there are comparatively few sources of independent evaluative material. In 1946 EFLA began such a program which evaluates some 360 films annually. The form of publication has changed slightly over the years. Now these evaluations are printed on 3 × 5 inch card stock in sets of 36. The cards are mailed to constituent and service members as part of membership services. Although the evaluations are edited and printed in the executive offices in New York, the actual evaluations are done by committees across the country, using a form developed over the years. Each committee consists of at least three people: an audiovisual specialist, a subject area specialist, and a utilization specialist. The office assigns films to committees and requests the preview prints from the distributor. Some committees prefer to send in evaluations of films which they are previewing for their own collections. Evaluations are also done by two other important groups — The Festival Jurors at the American Film Festival (see more under section on Festival) and special committees at the EFLA office. Beginning in the late fall of 1969, it was decided that publications of sets of evaluations covering all available material on one topic would be started. Materials for these sets will be previewed by experts in the EFLA office under the general chairmanship of the administrative director. Topics so far under consideration for inclusion in this program include Drugs: Use and Abuse, Ecology, Minorities in American Life, and Sex Education.

To provide a simple reference tool based on the evaluation program, it was decided to publish in one volume all cards issued between 1946 and 1965. A supplement to this Film Evaluation Guide was published in 1968. A second supplement is currently being prepared for publication and will include those cards published between 1967 and August 1970. These three books will provide material on some 8,000 films.

Information Services

Over the years the EFLA office has accumulated a tremendous store of information on all aspects of the nontheatrical film field. Although this aspect of service has never been widely advertised, the growth is constant. Requests come in daily both by mail and telephone. Usually the requests are simple ones for source information but some requiring considerable research time also arrive daily. This service is provided free to members and on a one time basis for nonmembers. However, the files are made available to anyone who wishes to come in to do independent research. Until the fall of 1969 the space available was very cramped and it was impossible to accommodate more than one researcher at one time. At that time a move was made to larger quarters and an area has been set aside as a reference library. Hopefully, as money becomes available, this area of EFLA's service will expand. A professional librarian will be hired as soon as possible to consolidate and improve the files, answer questions, and help in the compilation of badly needed bibliographies and other publications.

Workshops and Seminars

From its inception EFLA has conducted workshops packed with information on films, equipment, and methods of circulation. As the association grew and after the establishment of the American Film Festival, a number of regional meetings were planned. These programs are designed to bring experts and newcomers together for an intensive 2- or 3-day session devoted to a single major theme. Registration is normally limited to between 100 and 150 participants to allow for full involvement of everyone.

The first such workshop was held in Chicago in 1963 on Film Evaluation. Others have been held in Los Angeles, Kansas City, New York, and Detroit. In the fall of 1970 there will be a workshop on Minority Films and Filmmakers. Future plans include meetings in Boston, Toronto, Hawaii, and Salt Lake City. Topics to be covered include New Cinema, Administration of a Film Library, Reference Service, and Film Evaluation. Reports on the highlights of these workshops are published either in pamphlet form or in *Sightlines* to provide some insight and help on the areas covered for those unable to attend.

American Film Festival

The twelfth annual American Film Festival was held in 1970, an event which has grown to be the largest such Festival in the nontheatrical field. The Film Council of America had originally started a Festival (American Film Assembly) in 1954 in Chicago. After the 1958 Festival, the Directors of the Film Council were unable to continue and the EFLA Board decided to redesign the Festival and move it to New

York. The main purpose of the Festival has always been to encourage the production and distribution of better film materials and to make available to members screenings of the best materials produced each year in an intensive viewing session.

In the original Festival, some 400 films were submitted. The 1970 Festival received almost 1,000 entries, a growth of more than 100%.

From the beginning films competing for the Blue Ribbon Awards were selected from the original entries by prescreening committees. These committees are chosen from applications sent in to the EFLA office by interested parties. A committee must consist of at least six people, two each audiovisual, subject area, and utilization specialists. The committees look at all the films submitted in one category and return reports to the office. Roughly a third of the original entries in each category are rescreened in the final competitions at the Film Festival. Blue Ribbon Trophies and certificates are awarded to the winner in each category.

In addition to the Blue Ribbon Trophies, all prize winners are potential winners of the Emily Award. The Emily is given to the film with the highest numerical rating at the Festival. This award was founded in 1969 to honor EFLA retiring administrative director, Emily S. Jones.

At the 1970 Festival, Red Ribbons were awarded to the runners-up in each category. In all a total of forty-two Blue Ribbons and forty-five Red Ribbons were given out at the Gala Blue Ribbon Banquet on the last evening of the Festival. The competition screenings are conducted in a dozen rooms in simultaneous showings over a 3-day period. On the last day of the Festival the Blue Ribbon Winners are reshown in four or five all-day screenings.

In addition to the competition screenings, a number of special events are also held during the Festival. The New York Film Council, which works closely with EFLA, has generally sponsored a Feature Film Preview on the first evening of the Festival. In recent years there have been special programs which have included: *Young Filmmakers* with Roger Larson, *Sesame Street* with Dr. David Connell, *Electronic Video Recording* with Dr. Peter Goldmark, and a screening of *Avant Garde* films sponsored by the Film Library Information Council.

8 mm Films and Filmstrips

In the early years of the Festival these audiovisual aids were also entered in competition. Unfortunately, it is almost impossible to get committees of qualified people to undertake the prescreening of these materials, so they have been dropped from competition. However, a showcase screening is provided as a service to producers of these materials. For a small fee, these may be entered and are shown throughout the Festival in screening rooms specially set up for this.

Blue Ribbon Circuit

After the Festival is over the winning films are sent out as a group for screenings in selected libraries. This circuit provides an opportunity for audiences across the

country to see the best films of the year. Demand to be included in these screenings increases every year. About twenty-five different locations are possible and an attempt is made to cover as wide a geographic area as possible.

Film Festival Guides

As a permanent record of the best films produced, a guide to the Festival films is published each year. This booklet includes production and distribution information and a brief annotation for each film and filmstrip. The guide is given out to Festival registrants with the program and is also mailed free to all EFLA members. Copies may be purchased for each year from 1959 through 1970.

Future Plans

At twenty-seven, EFLA is the undisputed leader of the various audiovisual organizations. Over the years it has provided valuable services and leadership to a growing audience. Much of what has been accomplished should rightly be attributed to the singular devotion of Emily S. Jones. Miss Jones was the director from 1946 to 1969 and was the initiator and worker behind all of the programs.

In the last few years the development in this field have been fast and furious. The Film Department has become the Instructional Technology or Educational Media Department. However, the need for critical evaluations, good bibliographic tools, and reference services is as badly needed as ever. EFLA hopes to continue to grow with an expanding field looking always for new directions while consolidating and improving its existing programs.

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ESME J. DICK

EDUCATIONAL INFORMATION NETWORK (EIN)

The Educational Information Network (EIN) is a consortium of educational institutions whose purpose is the sharing of computer resources. It is administered by EDUCOM for its members, and is funded by EDUCOM, the United States Office of Education, and the National Science Foundation. The headquarters are at 100 Charles River Plaza, Boston, Massachusetts.

EIN operates in a manner which is unique. It secures the commitment of member institutions to run computer programs for the network. The submitting institution (called the "resource") is free to charge whatever rates it wishes under this commitment. The program, however, will be run at the resource institution rather than being transplanted to the user, as is the case with other networks.

Information about committed software is distributed through a publication called the *EIN Software Catalog*. In reality this is a periodical, as it is updated by the addition of approximately 100 pages a month. It provides to the educational community a medium for the exchange of information about software, as well as a listing of the software itself. In that respect, it serves the function of a scholarly journal.

The over-all purpose of the network is to allow individuals to access the work of other individuals. To this end it supplies information about software in existence (the information barrier), secures the permission of the resource for the user (the availability barrier), and provides a medium for access (the access barrier). By virtue of this exchange, several things happen.

First, unnecessary duplication of software is reduced. Much duplication is caused by ignorance that a job has already been done elsewhere, or by the untransferability of existing software to the available machine.

Second, each campus can offer a wider variety of services to its staff. The diversity of specialized hardware and software is such that no single institution can afford to maintain it all on site. Through EIN, each institution can use facilities available elsewhere.

Third, computing resources are made available to the "computer poor" small institutions.

EIN communicates with individuals via the institutional computer center. These in turn relate to EIN in one or both of two roles. They can serve as a resource, supplying something to the network, or as a user, using a resource through the network.

The resource has a short range goal in providing programs. Publication in the catalog provides recognition — like a scholarly journal. In addition, the computer center can sell excess capacity and improve its over-all budget picture.

The user has a purpose in using the network because he can provide capabilities to his campus which are not otherwise available.

In order to facilitate communication between the network and its members, EIN maintains a group of representatives, one or more at each institution. These persons, called "EIN Technical Representatives." are institutional employees who have authority to commit resources and to allocate funds for the use of the network. They are expected to attend two meetings annually of the group as a whole. Most frequently, the director of the computation center is also the EIN Technical Representative.

The origins of EIN go back to the EDUCOM summer study of July 1966. A group of educational computer experts were assembled in Boulder, Colorado, at that time. Their discussions resulted in a foundation document (G. Brown, J. Miller, and T. Keenan, *EDUNET*, Wiley, New York, 1967) and a proposal for action.

A modified version of this proposal was funded in June 1968 by the United States Office of Education and the National Science Foundation. It called for a study of networks to be performed and for an educational information network to be set in operation. Dr. Thomas A. Keenan of EDUCOM was the executive director.

Initial activity involved the assessment of existing networks and the design of the EIN Network approach. Commitments from various member institutions were secured and several hundred programs were selected. A brief summary of these was published under the title *EIN Program Mix*.

A set of standards was developed for the documentation of programs for the catalog. These standards differed from most previous standards in being oriented toward the user rather than the programmer. It was intended that an academic person with no knowledge of computing should be able to recognize and use programs applicable to his work. Upon publication (*Documentation Standards Handbook for EIN Software Catalog*), these standards were adopted for internal use by a number of member universities.

The initial edition of the *EIN Software Catalog* was published in late August 1969, and the network was declared open for use on October 14, 1969. At that time, Mr. John LeGates replaced Dr. Keenan as executive director of EIN.

At the time of opening, the scope of EIN was limited to programs which could be run in the batch mode at the submitting institution. The subsequent history of EIN has consisted of the gradual broadening of that scope.

Although both programs and systems of programs were eligible for inclusion, it became rapidly apparent that the redocumentation of systems for the catalog was too arduous a task, and systems were, in fact, excluded. Accordingly, a revised docu-

mentation standard for systems, which relied heavily on reference material, was adopted in early 1970.

At the same time, EIN took the first step in the development of electronic connection. It became permissible to list systems which could be accessed remotely. In actual practice this meant access over voice grade (2000 baud) telephone lines, employing standard low speed I/O devices.

With the publication of Supplement 10 to the catalog (October 1970), the capability of the network was again extended by the inclusion of remote access resources that allow general access to their facility in addition to specific programs.

The funding agencies extended the EIN grant from June 1970 until June 1971 on a cost-sharing basis with EDUCOM. During this period it is planned to convert the network from a grant economy to financial self-sufficiency. The intention is to distribute the cost over those who are benefiting from the service. The devices will be an annual membership fee and a network overhead charge.

It is the long-range goal of the network to establish direct electronic connection among its members, and to maintain a clearinghouse for the major software produced in the academic community.

JOHN C. LEGATES

EDUCATIONAL MEDIA AND TECHNOLOGY

The major problem of any report on educational media and technology is the uneven emphases of the field. The major emphases favor message design and the management of the instructional enterprise for formal educational purposes. To a considerable extent educational media is a topic of almost exclusive concern of teacher education and instructional development. In education, it is almost a prerequisite that media materials be mediated by a professional person before learners may interface with educational media and technology. Such a position, to the extent that it prevails, is contrary to the librarian's position that no one be denied access to information on his own cognizance, or the opportunity to initiate and conduct his own learning enterprise.

Educational media and technology is a subject of considerable professional interest to librarians. Librarians are "in the business" of all communication media and the related technology in order to provide services to individuals, groups, and the community. Such a position is not only assumed by, but constitutes an integral part of *Libraries at Large* (*1*), the report of the President's Commission on Libraries. A concern for educational media and technology is also reflected in the title and function of the U.S. Office of Education's Bureau of Libraries and Educational Technology.

Textbooks in educational media provide an indication of developments in the field not only by the increasing number which appear but also in changed emphases in

content. A case in point might be taken from the two editions of Erickson's (2) *Administering Instructional Media Programs*. In the 10-year span between the two editions it is apparent that changes have occurred. For one thing, the phrase "instructional media" has replaced "audiovisual" as the descriptive term for the program which is administered by a media director. For another, there is greater professional maturity and confidence in the role of educational technology as a prime mover towards innovation and change in education. The media profession appears to have reached a level of professional competence that justifies their claims to educational leadership (3).

As in other fields, the terminology used to identify educational media remains in a state of change. In some quarters, *audiovisual* (see *Audiovisual Materials and Services*) has been replaced by *media* as the standard referent for those communication and learning materials which have aural and visual characteristics whether verbal or nonverbal. In other quarters, the expression *instructional technology* is being used. Recently the joint committee of the American Association of School Librarians and the Association of Educational Communications and Technology (AECT, formerly DAVI) used the term media to refer to all modes of communication, including print and audiovisual forms, in the new *Standards for School Media Programs* (4).

More recently (1970), the NEA Department of Audiovisual Instruction (DAVI) changed its name to the Association for Educational Communications and Technology. The *AV Communications Review* (5) is the research reporting publication of the AECT and it should continue to be perused for trends in the field and changes in terminology. In more recent years, the *Review* has extended and enriched the valuable compilation of Travers (6) on research and theory in the field. Since librarians are more familiar with printed materials, it might be well to point out that educational media includes all the older audiovisual materials such as films, filmstrips, pictures, recordings, charts, and posters, as well as the newer media of computer-assisted instruction, programmed materials, television, and remote-access retrieval as well as the relevant methods, systems, and hardware.

Both library science and the media profession are responding to the forces of social change but from opposite position toward, hopefully, a common central one (7). Librarianship, for example, has always taken a stand upon an humanistic approach to the affairs of men (8). But in recent years it appears that the social sciences have more to offer in the way of a realistic appraisal of the human situation (9) before message design is developed. According to Saettler (10), who has written the first comprehensive history of instructional technology, the media profession in responding to social developments has moved its orientation from a physical science "hardware" approach to a better appreciation of the social sciences:

> The basic view of the behavioral science concept of instructional technology is that educational practice should be more dependent on the methods of science as developed by behavioral scientists in the broad areas of psychology, sociology, and in the more specialized areas of learning, group processes, language and linguistics, communications, administration, cybernetics, perception, and psychometrics. Moreover, this concept includes the application of engineerng research and development

(including human factors engineering) and branches of economics and logistics related to the effective utilization of instructional personnel, buildings (learning spaces), and such new computerized machine systems as data processing and information retrieval.

Saettler goes on to consider the fundamental problem of educating youth of today so that they may eventually be able to think as the men of tomorrow where the conditions of human life and possibly the environment will have changed drastically. The problem is not to define educational goals in terms of overt adjustive behavior, but in relation to a rational tradition and a problem-solving effectiveness. According to Russell (11) the values of the rational tradition include: longing to know and understand, tendency to question, search for data and meaning, demand for verification, respect for logic, and considerations of premises and consequences. Because of the work of Bruner (12) and others, the rational approach to educational design has recently received heavy emphasis in educational circles.

However, the overemphasis on, and almost exclusive use of the rational approach to educational design has been challenged. Jones (13) has pointed out that fantasy and feeling cannot be ignored in educational design. Erickson has developed an instructional method (14) and laid the basis for a systems approach to channel considerations (2) upon a communications position that incorporates both the affective and cognitive domains.

Although it has been variously interpreted and criticized (15), the report on the President's Commission on Instructional Technology (16) is in a way as significant as Saettler's history. It represents the largest and most comprehensive study ever undertaken of the relationships of men, media, and machines as well as the processes in instructional technology. Even though the report follows a media qua media approach, the emphasis is upon a communications and behavioral science orientation to educational media and technology. There is, of course, considerable emphasis upon research as opposed to operational program funding, but this will, it is hoped, bring education and the media industry into a more effective working relationship.

The commission's report provides a strong foundation not only for the continued education of educators in media utilization, but more significantly for the public education of all citizens. Television, radio, and the graphic press can be employed in the process of communicating to the general public the possibilities for improved education. Despite the problem of defining educational technology, whether hardware or the process of a systems approach to instructional design, Briggs (17) has identified the significant contributions of the report. These crucial points, as he calls them, may be taken as characteristic problems and trends in the current status of educational media and technology:

We should not continue to bolster outdated curricula by use of the new media.

A systems model for the design of instruction should govern media decisions with specific kinds of learners in mind.

The new media can help bridge the gap between school and the "real world," and can facilitate learning outside the school.

Technology can humanize instruction by providing the tools for individualization, thus making better use of the learner's time and the teacher's time.

A new kind of cooperation is needed between educators and industry to achieve both better hardware and better software.

An improved technology would require more support for basic and applied research in learning and instructional design.

Efforts are needed to keep technology from determining the goals of education.

Much money has been wasted when equipment "gathers dust" due to unavailability of suitable software or poor maintenance support or inadequate teacher training.

Presentation devices alone are not adequate for learning; there must be learner response, with feedback.

Educational technology is not responsible for all the ills of education and of society; a better society could be better enjoyed via technology.

Pluralistic goals require pluralistic means (media), but we need models for matching media with goals.

While many new media save time in learning, the data are not consistent on other learning criteria, nor would data based on our present "model T" age of media predict the future potentials of media.

Future applications of systems technology should center around problems rather than around traditional content of the separate disciplines.

If the major recommendation of the commission is implemented, the establishment of a National Institute of Instructional Technology within the National Institutes of Education, it will serve not only to coordinate various elements in educational media and technology but also will give the audiovisual field a visibility it has not had. Of course such a step would tend to locate communication media within the mainstream of formal education. Whether such a step would be detrimental in view of the fact that educational media and technology are employed by a wide range of communications agencies and organizations both public and private, is at the moment a moot question. However, it must be remembered that library development and in particular the public library movement has grown under the leadership of the U.S. Office of Education.

In the interim, the federal interests in educational technology continue to be administered through the Bureau of Libraries and Educational Technology of the U.S. Office of Education. The National Audiovisual Center, National Archives and Records Service, continues to provide information about media and sell audiovisual materials produced by any of the United States federal agencies. A National Center for Educational Communications (NCEC) has been established in the U.S. Office of Education. The purpose of the NCEC is to accelerate the spread of validated research-based products and develop widespread educational communication linkages for the effective application of new knowledge. NCEC director, Burchinal (18), describes the program of the NCEC:

NCEC programs are based on the following premises: (1) its planning must be based on the current state of scientific knowledge about application of information for improvement of practice in education and other fields; (2) NCEC programs should not be self-contained, but should be linked to communication and installation efforts in other Federal, state, local and private programs; (3) where possible, already established communication channels should be used to reach local users; (4) as necessary, NCEC should stimulate and support development and demonstra-

tion of needed collaborative communication programs among local, state, and Federal agencies to extend the impacts of existing systems; (5) spread of research-based materials and systems and exemplary operating programs (not limited to public schools) are the two main goals of NCEC; (6) to attain optimum impact the NCEC program is based on solicited and directed activities rather than on support of unrelated proposals; and (7) formative and summative evaluation activities are an integral part of all major NCEC programs.

Returning to Saettler (*10*) in order to obtain an overview of educational media and technology, it appears that three fundamental areas stand out in perspective as significant to the librarian and information specialist. These broad areas include the considerations of message, medium, and channel (Table 1). Message concerns include the substance of what is to be communicated, i.e., the content of the total communicative experience. Medium concerns include that subset of the total mes-

TABLE 1

Educational Media and Technology

Sender	Message design	Media, materials, and control	Channel vehicle	Audience
Group sender based on formula	Present moment "rain" of information	Station advisory committee *TV Guide* Ayers	CTV, ETV by wire or airborne to house delivery Daily, weekly newspapers by mail or house delivery Home access by wire	Mass audience
Group or individual sender based on formula	Present moment interpreted	Ulrich *Books in Print*	ETV, radio by wire or air to house delivery Magazines by mail and vendors Popular publishing of paperbacks and pamphlets by bookstore, mail, and library	Mass selected audience
Individual senders with unique intentions who work to meet demand	Organized knowledge in media centers	Mediagraphic and bibliographic control	Films, videotapes, slides, transparencies Data banks Community resources Journals, house organs Books, pamphlets	Self-motivating and self-selecting audience

sage that deals with the shape of the message, i.e., the materials that represent the hardcore of the message. Channel concerns are a subset again of the total message, i.e., the equipment through which the medium is presented to the receiver, or the facilities and administrative policies that shape the interface between sender and receiver.

The content to be communicated is the message. The content of message design includes knowledge or information, understanding, attitudes, and skills. Message considerations encompass the substance of anything to be communicated in order that meaning can be engendered in an individual, a group, or the community. It may be possible to transfer information in the sense of data, but meaning has to be communicated (*19*). It is only recently that librarians have given any attention to the problem of promoting use of information by means of its surprise value rather than by data transfer (*20*). One reason for this has been the lack of theoretical explanations that could account for the value of information in kinetic situations.

The medium, on the other hand, is the recorded part of the message, i.e., that subset of the message that can be acquired, organized, and indexed in comprehensive storage collections. Indexing provides access to the totality of information space wherein pertinent information surprise experiences may be sought (*21*). Media range from the three-dimensional object or realia, through two-dimensional audiovisuals, to symbols, concepts, and words. The media of communication may be organized around the cone of experience scale (*22*) as in museum work, or else by the librarian's cognitive maps of indexing and classification.

The shape or form of the media determine what channel or structure will be required to present the medium to the receiver. The channel as the vehicle may be any electrical, mechanical, or physical device including a television system, a projector, the human vocal cords, or a recording and playback device. The channel may be any administrative or physical structure needed to facilitate interface between the individual and the medium or message. Certainly the control documents of purposes, policies, and procedures are major structuring devices upon which organizational communications is based.

It is obvious that there has sometimes been a dichotomy in emphasis between the message and the channel. The message has not always been considered as the production of a situation within which communication can occur. Unfortunately, to many the message is synonymous with the medium as well as the channel. Until recently the preponderent emphasis has been upon the technology including the mechanics of materials preparation without enough consideration of message development and design. Saettler maintains that the rational or theoretical-deductive mode of thinking about instruction is responsible for the dichotomy as well as the evident commercial investment in instructional media and technology.

This unfortunate dichotomy which has grown up in educational media and technology has been examined by Oettinger (*23*) who considered not only the new educational hardware but also the institutional setting into which it is being introduced. Recognizing that the American educational "system" is extraordinarily complex, Oettinger concluded that the problems of educational technology could be

tackled by systems analysis and operations research. This means, of course, that all the components of the field as well as all relevant factors should be taken into consideration.

Although there is an estimated 30–50 year time lag between research findings and their adoption in innovative practice, a comparison can be made between the two decennial reviews of audiovisual instruction in the 1960 and 1970 editions of the *Encyclopedia of Educational Research* (*24*). The comparison shows that there has been a shift from media and machine concerns toward message considerations and instructional design. This is supported by other reviewers, e.g., Edling (*25*), writing on instructional objectives and educational media, concluded his review in these words:

> There is little evidence to support the concept that given media, qua media, contribute to more or better learning than other media, i.e., there is no evidence as to what, or how much is learned in "nonmedia" situations. But there is considerable evidence to indicate that research and development activities involving media have (a) helped clarify educational objectives, (b) contributed to the analysis and design of media that produce the specific learner behaviors identified, (c) utilized learner responses to refine and develop more predictable learning experiences, (d) clarified the need for specific instructional strategies to attain given objectives, and (e) provided new potentialities to determine whether or not educational objectives have been attained.

Saettler (*26*) also writing in the same issue of the *Review of Educational Research* in reacting to McLuhan's famous witticism "the medium is the message" comments, "It is important to recognize that the message cannot be confused with the medium in an instructional context and that there is, at best, only a low-order correlation between message and medium." Saettler goes on to criticize research that did not carefully separate the physical characteristics of the medium from the sign "vehicles" of the message as carried by the channel.

While most of this research grows out of instructional theory rather than communications theory, many of the findings could lead to innovative practices in library development. But a widespread communications role for the library profession remains latent and librarians have concentrated their attention, what little has been given to audiovisuals, on medium concerns of materials control and descriptive labels. On the other hand, a large part of media technology is concerned with "local" materials production and program message design, areas where a theory of communication, not the acquisitions and cataloging of the published record, is essential.

Consequently, it is not surprising to find that the literature of audiovisuals in library and information science, what little there is, concerns itself with bibliographic and content control. As late as 1967, Lynch (*27*) complained about the paucity of any writing at all by the library profession, and her summary of the literature of audiovisual "theory" and practice is certainly indicative of this state of affairs. A more serious attempt was made by Dewey in 1970, in a brief annotated bibliography (*28*), to bridge the gap between library and information science and the field of

instructional technology. But it may be some time before the media and channel concerns of the librarian catch up to and include the message developments and design of the educator.

It is no surprise to find that librarians, ignoring the systems approach, have developed audiovisual services using the methods of print-oriented organization and cataloging. Grieco (29) consequently exhorts librarians to provide the same intellectual accessibility for nonprint materials that is now accorded print. Grove (110) expounds on what he calls the librarians' "Excedrin headache," i.e., cataloging control of the media. Eason (31) compiles a selected reading list on audiovisuals which is even more heavily oriented towards control of the produced (published) record.

Although older in time, Nolan's (7) survey in 1961 and projection to the 1989s indicates some of the essential problems and concerns that librarians must face if they are ever to move into the field of communication. The following points represent but a condensed version of Nolan's conclusions:

> Increased training in the handling of audiovisual materials, but far more important will be the need for imagination, initiative, and practical planning.
>
> More intensive studies of needs for audiovisual materials: their usefulness, effectiveness, and relationship to the requirements of teaching and library services.
>
> Expansion of technological research and automation to permit a greater degree of use through self-service and through mass service.
>
> Greater coordination of the various audiovisual forms with one another and with printed materials through more intensive programming.
>
> Development of more systematic bibliographic coverage and methods of organization of audiovisual materials for use.

Stone has frequently defended a communication's role for the librarian, but his various contributions (32–34) towards a theory have been largely ignored by the profession. His insistence that the library role be redefined is in line with the systems approach to message development and to the design of research in educational media and technology. The imperative remains to explore (e.g., by market analysis) patterns of actual and potential use for educational media through self-service and through mass-service.

The area of professional education in media and technology appears to have a more advanced development than the field of library service. Goldstein (35) made an initial contribution by explicating the relation of educational media and technology to the problems of education for library and information science. As the result of a manpower approach to the role of the media specialist, Stone (36) explored the training needs of media personnel. Working from a theoretical communications position (19), Penland considered the competencies needed by the librarian in a communicative role (37).

Not until recently have librarians had a clear and forthright statement concerning the needs for a membership organization and a national office staff to coordinate library interests in communication media and technology. Stone (38), reporting on the Audiovisual Task Force Survey of the American Library Association, indicated the wide interest in the field as well as areas of concern for future development. The importance of this survey report merits a listing of the five major concerns:

Recruitment and improved training of personnel who will exhibit more favorable professional attitudes toward development of A-V services by libraries.

Regular gathering, compilation, and publication of more complete and reliable information about audiovisual materials appropriate for library acquisition and distribution.

Gathering, compilation, and publication of more complete and reliable information concerning items of equipment required for effective use of audiovisual materials in libraries and by library patrons.

More concerted and productive efforts to promote the interest of librarians in audiovisual services and to explain the importance of such service to the various library clienteles served.

More help with development of special services which utilize audiovisual materials and equipment including those established for hospital patients, disadvantaged groups, special education programs, etc.

In considering the educational media in a communicative system, the word media is often used to include the content to be communicated and the materials and equipment that convey the content. Despite McLuhan's flippancies that the "medium is the message," precision is required in analyzing the avenues through which the receiver perceives the environment. Consequently, it is helpful to make a distinction, however "arbitrary," among message, medium, and channel. Communication theory underlies message considerations. Library and information science supports the control and retrieval of medium content. Channel considerations depend upon systems theory and operations analysis.

Consequently, both library science and media technology have begun to examine their role in communications in relation to a systems analysis and cybernetic point of view. A redefinition of the library function in all areas but in particular in media services is a major imperative. In any attempt toward a first synthesis of the library uses of the new media of communication, Stone (34) took a position on the principle that it is more effective in terms of human needs to move information to the people than to move people to information as is now the practice. This principle has become more commonly accepted in educational media and technology (39). The library profession has yet to make such a total commitment. For example, library service by mail through an order catalog has only finally been accepted after more than 100 years of commercial mail-order delivery (40).

Harcleroad (41) introduces his survey of academic libraries with the remark that "technological improvements have made it possible for students and professors on many campuses to produce their own materials to meet local needs." Exciting as the possibility sounds, McIntyre (42) is more pessimistic as he focuses on the prevailing attitudes of today's professionals.

The presumption that the librarian is or should be considered as a partner in the production of materials for the non-print technologies [is unrealistic]. The accuracy of this presumption is scarcely self-evident, to other specialists, or to very many librarians. Non-print materials, to many librarians, do not belong in the library. Another group of librarians has made the transition to film, records, audio tapes and other audio-visual aids. However, these feel little concern for production. They produce instructional materials about the library.

Role definition as a communicator is not always an easy task for librarians. It is difficult to grasp the new requirements of information surprise value and interpretation as well as the team approach to service programming. With the network approach to library development it is no longer possible for a single librarian to stimulate and develop contexts wherein communication can occur (43). Library communication teams will include not only subject and content specialists, but media, systems, and engineering specialists. Personnel in the specialties may serve as a support team to the librarian communicator. Certainly in the management of the communications resources, an increasing dependence will develop upon man–machine systems.

Message Development and Design

Message design encompasses both context and content in order that communication may occur. The message is considered to be independent of both media and content so that they may be related to specific communication requirements and theoretical considerations. Tosti (44) proposes a six-step presentation form as distinct from the media which carry that form: stimulus (encoding form, duration); response (demand, frequency); management (frequency, purpose). The steps in Tosti's developmental procedure resemble those of Gagne (45) and the goal-media matrix of Allen (46). Briggs (47) carries these procedures a step further into what some might call a prescribed methodology or what others would describe as a set of heuristics (48).

Works such as the above are important not only as a guide to local production of media materials, but also as a reminder of the unplanned way in which communication materials are produced and utilized. To a considerable extent, commercial publishing and production determine both the content as well as the media of communication and instruction. When librarians make a choice from among commercially produced media, their manner of selecting for message design does not appear to be any more systematic or logical than the rational of most editors. Therefore, it may be useful to librarians to have listed the five steps in Tosti's (44) developmental procedure:

> Determine the nature of the problem by interview, observation, or research. Establish general goals to solve the problem.
>
> Determine the specific behaviors to be established and the entering behaviors of the receivers of the message.
>
> Deduce the presentation factors which produce the desired behavioral effect, employing established evidence in learning; then analyze or synthesize the generalized response sets which may be employed by the receiver in this response to the presentation.
>
> Select media which fit the presentation requirements. Media selection must be done in terms of eliminating media which limit or otherwise adversely affect the presentation design rather than specifying advantageous media. Then assemble an operational instructional systems package (media-mix).

Determine a strategy for the introduction of the operational system into the instructional environment.

The problem solving approach to message design has been developed by Kaufman (49) and by Gagne (50). Based on the principle of association in learning, multi-image communication increases the information and range of associations stimulated. In the multiplication of images, relevant as well as irrelevant detail increases, it is therefore important to have clear and simple images which help to keep the visual tasks close to optimum (51). Multiple associations can communicate concepts as well as move the affective domain, and teach through feeling and emotion. Multi-image communication appears to hold considerable potential for the library's own programs of training laymen in the use of the library (52, 53).

The area of message development and design is known in library science variously as program planning, adult education, or library service to groups. In information science, message design is not yet considered to be an area of professional concern. In general adult education, message development and design encompasses the whole area of creating the conditions within which communication and learning can take place. In formal education, it is known as curriculum development and the structuring of the learning enterprise, or instructional design. In more general terms, message development and design as a function of any profession, as distinct from a discipline, is the creation of situations wherein communication can occur.

The purpose of communication is to inform and to motivate. Communication functions to alter a receiver's concepts and to change his preferences and feelings. In the construction of a message, it is necessary to build-in informational and especially motivational referents. In creating contexts wherein meaning can be engendered in others, three conditions must be taken into consideration: signs and symbols must be avoided that are not in the concept repertoire of the receiver, each sign or symbol must have the same referents for sender and receiver, and sender and receiver must accept the same syntactical rules.

Analysis of message design raises questions of media and channel considerations. Grammatical conventions and concept definitions can be accommodated fairly readily, whereas differences in concept referent remain at the core of semantic problems in communication. What individuals "mean" by concepts, or the images they have, are always referential, personal, and different from anyone else's. It is important that the various media parts be integrated with and relevant to the larger experience being provided for patrons of any type. Media and channels must be chosen carefully because they perform a secondary function in the actual process of communication. Use of the media requires a wide knowledge of available media and an understanding of the function of any particular medium in relation to the context in which it is being employed.

Dale (22) was among the first to realize that the context has implications for the use of media. Dale's "cone of experience" made a significant contribution to an understanding of the connection between the real world of the patron and the more abstract, if not simulated world of information stored in the various types of media materials. People whose environment includes television, movies, pictorial maga-

zines, roadside advertising, and the widespread use of graphics in marketing require a more active and diversified communication mode than the reflective reading of one document at a time.

The individual perceives the world only to the degree permitted by the effectiveness of his senses and to the extent that his cognitive map and value system allow him to comprehend and organize what he experiences through the senses. He may also have lacunae in his experiential life which vicarious experience through media may help to overcome. While media materials may help individuals in a group to a common perceptual experience, the communicator will find it necessary to discover by questioning or other feedback techniques what each individual really does perceive.

One concern which occurs in message design is over the development and sequencing of stimulus materials. In the past there has been two basic approaches to instructional strategy: stimulus-oriented and response-oriented. Neither approach is conducted in a vacuum, and as a result the optimum approach is to present cues in context. Stimuli contexts are so arranged that the learner can practice his response to appropriate cues so that his responses are the correct ones (54). Unfortunately, the practice in library and information science has been largely stimulus-oriented. Librarians can usually be counted on to present materials or information that will titillate the patron. But librarians will in few, if any instances, ask the patron how effective the information supplied has been.

The linguist (55) and coding specialist (21) are joined by the gesture expert (56, 57) in order to discover how nervous impulses and sounds have been recorded, transmitted, and received in a wide variety of disciplines. The fine and useful arts have all contributed to media and channel design. The fine arts create nonverbal cues to which others respond (58, 59) by giving expression to inner events through shape, color, movement, texture, and sound. The useful arts give shape to the external environment according to the assumptions and conventions of a particular period. Architectural structures, and sculptured objects become symbols for communication (60).

According to Gagne (45), participants need to be counseled on an individual basis about sequences in the group experience. In this dyad, feedback loop stage, questions should have as antecedents the symbols or language which the patron is expected to associate with the material. Other antecedents will of course arise more "naturally" from the individual's capabilities and interests. As long as the media can be expected to carry part of the load for communications objectives, the librarian and media communicator will have time and energy to individualize participant experience. Social libraries and information centers are indispensible elements in any communication system even though the painstaking and time-consuming work in counseling and information retrieval, in groups and in meeting halls may appear to bring only small returns as compared to the large audiences of mass communications.

The objectives to be reached in communication are probably as diverse as the concerns and interests of the individuals, groups, and audiences to be reached. How-

ever, considerable work has been done to identify a general framework within which unique and local goals can be accommodated. The literature of educational communications has been briefly surveyed by Allen (*61*). His list of purposes for message design serve as one dimension together with media type as the other axis for a matrix of media stimulus in relationship to communication objectives. Allen's list of objectives (*46*) included the following items: transferring factual information; acquiring aural and visual identification skills; understanding principles, concepts, and rules; learning behavioral procedures; performing skilled perceptual-motor acts; and developing appropriate attitudes, opinions, and motivations.

Readiness to be communicated with fluctuates in response to various events. A receiver may find himself in a threatening situation where his uncertainty and insecurity make him highly susceptible to persuasion. The identification of such "teachable" moments (*62*) is significant because they offer an opportunity for effective communication, and because there is a danger that the person will turn to inadequate sources of information when more appropriate sources are not available. However, since the arousal of too much fear and anxiety can backfire and produce deep conflicts (*63*), a total communications design (*45*) should be integrated around counseling situations, information retrieval, and group processes rather than the more usual mode of mass communications alone.

The relation among the communication contexts is significant. What one may say in dyad cannot be discussed in a group, and what one says in a group may not be presented to an audience. A degree of socialization has taken place and a loss of individuality has occurred. This transformation is, of course, a valuable learning experience which can be obtained in no other way. Sometimes the book oriented, individual approach of the librarian has a disadvantage particularly when it comes to the socialization process. All sorts of socially queer notions can be gotten away with in the dyad, aided and abetted by book reading.

The listening and viewing skills need to be encouraged and practiced in ever widening groups. Referral may be appropriate in order to develop these interpersonal processes into enlarged communicative contexts. In transmitting motivation, the purpose is to affect the feelings of mood of the receiver in such a way as will result in a shift in emphasis in the semantic content of the message. The technique is to attach valence-laden words (adjectives, modifiers) to the concepts being transmitted to the receiver and which are expected to inculcate the appropriate motives. In defense, the receiver may learn to ignore such value-laden adjectives until he can determine for himself that they are acceptable to his own value system.

Besides such considerations as transmitting information and motivation successfully, there are the additional concerns of planning for feedback and of selecting appropriate media and channels. Communications sent out to the general public must coordinate or choose among newspapers, radio, billboards, television, speeches, mailings, and telephone. Bloom's taxonomy (*64*) is one source of behavioral objectives to be built into educational communications message design, but each commercial and public interest has its own behavioral change-objectives in mind. In any event, the selection of an effective medium of transmission requires knowledge of

content, various media capacity, previous experience of the target audience, attention span, intelligence, and receptivity to aural, video, or print stimuli (65).

Even though evidence exists that message content is more significant than the format in which it is presented (65), channel and media considerations cannot be ignored. Disconnected, random information and communication efforts are not very effective. Consequently a continuous well-planned and well-integrated communications design is needed. Each message placed in a variety of media is based on previous messages, reinforces them, and in turn provides a basis for subsequent messages. For example, the mass media—radio, TV, newspapers and magazines—are tremendously effective in spreading information and in stimulating persons already interested and motivated to translate their motivations into action. However, the mass media cannot effectively provide the two-way flow of communication and interaction supplied by information retrieval and small group processes (66).

Any communication design aimed at total populations cannot effectively take into account the special and unique beliefs, behavioral habits, and needs of minorities and other subgroups in the population. Communications aimed at one population segment may have an effect on other audience segments whose personal and group interests are strongly emotional and where subcultural values are deeply embedded. The effect may be very different from, and even diametrically opposed to the intentions of the sender. The mass media have to be augmented and at times supplanted by the slower and more tedious processes of individual contacts and group interaction (67).

Educational media include all communication materials employing code, sign, symbol or any combination of these. In the usual sense, however, educational media are dichotomized into print and nonprint materials. This is a helpful distinction, at least initially, because it focuses upon the essential differences in message composition that eventually get recorded on the material. In other words, the material is of secondary importance. Of more significance and fundamental is the difference in style of composition used in message design. Coded materials generally can only be "read" by some device like a computer. Audio and visual materials often require some sort of projection equipment. Verbal symbolic material is usually read without assistance as in printed documents.

In the narrow sense, educational media include all those objects and messages that have been constructed or assembled for the purpose of stimulating surprise in an adaptive control organism. Educational media may also become variables in the learning enterprise that are designed to shape behavioral change as well as to develop the resource matrices that support the feedback process. Educational media in the broad sense include all of the objects and messages (verbal and nonverbal), whether constructed by adaptive control organisms or existing in the physical environment. Any object or message may occasion a stimulus in a human adaptive control organism; and when the information from the stimulus "surprises" the adaptive control organism, the communication cycle is initiated.

Traditionally, and even today the educational media have not been considered in such broad terms. Only those documents composed for an instructional purpose

have been considered educational texts. The format of such documents has been designed to facilitate the recitation process for any given group of students within an extrinsically controlled context. But as the learning context moves up Woodruff's scale (68) from high control and low communication to high communication and low control, not only does the level of intrinsic motivation and opportunity for self-actualization grow but also the range and dimensions of educational media increase enormously if not exponentially until the term communication media becomes more appropriate.

However, few professional people have yet arrived at such a millennial stage of thought, principally because no theory of communication underlies either educational media or educational technology. Often at the programmatic level not even learning theory is employed, but a sort of intuitive understanding of the educational process. Even though *AV Communication Review* (5) regularly reports on research studies that have been undertaken in educational media and technology, no theory of communication has been available to media personnel that could account for their professional methods as well as the gestalt of human activity. This situation is remedied now with the development of cybernetic theory (see *Communication Science*), and educational media can be assessed in relation to their function in communication.

The media profession, including the librarian and the information and audiovisual specialist, should be a communicative situation-producing profession whose objective is to help people achieve order and social productivity in their personal, social, and intellectual lives. Many attempts have been made to propose general communication theories, but the cybernetic systems approach appears to be the most useful for the media profession. While it is not the intention here to explicate that theory, which has been done elsewhere (19), perhaps Figure 1, diagramming a general communication model, will provide a map of relationships in cybernetic communication theory that are relevant to the media profession.

The diagram assumes that all human and social activity is ordered to some purpose (69), and that this general purpose is to achieve order and understanding in individual lives, in the generation and transformation of human knowledge, and in the communication endeavors of society. As indicated in the center of the diagram, the media communicator serves both the individual and the social endeavor as well as the disciplines by acquiring and organizing the records of new knowledge whenever it is created. Based upon both the terminology and the synthesis created by the disciplines, the media communicator transforms the newly discovered knowledge into abstracts and descriptors and classifies these homomorphic transformations (descriptors) so that information "surprises" can be obtained by a patron in the information retrieval process.

After watching any adaptive control organism called a human being, it is easy to discover that in spite of varying abilities and individual difference, these organisms perceive much, if not all of their information outside the structured environment of the library. And even when they do consult libraries it is usually with a minimum of contact with the librarian. According to epistemological theory, especially as it

FIGURE 1. *General communications model.*

has been enriched by cybernetic theory (*19*), the adaptive control organism (*70*) feeds upon vast amounts of inductive perceptions before developing much cognitive structure at all (*71*). The process resembles a concentric and helical mapping of many experiences upon single symbols. Once symbolization has transcended sign occurrence, logical thought is possible and messages can be developed based upon deductive composition (*37*). The perceptual mechanisms of adaptive control organisms are constantly in contact with information stimuli to which they respond. They listen, see, taste, touch, and smell their environments and somehow, through trial and error and with an enormous waste of motion at times, they come up with communicative results which are truly effective.

When this is the case through unchannelized means, should it not be the objective of communication to capitalize on these random experiences in listening, viewing, and reading by constructing situations and processes wherein information surprise can occur? A considerable amount of money is spent on the print-oriented channel of communication. Some amount could be allocated to the development of environ-

ments (museum, gallery, concert hall) that change with the issues of community life and that represent information through viewing and listening experiences. It is possible to come to grips with this evolving need for information surprise which grows out of the dynamics of community life and which may initially be relevant to the persistent issues of the commonwealth.

In order of epistemological primacy the therapeutic function of audiovisual composition will often take precedence over oral counseling depending upon the cognitive development of the human individual being served by means of media therapy and media counseling (71). All men are not always vocal about deep-seated emotional needs as is indicated by the prevalence of art forms that serve for emotional expression in all societies. Because of this, audiovisual message design appears to be the prototype method for engendering cognitive development among inchoate, or temporarily inchoate individuals by the media profession. Developed in the teaching profession, media communicators use audiovisual theory in order to move patrons from intrapersonal to interpersonal communication patterns. Librarians have limited their involvement with such "therapy" to small children (72).

The essence of media composition is the juxtaposition of experimental signs, whereas verbal composition is based on the logical organization of symbols. However, for many people without much formal education, concept-development and flexibility remain a distant goal. Educational and communications media will have to incorporate materials with a preponderance of sign and object referents. Other than Pryluck (73), few researchers have investigated the function of knowledge, as recorded in audiovisual materials, in intrapersonal and interpersonal human communication. It is usually assumed quite erroneously that message design follows similar conventions whether expressed in verbal language or audiovisual language. Pryluck points the way toward more critical and extensive research that hopefully will validate theoretical considerations and dispel this illusion.

Library and information science is predicated upon deductive and logical message composition whereas media science rests upon inductive message design. The literature of library and much media science tends to ignore this fundamental dichotomy. To gloss over it uncritically appears to be the cause of professional apprehension and confusion as well as the vying of two powerful professions for hegemony: media studies and library science. It is apparent that the dichotomy may continue to exist at the functional level between the two professions, but at the epistemological level the inference is strong for a symbiotic relationship. After all, despite professional function, it is the same human being which is being served.

The media communicator must take a leadership position in the social communicative endeavor. Unless he does, he can scarcely merit the high social responsibility delegated to the profession. The media communicator, as an audiovisual specialist, a librarian, or information specialist, is an agent for change in the lives of individuals, groups, and communities. All further professional competencies and roles which this person is required to perform stem from this basic and overriding consideration. In addition, the media communications specialist must have competencies at some level in the areas of materials control and hardware systems as necessary prerequisites to his effectiveness as an administrator of a communications enterprise.

The present preoccupation of the audiovisual and information science profession with hardware, even systems of hardware, has in some instances become an obsession (23). In any event, it is an obvious indication that the audiovisual approach as well as the print proclivities of the traditional librarian have not risen beyond the level of a technology. Surveys of the literature of the audiovisual and library profession are discouraging. They reveal a lack of professional theory and any rationalized epistemological base (74). However, if society is to be served by communicators, a new generation of professionals will have to be educated for a leadership function as the administrators of the hardware systems wired together by the technologists and technicians.

There is a vast outpouring of articles on the utilization of educational media and technology of the type that appears regularly in the pages of *Audiovisual Instruction* (75). By consulting the various journals of this type, teachers can have their lesson plans employing any of the educational media singly or in combinations made up for them in almost every subject area. However, other than Gagne (45), few have attempted to develop a positive rather than a remedial approach to the educational enterprise. If the audiovisual or librarian technologist wants to have his "image" changed, it will have to be done on the basis of a new theoretical position which will guide his endeavors.

The technologist, be he of an information, audiovisual, or librarian persuasion, approaches the patron, whether as an individual or in the group, as if the patron already knew what he wanted or at least could be counted upon to express his concern. The appearance and rapid proliferation of audiovisual materials and equipment have raised disturbing misgivings and doubts on the part of many librarians. These uncertainties have continued principally because the advocates and exponents of audiovisual studies have not identified any epistemological matrix that is a function of audiovisual materials use. Perhaps of even more fundamental concern is that the technologies of the information, librarian, and audiovisual professions can be indicted for their almost exclusive use of linear and traditional models of equipment deployment and data transportation which pose as models of communication.

The function of the library and information science profession is to organize and codify knowledge for effective retrieval. This indeed serves a very serious and fundamental objective in society. If this library function were not performed, society would have a much more difficult time in preventing large numbers of its members from slipping back into entropy. The library function is concerned with the preservation and organization of all knowledge for rapid access and retrieval. This traditional library function is *the* major order-producing control device without which the social order would be seriously handicapped. There is a direct relation between the sophistication and complexity of a civilization and the library function network upon which it is built.

Since no library can be organized to suit the idiosyncracies of each user, librarians have always maintained a public service staff to promote more effective interface between the user and the file. The general function of this *communicative* professional staff is to help patrons overcome the limitations of classification regardless

of whatever "notation" is employed, be it in code, descriptor, or reference form. This interface, however, has unfortunately seldom if ever been considered as a communicative endeavor. The role of the librarian has more often been viewed as an interactive mode between user demands and a logico-deductive system somewhat analogous to the mapping relationship that exists among "natural" computer languages, compiler language, and the logico-deductive machine itself.

The purpose of library communication services is to facilitate the use of information in people's lives by releasing knowledge from the viselike grip of logic and symbol. In general this is done in two ways: (1) Lowering the level of abstraction, and (2) relaxing the formality of the context within which information is sought. The *first* way of facilitating use of information is to lower the level of abstraction. This is done by increasing the range of messages in both audio language and visual language. These audiovisual records are placed in juxtaposition with the written record whose complement they are.

Lowering the level of abstraction helps those individuals who have enough experience with signs and symbols in some area of knowledge and who are able to browse on their own. But since the library cannot store objects (i.e., referents for signs and symbols) nor even many audiovisual records, many individuals need help in establishing a relationship between the signs and symbols of their unique experience and the signs and symbols of the culture. Librarians need to know audiovisual composition in order to help patrons who are not able to talk about felt needs. Once the patron creates a visual and/or audio composition on his own, about his felt but unverbalized needs, it is much easier for him together with the librarian to explore his area of concern.

The *second* way of facilitating use of information by a wider range of people is to relax the formality of the logical context within which information surprise is sought. Instead of expecting the patron to know what he wants, or of pushing a book at him almost as soon as he opens his mouth, the librarian is prepared to listen and to observe. This practice is designed to create a climate that encourages the patron to express himself and in the process develop his cognitive flexibility.

Listening and observation are practiced by the librarian in three contexts: dyad, group, and community. Various methods and techniques are employed to facilitate communication and are known as counseling (see *Counselor Librarianship*), group dynamics (see *Adult Education*), and community development (see *Community and the Library*). In essence, the librarian constantly demonstrates his skills of listening and viewing or observing. Hopefully, the patron will learn from the librarian's demonstration in order to improve his own listening and viewing skills. More realistically, it is expected that the patron will be able to develop appropriate concepts for his felt needs, which in turn will expedite the retrieval and use of materials.

Television and motion pictures are often considered as a systems approach to message design. Certainly a number of considerations (76) make television a desirable instrument of communication for librarians. However, once the videotape is produced it is presented in a context. It is this context, including the videotape, that constitutes message design. To a considerable extent, independent study is a function

of the media center and in particular of the library component (77). However, as the range of materials accessed increases, all media, not just print, will be used more extensively. Operations analysis leads hopefully to better utilization, but infrequently to cost analyses. Production costs are not always computed for media centers. Howey (78) offers a method that can be used as a guideline for development purposes.

Finally, it should not be forgotten that simulation is an important aspect of message design, particularly when it is employed for instructional and research purposes. For example, at the Graduate School of Library and Information Sciences, University of Pittsburgh, a socio-political and info-cultural environment has been developed in a library-community encounter simulation (175). Demographic, land use, and legal data of Allegheny County (metropolitan Pittsburgh) serve as cold-start constraints before fifteen weekly cycles carry the encounter system 15 years into the "future." The on-line/off-line model is cybernetic in terms of its response to input (man or machine) and can cause new interpretations of the response by those receiving the input for the next cycle (man or machine).

Media Materials Development and Control

Media in their variant forms provide the individual with a more highly organized experience about his environment than is possible from the social game or the constraints of the physical environment. According to Dale (22) and Pryluck (73), media materials are an intermediate level of content organization between real life experiences and the highly abstract conceptualization of written communication. Related to the taxonomic work of Hall (79), Stevens (80) has organized the types of media materials around a taxonomy of formative, informative, and instructive cultural mediators in order to arrive at an understanding of the function of materials in communication.

Culture mediation as a synonym for message design may be considered to refer to all the processes involved in the human capacity for sharing sign behavior. On the other hand, culture mediators refer to all the devices and things that men use to share sign behavior with one another. Cultural mediation is a transactional and dynamic term while the cultural mediators may be stored in libraries and media centers. A transactional and cybernetic theory is provided by Stevens (81) as a guide to organizing media materials in a taxonomy that is more action than subject oriented.

A librarian's orientation to materials is often one of confidence in the stability of their structure. This reliance exhibits a mental set about how words, sentences, paragraphs, and pages in a book ought to be ordered in a linear structure (82). However, materials collections can be made more dynamic by the inclusion of media materials, especially programmed textbooks. Nevertheless, recorded materials alone cannot ensure communication. A careful and disciplined interaction of patron and librarian is essential.

Libraries have taken little if any responsibility for media materials and equipment

with the possible exception of the school and some few college libraries who have pioneered with the "library college" idea (*83*). The library qua library must of necessity meet the objectives of its essential nature. These purposes were spelled out by the Conference on the Intellectual Foundations of Library Education (*84*). The principle axioms were: (1) acquire one copy of everything published, (2) organize for location access, and (3) index for information retrieval. The fourth axiom, promote use of information surprise in people's lives, was scarcely touched upon because of a lack of a communication theory.

For the traditional librarian, materials development and control includes the concept of publishing (especially in the function of an editor) as well as the library-like activities of document acquisition, cataloging, and retrieval. These functions are also considered by the information science profession, but in this instance the concept of publishing is expanded to include knowledge creation and regeneration. Also known as professional and scientific communication, knowledge creation and regeneration includes such concerns as the literature scientist and the invisible college, as well as an array of user studies and certain aspects of information transfer and networks.

Communication principles and methods are fundamental to an understanding of message design and are also essential to the preparation of materials. There has to be some form of stimulation strong enough to get through to the receivers. The audience must notice something and the media are the means usually used to accomplish this purpose. To an extent, librarians may consider local production of materials under the heading of reprography (*85*), which perhaps is to be expected in the frame of reference within which most librarians operate.

Because printed materials are so common, librarians tend to neglect the preparation of other types of materials. Considerable attention to details is required before effective stimulus and communication can occur. Librarians need to know more about how materials are actually used by people for information and education. They need to be able to predict that this piece of material will probably have that anticipated result on a particular patron. Asheim (*86*) considered that content analysis and studies of the atypical reader were important research areas in librarianship.

If Asheim's challenge were accepted, librarians might have a firmed basis on which to deal with the library (or counseling) approach as opposed to the school (or instructional) approach in building effective audiovisual programs. With some knowledge of communication theory and the learning process, more librarians may be able to respond to Wendt's plea (*52*) for more research in audiovisual materials:

> Although in the past the profession of librarianship has been concerned principally with the printed word, librarians should also be involved in determining which elements in pictures provide the most effective communication. This should not be left only to photographers since the same analytical techniques employed so brilliantly in linguistics could be used to determine the communicable elements of pictures. The growing interest of pictorial content calls for research into the instructional values of pictures, an area most appropriate to library science.

While the focus of content analysis may be upon message systems, the locus of its endeavor is upon media materials. Without materials there would be little data upon which to base its inferences about the context of communication. Context analysis can only be studied inferentially from content analysis:

> Publication as a general social process is the creation and cultivation of shared ways of selecting and viewing events and aspects of life. Publication is thus the basis of community consciousness and self-government among large groups of people too numerous or too dispersed to interact face to face or in any other personally mediated fashion (87).

There are two ways of considering audiovisual materials which appear to represent opposing viewpoints as to their function in communication. Those who hold to the superiority of the printed word consider the audiovisual approach as a subsidiary, illustrative way of illuminating the text for ease of reading. As long as the main thought sequence is carried by the verbal message it is permissable and in some instances desirable to visually embellish certain passages. Even the film and the videotape, to persons of this persuasion, record a verbal sequence and illustrate it with a greater degree of audiovisualization than is possible in a book.

This orientation to the primacy of verbal composition is usually what is known, albeit pejoratively, as the librarian's orientation to media materials even though it is noteworthy that most information about the new media is to be found in printed form. The referent of the concept is presented illustratively, not inductively in order to surprise the senses. In fairness to the librarian it must be pointed out that knowledge and even language is organized logico-deductively. It is consequently imperative that any information retrieval scheme can do little else but be compatible with the system. This means that concepts and logical relationships tend to predominate over iconic composition patterns.

The opposite point of view is championed by the media profession, often with a good deal of chauvinism. To the audiovisual specialist, primary message design is developed on the basis of inductive composition. The basic information unit is iconic rather than symbolic. Messages are composed on the basis of juxtaposition of signs. Meaning cues are primarily engendered as inferences from the juxtapositions and verified by the adaptive control organism through the summation of verbal labels.

Media composition and methods of materials utilization have been developed without much concern for individual differences in human information processing (88). For example, individuals who differ in their previous experiences with film also appear to differ in the extent to which they profit from filmed learning sequences. This phenomenon has been called film literacy (89), and Pryluck (90) has suggested that such comprehension is based on a grammar of the film. Snow (91) has suggested that the ability to receive, organize, code, manipulate, and retrieve information from visual communication is a product of an understanding of the variables in cinematic and editing practices.

Listening and visual literacy are becoming of increasing concern to the media communicator as he escapes from the notion that audiovisuals illustrate the printed

record. In fact, oral communication may be declining because of the growing preva-
lence of people who are heavily plugged into various media (92). However, it is not
as yet entirely clear whether visual literacy is developed within content or context,
or perhaps a combination of both. The study of visual literacy should appropriately
begin in the elementary school and continue through secondary (93). The sequencing
of content is as important in visual materials as it is in printed media.

Visual composition is, in part, based upon camera composition. Since the camera
is an extension of the senses, photography can be used as a social science research
method (94). Fine photography is fine observation. The challenge is to observe with
scientific significance when mapping social interaction, when interviewing, and when
capturing slices of reality not readily accessible to verbal description.

Written composition is so common that it is taken for granted and almost never
considered in discussions about the educational effectiveness of print materials. Even
when analysis focuses upon the readability of the syntax and the vocabularly load,
few persons question the logical nature of the message design. In fact, syllogistic
design is stressed when each paragraph is expected to begin with a topical sentence
and follow a logical exposition as it is developed. Even for works of the imagination
such as fiction, drama, and poetry, apparently the same principles of logical compo-
sition apply.

It is only within recent years, under the impetus of linguistic analysis, that any
serious attention has been given verbal composition. The pressure for analysis has
come from the information scientist as he encounters the problems of homomorphic
and isomorphic transformations. Meredith (95) has stressed the role of symbol
referents when making transformations for abstracting purposes. MacKay (96) has
found that types of kernal messages such as questions and commands vie with
sentences in retrieval negotiation. Miller (97) has employed the information measure
to analyze the variance between input and output information.

However, when it comes to audiovisual materials the lessons of linguistic research
have either been ignored or the findings are assumed to apply to messages designed
on the principles of inductive composition. Apparently it is not so obvious that
audiovisual message design follows inductive principles of composition rather than
the traditional deductive conventions of written composition. Media composition is
the juxtaposition of experiential signs in contrast to the logical organization of sym-
bols in verbal composition. Sequence is a method that is deliberately employed to
enhance meaning rather than merely to maintain order (98).

The lack of clarity of function between inductive and deductive composition may
result from the fact that deductive composition has for centuries been self-sufficient.
On the other hand, inductive composition rarely stands alone without some deduc-
tive composition in the message design. Music and visual art are exceptions, but
seldom if ever are they considered educational media unless there is a running com-
mentary or at least a caption. Consequently, it must be noted with regret that edu-
cational media has so far been almost exclusively concerned with the audiovisualiza-
tion of linguistic composition. The audiovisual component is considered as a supple-
ment to message composition based on linguistic principles.

In audiovisual composition, the word-labels are secondary to message design and serve only to assist and reassure the receiver that he is "getting the message" that the sender apparently intended. But of even more fundamental importance is the fact that audiovisual composition is closely related to the actual behavior of an adaptive control organism in perceiving and in interpreting the stream of information modulations to which it is constantly submitted throughout the day. Inductive composition parallels the spontaneous life-style of the individual, whereas verbal composition is an "afterthought."

Verbal composition constitutes a second stage of message development which synthesizes a number of observations as well as judgments about relationships among those observations. Great reliance is placed on concepts, of necessity, because symbols can be manipulated by the logical operations of synthesis or syntax. Verbal composition makes it possible to construct theoretical syntheses that ultimately explain the world of phenomena more effectively than iconic composition which largely mirrors phenomenological surprises.

It is unfortunate that the dichotomy which exists between the two major forms of message design has tended to divide the energy of communicators. To ignore one form of communication and overemphasize the other eliminates many patrons whom the library would serve. Perhaps special librarians (30) can limit their communication to verbal message design, but libraries with more general social purpose cannot. Only the specialist can be expected to communicate in his subject field exclusively with verbal and logical message design. This is the same as saying that he can read in the field with flexibility and ease.

However, when the specialist reads outside his field he may need discourse units that are not as rigorously logical in message design. He might even be interested in perusing an inductive audiovisual. If this is characteristic of the specialist, how much more so could it be of the general layman with less educational attainment. Media materials should predominate in information centers and be designed to serve a wide range of communicative purposes. Design and layout should simulate environmental conditions within which information surprises occur in a discovery context.

Content analysis of audiovisual media materials is frequently assumed to be the same process as used for print media. But when one considers the principles of audiovisual media composition, the homomorphic transformation of media documents for descriptor-flagging purposes appears to be grounded on two principles not found in print media: stimulus generalization and cue summation (99). The consideration of how information is processed and stored in audiovisual media is a significant concern in the development of functional media descriptors. Conway (100) maintains that a solution is to be sought in the referential function of sign carriers in combination with word and pictorial items. The pictorial or other nonverbal item must have a referential function equivalent to the word with which it is paired.

One way which has been used almost in desperation in order to solve the problem of descriptive cataloging and the content classification of media materials is to follow the principles developed by librarians for print media (101). For example, uniterms (102) have been suggested as a method of content control in a file. This approach is

designed to profit from the comprehensive bibliographic and mediagraphic resources and services of the Library of Congress which has been cataloging and classifying films, recordings, and filmstrips for many years.

There have been several attempts to format and standardize the descriptive cataloging of media materials, but the two major vested interest points of view include the audiovisual specialist and the librarian. The audiovisual standards (*103*) are to an extent reflected in the National Information Center for Educational Media (NICEM) (*104*) bibliographies which, while produced from computer tape, are available in book form. The librarians standards (*105*) are basic to the descriptive cataloging of the Library of Congress. While printed unit catalog cards have been available since 1901, the descriptive cataloging information is now being distributed in machine readable form as well as in printed format (*106*).

The Machine Readable Cataloging (MARC) of the Library of Congress has considerable significance because it provides an internationally accepted standard in digital format. MARC II is a communications format that can be used by various kinds of computers using many languages. It is hospitable to all kinds of elements. The structure of all MARC formats for various media are identical, but the content descriptors can be varied to abstract the homomorphic transformation of different kinds of representation: films and strips, videotapes, pictures, transparencies, slides, audiotape, music, phono-records, maps, serials, books. MARC tapes require a computer which, of course, is available at most medium to large libraries or media centers, such as the Knowledge Availability Systems Center, Graduate School of Library and Information Science, University of Pittsburgh. MARC tapes are also accessible to small libraries and audiovisual centers through cooperative networks, or state and regional systems as for example the Pittsburgh Regional Library Center (PRLC).

Current Library of Congress Catalogs include *Motion Pictures and Filmstrips* (*107*) which is issued quarterly and *Music and Phonorecords* (*108*) which is issued semiannually. The Library of Congress has been a source for catalog cards for certain audiovisual materials, films, filmstrips, and recordings since 1952. As of July 1, 1968, 17,000 films and filmstrips had been cataloged with heavy emphasis on educational films although some theatrical and TV films are included. They cover 35mm and 16mm films, with 8mm film getting attention recently. The Library of Congress record cataloging covers about 85% of the recordings sent to them. The time lag of 2 to 3 years between the production dates of the audiovisual materials and the issuance of the catalog cards is gradually being reduced.

Packaged programs for cataloging and processing services are available. A recent survey (*109*) indicated those commercial firms that issue cataloging and processing kits for audiovisual materials and who will contract to catalog and process a particular library's current media acquisitions. Some of these firms will supply a library with a computer-prepared multimedia book catalog in which print and nonprint materials are interfiled. Despite such efforts as these it is generally agreed that the bibliographic control of nonprint materials leaves much to be desired. According to Grove and Totten (*110*):

No standards now exist for the bibliographic control of media. Institutions and organizations have devised their own schemes for organizing nonprint materials. . . . A parallel may be drawn between the chaos in media organization and that experienced with books, prior to the development of control sytems by Melvil Dewey, Charles Cutter, Ranganathan, Antoni Panizzi, and others.

The Department of Audiovisual Instruction in 1968 made an attempt toward a system for organizing nonbook media with its *Standards for Cataloging, Coding and Scheduling Educational Media* (*103*). This publication, however, is considered inadequate by Totten and Grove (*110*):

> Only joint statements, proposals, and recommendations for the control of media by the Americal Library Association, American Association of School Librarians, and the Department of Audiovisual Instruction (DAVI) are appropriate today. Other professional associations in the United States and foreign countries must also be involved in the development of systems and standards for the bibliographic control of media if they are to gain universal acceptance.

Concerted action toward the goals of adequate selection tools and bibliographic control is a serious area of concern and one in which librarians must act in order to fully utilize the potential of the newer media. Grove and Totten (*110*), for example, recommend the development of state, regional, national, and international union lists of print and nonprint media; the commitment of the United States national libraries to an equal concern for print and nonprint media; the establishment of a United States Media Council to bring together all components of media sciences for the encouragement of joint efforts in the bibliographic control of media. Cooperative activities at all levels by members of different disciplines in the media sciences should occur to enable the professions to build universal standards and systems for bibliographic control of media.

Local production of media materials is an extension of reader "book selection" principles. Phinney (*111*) made a considerable point of the fact that specific materials are needed for specific behavior changes. Is the stimulation strong enough to catch the reader's attention and lead him into learning something? If these materials are used, what impact will they have? Questions such as these are fundamental to the preparation of reading lists or the development of displays. When a change has been decided upon, or a learning is to be induced, a message is designed including its appropriate subset of materials. To proceed in this program development manner is not different, except in degree, from the identification of behavioral objectives as a necessary step in instructional design.

It is the media profession, however, that has expanded the concept of publishing to include local production of materials. Whether to purchase or to create on demand the materials as well as programs (*112*) divides, on philosophical grounds, proponents of either position. Consequently, graphics and sound design together with materials preparation is an endeavor of several dimensions in the audiovisual profession. Perhaps this considerable emphasis upon materials production may account for the lack of concern on the part of the audiovisual profession over the published

(produced) record and explain, in part, the low visibility accorded bibliographic (mediagraphic) control.

The area of materials production, whether commercial or local, is a wilderness of private initiative lacking coordination. Surveys are needed of actual and potential production capacity. No single bibliographic (mediagraphic) publishing concern exists that could inventory the production record in regular listings, and the evaluation of media materials is haphazard and almost nonexistent.

Of more immediate concern to the audiovisual profession is the serious lack of bibliographic control or, to coin a word, "mediagraphic" control. As far as control of materials resources is concerned, both in terms of "mediagraphies" and the indexing problem, the audiovisual profession is in a state of development comparable to the library profession 75 years ago (see Figure 2). It has been estimated that in 1971 there are 213 sources of slides, 183 sources of overhead transparencies, 453 sources of filmstrips, 330 sources of 8mm films, and over 500 sources of 16mm films.

In addition to the several thousand audiovisual items which appear each year, no one really knows how many audiovisual items are still "in print," or indeed whether they can still be obtained from some media center. This problem is compounded by the fact that it never seems to worry anyone that in 50 years of public broadcasting no one has made any attempt to preserve the productions of radio and television. Vast sums of money have been spent for productions that are an expression of and have had an impact upon the culture. Who can say that these are any less valuable a social record than the many newspapers and magazines which are assiduously collected, organized into collections, and indexed by libraries.

That such a situation persists in a curious anomaly in a society that over 100 years ago established a major social agency (the library) to acquire and organize for use the product of one medium of communication (publishing industry). No one appears to be concerned, if indeed it occurs to them at all, that the untold resources put into radio and television programming are not preserved. Such methods exhibited by Broadcast Pioneers (*113*) and those programs which are kinescoped for commercial distribution, while commendable, are completely inadequate to deal with the magnitude of the problem.

Of course, the answer is usually given that we live in a print-oriented culture. But this has become less viable as an excuse as we begin to move into McLuhan's global village and as a rapidly increasing proportion of the population is reared on the audiovisual media. It is interesting to speculate on what might have happened had the library profession not given up museum work more than 50 years ago. Perhaps it would have become commonplace by today for libraries to acquire every form of material.

Be that as it may, there is a serious problem of mediagraphic control. In bibliographic theory (*114*) and applications research (*115*, *116*) there are a number of functions which control of print media is designed to serve. As indicated in Figure 2, these functions include inventory control, evaluative selection, holdings identification, subject guide, and bibliography of mediagraphy. In the following discussion of the various functions of mediagraphic control, many of the references will include
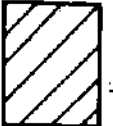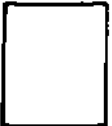
FIGURE 2. *Mediagraphic control system.*

both materials *and* equipment. Unlike printed materials, purchase of audiovisual materials does not include the vehicle by which the material can be perused. Separate companies in many instances provide equipment. This differs from print publishing where the publisher supplies the vehicle for perusal (the binding) along with the media content materials.

The function of inventory control requires a record of the existence of all items produced by the audiovisual industry, together with information about price and source for purchase. No comprehensive listing exists that performs this function for audiovisual materials. In the interim period before one is developed, other "tools" have to be used which are partially successful. The *Educational Media Index* (*117*) and the NICEM mediagraphics (*104*) are usually employed. Since these tools are not comprehensive, producers catalogs have to be employed. These publishers catalogs must be individually indexed, if indexed at all, because there is no annual directory of publishers catalogs let alone a subject guide to media materials "in print." Often the imprint and collation information is not supplied (*118*).

The *Audiovisual Market Place* (*119*) is a more recent publication and serves the purpose of a directory to producers of materials and equipment. However, it might be well to note that no comprehensive listings of equipment is available. Although several directories do exist with varying degrees of coverage, there is a serious need for the "regular gathering, compilation, and publication of more complete and reliable information concerning newer media and the various items of equipment required for effective use of materials by library patrons (*120*)."

Strange as it may seem, considering the huge number of books written about the audiovisual profession and its practice, there is no comprehensive reference guide to the sources of the audiovisual form materials. Several years ago Shores (*121*) made a beginning by providing a guide which is now out of date. More recently Gambee (*122*) has developed a guide to mediagraphy, but for instructional purposes. This, however, does not diminish its importance and usefulness for media personnel in the absence of almost anything to the contrary.

In the function of evaluative selection, the audiovisual field is not without some tools. The *Landers Film Reviews* (*123*) and the *EFLA Cards* (*124*) are the most comprehensive, but unfortunately they are limited to film materials. The *Booklist* (*125*) is another source which evaluates media materials, but its scope of coverage is limited to small public libraries. There is no comprehensive evaluation tool on the scale of either the *Library Journal* (*126*) or *CHOICE* (*127*) which are available for books. However, as of November 1967, *Library Journal* did initiate a multimedia listing. Other viewing aids exist by the various forms of material (e.g., recordings) and interested media personnel should consult Gambee (*122*) for titles.

In this same vein, but in the area of retrospective evaluation of audiovisual materials, there is no standard listing of basic materials that one could expect to find in a media center. Apparently the audiovisual profession has so far not felt the need of keeping "in print" or generally available the great classics of radio, television, or even the audiovisual production industry as has the Broadcast Pioneers done on a limited scale (*113*).

The performance and evaluation of equipment is a problem in the audiovisual profession. As in most other areas of mediagraphy, no completely satisfactory evaluative source is available. *Consumer Reports* (*128*) is one source for equipment evaluation although the emphasis is upon home consumption. The reports of the Library Technology Project (*129*) are another source. While the scope of evaluation has tended to increase in recent years, the emphasis on items of equipment for inclusion has been based on library interests, not necessarily media center interests. There are other descriptive sources of information about equipment. Various issues of journals are devoted to types of equipment as, for example, microform equipment which appears in *Information and Records Management* (*130*). This guide for buyers and users includes cameras, readers, film, and reader-printers.

Another more recent (1967) source of evaluations is the Educational Products Information Exchange Institute. EPIE Institute is a nonprofit information and evaluation service. The purpose of the EPIE Institute is to develop and maintain an independent educational cooperative designed to provide its members with information and counsel based on impartial studies on the availability, use, and effectiveness of communications materials, equipment, and systems. EPIE members receive nine monthly reports during the academic year (*131*).

While it may not be desirable to detail innovation and experimentation by standardizing makes or models of audiovisual equipment, there can be some compatibility in performance specifications. Wyman (*132*) maintains that a number of questions can be raised in an effort to measure and report some characteristics:

> The American National Standards Institute has established a new group called PH-7 for photographic audiovisual standards, and it is attempting to select existing standards that might be used and to initiate new standards where necessary. AECT is a cosponsor of this committee with the National Association of Photographic Manufacturers and the National Audiovisual Association.

The functions of holdings mediagraphy is another area in which few tools are available. The catalogs of producers and especially distributors meet in part the need for booking materials. But as in other instances the services are limited largely to films and kinescopes rather than videotapes. It appears to be almost a standard practice in the field *not* to loan forms of audiovisual materials other than films and kinescopes. Even within a media system, such as a school, the practice is to encourage each school building to purchase for itself those media materials that are frequently required other than films.

There are a number of media collections that loan film materials. Almost every large university and especially the land-grant institution of the particular state have film rental collections. Some of these, as at the University of Pittsburgh, provide service in addition to the school systems in the vicinity. Many state library agencies (e.g., North Carolina) have collections of films which can be borrowed, often free of charge by the general public, through the local district or county public library (see *Films in Libraries*). A word or two may be in order about the concept of a "librarian's library" for the audiovisual profession. This concept of a national media

center is only beginning to emerge in the media profession. NICEM may eventually have the potential to serve this function which at the moment is latent, although its bibliographies are invaluable (*104*).

The function of a subject guide to media materials has not yet been satisfactorily met although the *Educational Media Index* (*117*) and the NICEM bibliographies have made an attempt. The problem in part appears to be one of materials evaluation. Beyond a very general attempt at indicating audience grade levels, these bibliographies can hardly be called subject guides to a field as they are known for print materials in the various disciplines. Local attempts at most media centers are made but these are scarcely more than subject source listings.

An attempt has been made in the *Learning Directory* (*133*) to index media materials under very specific headings as distinct from the topical approach of most mediagraphy. Items included are considered primarily as instructional which excludes reference books, entertainment items, equipment, and supplies. All items in a single subject are listed together including audience level, medium or physical format, and followed by color, sound, size, date produced, price, and source. The plan is to revise the *Learning Directory* each year and to provide remote mediagraphic access via computer once a national network is available.

A national network exists in prototype. EDUNET (*178*) has been developed by the Interuniversity Communications Council (EDUCOM). If EDUCOM takes advantage of the Advanced Research Projects Agency (ARPA) computer network, many of the major problems that have inhibited adequate communications may be solved. ARPA has been developed by the U.S. Department of Defense in order to solve such problems as effective and economical data transmission, software exchange, large file handling, and administrative concerns. The technology is available and it is hoped that EDUCOM will handle the network traffic for educational institutions.

In the field of education, two publications can be made to serve as operational guides to materials by subject area: *Prime* (*134*), and *Educator's Purchasing Masters* (*135*). Both of these publications indicate which producers as well as which publishers offer materials by type of medium and subject. Neither reference indexes the actual media materials available but it is handy to have a listing of producers, processors, rental, and service agencies as well as a dealer's list by state.

Rather than working to meet the need for a subject guide, the audiovisual profession seems to have taken the route of the demonstration center where materials and equipment from many producers are assembled for examination purposes such as the regional examination centers which the Pennsylvania Department of Public Instruction has established within the commonwealth. Some university media centers perform this service. For example, the University Library, University of Pittsburgh has a materials and equipment examination center for faculty, students, and area teachers. In addition, though not entirely satisfactory, at the annual conferences of the Association for Educational Communications and Technology (formerly DAVI) a great variety of producers exhibit new materials and equipment.

The final form function, bibliography of mediagraphy, cannot be said to exist for

the audiovisual profession. The bibliographies of the U.S. Copyright Office (*136*) and the Library of Congress (*107*) are useful only indirectly. The need for bibliographies of mediagraphy can be met only in an indirect manner by consulting the card catalog of the media center or a standard index (e.g., *Education Index*). This method, however, is time consuming because the collation statement of each entry must be scanned for the note: "biblio." Once noted, the patron must retrieve the actual document to which the bibliography is appended in order to decide on its usefulness.

Besides mediagraphic (i.e., bibliographic) control, there are two other considerations of significance to the audiovisual profession: indexing and information retrieval. Indexing involves the whole question of content analysis (as distinct from context analysis) of the materials as well as the development of homomorphic transformations which will suitably serve as descriptors (subject headings, index terms). Information retrieval on the other hand, except in very limited files, is not available for audiovisual materials. About the best retrieval that can be had is from the topical approach of the NICEM (*104*) bibliographies. Since audiovisual documents do not have self-contained indexes, the entire work must be scanned for whatever specific information surprise it may by chance contain. Search strategy as a research topic scarcely exists in the educational media field. This lack appears to be a result of the fact that audiovisual documents do not have an index. Audiovisual materials are more often context analyzed, rather than content analyzed.

Treatise after treatise in the audiovisual profession considers the use of the materials in some context for some particular audience (*137*). This insistance upon a program orientation for materials is a strength and an asset which the library profession could do well to emulate. But the fact remains that, to the user at least, audiovisual materials cannot be used by an individual or a group unless they are mediated in context by an audiovisual professional person. This may not be entirely the intent of the profession, but it is unfortunate that media specialists have not developed a literature of retrieval strategy and information use.

Another opportunity remains unexploited by the media profession. Even the use of audiovisual composition in therapeutic and especially developmental counseling was developed by professionals in another though related field. For at least 15 years the elementary and secondary school English teachers have been using the method of audiovisual composition with inchoate children. Provided with a camera or tape recorder the student is encouraged to "shoot" an audiovisual representation of that experience which may be too deeply seated in his emotions or traumatic to talk about. However, once "objectified," the student together with the teacher in a counseling interview begin to find words for suppressed personal experience.

The early research on the comparison of one medium with another has not proved successful, and there is little if any concern over the problem of the analysis of content for purposes of homomorphic transformations which might prove useful for either descriptive (indexing) or inferential studies. In research in educational media, there has been a movement away from a gross comparison between a single form or even a combination of media as well as traditional methods of communication towards an increased emphasis upon variables within media (*65*). Motion pic-

tures and television have proved useful in stimulating interest, supplementing learning, aiding retention, and in influencing attitudes. Much less research has been done with filmstrips, flat pictures, recordings, color, and sound. However, some research is being conducted into improvements of the elements within a given system of message design.

The Educational Resources Information Centers (ERIC) are important research sources for educators. The ERIC clearinghouse at Stanford University is responsible for collecting and evaluating information on the use of instructional television, film, computer-assisted instruction, and other audiovisual devices. Documents are abstracted and indexed at Stanford, and then submitted to the central system for listing in the monthly journal, *Research in Education (138)*. The text of most documents is then available in either inexpensive microfiche or hardcopy.

Channel and Vehicle Deployment

Librarians usually consider channel and vehicle deployment under the rubrics of building, extension service, and larger units of library service. Such usage is almost synonymous with the concept as used in information science except that information transfer and networks are included. Also included in this concept is a consideration of networks of indexing systems (especially computer based ones) as channels through which information surprise (Shannon) can be transmitted. Considerable reliance is placed on engineering developments in channel capacity and fidelity. Librarians on the other hand would refer to the materials collection as the channel through which knowledge is made available to the people.

Channel may be considered the vehicle, structure, or system through which the medium is presented to the receiver(s) in context of the total message. Vehicle concerns are also related to the areas of message design and media materials. A number of considerations have to do with the vehicle types and functions that underlie physical access to educational media including both print and audiovisual documents. Engineering problems cannot be ignored as well as those of standard specifications for equipment design. A start has been made toward evaluation and standards specifications, but the work of both the Library Technology Project *(129)* and the Association for Educational Communications and Technology (formerly DAVI) needs support and expansion.

The word channel is used here in reference to vehicle and not to the conceptual framework of modality versus channel. The sensory modality involved in communication is distinct from the coding (sign) system that characterizes the information presented *(139)*. In the media profession, channel considerations revolve around the equipment by which media materials are made available to people and the broadcast stations (television and radio) by which message designs are transmitted to an audience. In addition, the audiovisual professional has been concerned with such vehicles as the learning resource center, dial-access media center, and computer-assisted and individualized learning spaces.

While some approaches are being made to the problem of channel fidelity, very little is being done about utilizing the presently available channel capacity. For example, television has been called the sleeping giant of higher education (*140*) because its potential remains unrealized. The only exceptions are in the areas of public radio and television which have received new and added encouragement from the Public Broadcasting Act. But there is no national network for the development of educational media in America. The major problem which those who struggle for such a network have had to face is the lack of top-level commitment to educational technology. The piecemeal approach often results from a fear of comprehensive change and remains the underlying failure of educational technology (*141*).

In considering the development of channel vehicles, it might be well to refer to the second of the two definitions of technology used by the Commission on Instructional Technology (*16*). Technology is "a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based upon research in human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction." Congressman Brademas (*142*) indicates five advantages that can accrue from the intelligent application of technology:

Increased productivity. Technology can speed up the rate of learning and help the teacher make better use of his time.

Individualized instruction. Technology can allow students to learn at their own pace.

A more scientific base for learning. Technology can enable teachers to determine which techniques produce the most effective results.

More immediacy in learning. Technology can bring the outside world to the classroom, reinforcing traditional methods of teaching.

Equal access to education. Technology can allow students in remote areas and ghetto schools to participate on an equal basis with students in more affluent neighborhoods.

The situation-producing context as a channel may be considered a function or process rather than a thing or place. Media materials exist in a location whereas services can be in many places at various times. This is a radical change in concept from a center whose primary emphasis is upon materials organization to the development of a facility in which communication can occur (*143*). This responsibility is not discharged only by moving data or materials to a receiver but mainly in creating contexts within which the data will have "surprise" or information values. For example, consultation such as that provided by a physician does not supply data but makes appropriate information kinetic for an individual. Brown (*144*) describes the role of this type of professional specialist as an executive change agent:

He is by nature a generalist, but specialized in the movement of information from a source to a client. He is manager or executive, the learning center director. His qualifications approach or exceed those of the principal. He is responsible for facilitating the learning of the students. He is not an audiovisual director. He is not a librarian.

His job is to organize and administer the services of the learning center, and to do this he calls upon the librarian and audiovisual specialists. He is essentially a change agent and will work closely with curriculum supervisors, guidance personnel, teachers, and other specialists to aid them in managing or guiding the learning of the students. In a school, his title would be that of vice-principal in charge of the learning center. On a district level he would be a deputy superintendent.

Fundamental to vehicle problems are network considerations. A national and public network of buildings and people is needed in order to produce the kinds and amounts of communication materials for an increasingly complex society (*145*). Commercial publishers and distributors will more than likely never be able to produce the range and combination of electronic, printed, and other media materials required by effective communication centers. Of even more critical concern is the question of storage, indexing, and distribution. Historically, the public library, for example, was established by the state in order to preserve the resource materials of a civilization and solve the time-binding and space-binding functions which commercial publishing has difficulty doing (*67*).

As a result of the Carnegie Commission (*146*) report on educational television, a corporation for public broadcasting was established by the Congress. The effect was to legitimize nonprofit "educational" television as an important public service. While educational broadcasting (see *Educational Television*) may face a problem of remaining autonomous under increased governmental support (*147*), this recognition of public broadcasting as a public responsibility may prove to have been a significant step in overcoming the problem of media access (*148*). However, there remain other concerns evident in educational television which offset its effectiveness as a communication channel for the emerging public interest:

> This trend has been evident in several ways: the tendency of the stations (even then owned by schools and colleges) to establish themselves as a separate educational force; the effort to make the schools come to the stations for services, rather than trying to develop an integrated effort based on curriculum needs; the practice of packaging lessons and programs and attempting to sell the schools on "something great they need"; the general lack of interest and often hostility to the development of multichannel-cable transmission and ITFS service for educational development. The result has been a kind of unspoken philosophy; if the schools don't need us, we don't need the schools (*149*).

While a national network for the production and distribution of educational media does not exist, various blueprints have been developed. Some state and regional networks have been implemented which eventually may serve as components in a total national network (*150*). Certain functions become evident when systems analysis is applied to the operations. According to Stone (*148*), the following components constitute essential mission objectives of media networks.

> *Materials Acquisition and Production.* Commercial producers may be expected to provide the bulk of materials (or media) acquired. However much special production will be needed to supply the materials required by the communicators using the facility. Unlike the use of printed materials, programming or message design

is an essential and necessary characteristic of educational media. The message is practically always designed for a group in contrast to the individualized approach of printed materials. There is as much perhaps even more of a justification for a network of local media centers than there is for the urban branch library system. Production requires graphic centers and trained personnel whereas branch libraries have no function other than access to materials—a function that is now largely antiquated by electronic distribution.

Materials Access and Distribution are functions which depend upon a comprehensive and effective mediagraphic control of audiovisual resources including both inventory and holdings. The ephemeral nature of audiovisual materials poses an increasing problem the closer production is oriented to a specific mission. However, it may be desirable to develop methods for "calendaring" the production interests of local centers rather than the inventory of specific items.

Message Display and Materials Demonstration. Media materials require display devices in order that individuals, groups and communities may peruse their contents. On-premises display employs the various *projection* equipment commonly associated with audiovisual technology, e.g., overhead, dial access, 16 mm, players, monitors. etc. Off-premises display employs the various transmission equipment commonly associated with mass communication, e.g., photoelectronic press composition, transmitters for open and closed circuit radio and television, nationwide computer relays, videophone, etc. The purpose of such devices is to provide display facilities both for the network of media centers as well as in the community and in homes.

Counseling, Retrieval, Instruction service to people whether in the dyad, group or community contexts has the highest priority of the center's mission. Up to this point in time, media centers have serviced the educational and communication elite exclusively and have made little if any attempt to take services to the people or invite them to participate in the graphics and production services. The audiovisual profession has yet to accept a serious challenge in developing a role for itself in social accountability.

Evaluation and Research. An on-going program of evaluation and the application of research findings to existing operations is imperative. This is especially true to measure the continuing concern for the new technology and evaluate hardware systems. Special problems include standardization of systems components and parts, competing objectives for use, fluctuating rate structures, etc.

Most problems encountered by a technological system receive technological solutions. To overcome this tendency in educational technology, it is essential to incorporate systems theory (*151*) and operations research (*152*) into the channel and vehicle developments. Since the ultimate performance measures of any one system are the benefits provided to the larger system, educational technology can be evaluated for its contribution to the general fields of communication and technology.

The rational view of reality is predicated on the position that a right way of doing things can be discovered. On the other hand, systems theory is a way of viewing reality that assumes that systems exist independent of any necessary human awareness. Consequently, earlier methods of curriculum design were based upon the definition of single, measurable objectives and the subsequent derivation of interim objectives. This rational approach (*12*) has worked well enough for the design of course-segments but not for the more complex design problems of curriculum systems. Systems theory and operations research can more readily cope with the

interactive variations and fluidity of the total human communication system of which formal education is but a subsystem.

According to Spaulding (*153*), systems analysis is one of the major trends in educational media. Systems analysis and operations research is the process of thinking about not only the functions of educational media and technology but also their relations to other professions and the disciplines. In order to do so it is necessary to consider the totality of message design in terms of both intrasystems and intersystems relationship. An interesting application of this approach is to be found in the concept of an innovative diffusion center (*154*) where a system was developed to accelerate educational change.

No pretense is made that the development of a systems approach will be an easy matter in library and media science. However, the problem is essentially one of identifying the functions of the media and of relating these functions to communication objectives for any given context of dyad, group, or community. The development of the control documents of purposes, policies, and procedures supplemented by flowcharting of the objectives and operations (*155*) provide for a systems approach to the deployment of media materials and equipment in library and media centers. As Crossman (*156*) has pointed out: "Those institutions that have planned carefully and thoroughly on the basis of their needs, and who have written specifications directly around those needs, invariably acquire systems more satisfactory than institutions which permit a vendor to make decisions for them."

Related to systems analysis and operations research, though not limited to it, are the concerns of administration, which include planning, organizing, staffing, and controlling. Many excellent administrative texts exist. But as far as media centers are concerned, few approaches to administration get beyond the day-to-day management problems. However, attempts have been made to apply systematic flowcharting to educational objectives and processes (*155*).

It is important to appreciate the role of media in the larger context of communications endeavor. Within the field of educational media there is a growing emphasis upon the systems approach to the analysis and solution of communication problems (*14, 157*). The systems approach includes the selection and orchestration of all components, messages, and equipment relevant to any particular communication or learning context. In terms of equipment, Simons (*158*) has characterized the essential problem:

> Programming is the process of delineating what the equipment is to accomplish. what functions it must perform. and how its use is related to the general library operation. The next step, that of drawing specifications, is concerned with detailing the technical capabilities of the equipment.

While the visibility of educational technology has risen in recent years, its impact upon libraries, especially academic libraries, is in many instances minimal. The eventual impact of the computer upon library building planning is sometimes considered inevitable, but not perhaps before the turn of the twentyfirst century. Educational media and technology, however, are often deemphasized when librarians

project trends into the future (*159,160*). This is not to be taken as stating that no planning for media has been done. Stone (*161*) has discussed library planning for communications media and technology, and he indicates the important factors to be taken into consideration:

> Educational goals of the institution and methods of instruction employed (including various levels of teaching and research to be served by undergraduate curricula laboratories, to meet graduate student or research staff needs, etc.).
>
> A definition of the library function (What is to be included and what need not be considered).
>
> The number and kinds of special facilities and equipment which must be provided (identified in terms of subjects, media forms and formats, clientele, and/or intended use).
>
> Amounts and kinds of integrated versus decentralized media use facilities (e.g., multi-media carrels versus groups listening or viewing rooms).
>
> Degrees of administrative centralization versus decentralization to be afforded by the library system (through branches; in resource centers; by using satellite library arrangements).
>
> Production and reproduction responsibilities (by whom? in what amounts? at what costs? to serve what purposes?).
>
> The degree and nature of automated services (intended to help management, to provide information storage and retrieval services, to assist instruction and research. Who is to use the automation —individuals, classes, groups, et al?).
>
> Such considerations as integrated versus separate cataloging or various forms of material; staffing patterns and budget arrangements; planned growth rates; special communications facilities; possibilities for cooperation with other agencies and institutions.
>
> Particular spaces, furnishings and equipment (needed for materials and equipment storage; maintenance and repair; office activity; individual and group study and use of library resources; previewing; conference work; displays).
>
> Lighting and ventilation (incandescent, fluorescent, ultraviolet; window drapes and blinds; plans for use of microtext; dimming controls; air-conditioning requirements; special humidity and temperature regulators; need for dark rooms).
>
> Communication control systems (centralized and/or remote; one-way or multi-way; dial access audio and/or video; computer access and display mechanisms; individual browsing facilities for use of audiovisual media; loudspeakers versus use of headphones; special communication equipment needs).
>
> Reproduction services (graphic, photographic, electronic reproduction).

The challenges as well as the possibilities for truly comprehensive media information centers are enormous whenever the profession can be weaned from logical and deductive organizational arrangements. It would appear that the trends and developments that have led to the growing abstraction of all the arts and music might yield principles and patterns that could be employed to organize media information collections. In this way the media information seeker might enter the system at any point and be taken to any other point he may wish to pursue. The pursuit might continue even to the point of abstraction (sic!) should he wish to use the iconic representations to sharpen his cognitive flexibility.

It may be that society cannot be persuaded to support such organic and developmental media and information display centers. Possibly the criticism of ex-

pense will continue to be used as an excuse to disguise the traditional print-oriented bias. Certainly the old argument will continue to be heard that it is more efficient to teach individuals to read as well as to use logically organized libraries. But this is similar to the rationale used to design school curricula that will send all secondary students to college despite the obvious terminal occupational interests of the majority. Indeed, the approach of developmental media and information display might in the long run be more effective in developing the cognitive ability of the majority of young people not now having college aspirations.

Videotapes allow the repetitive use of programs and make television as flexible as the film. Videotape cassettes can be employed in remote access systems or used directly in portable projection equipment. In the area of mass communication, it is interesting to speculate on the effect of widely available videotape cassettes as a method of distribution in contrast to simultaneous transmission via communication satellites except for the reporting of newsworthy contemporaneous happenings (176). In any event, the uses of videotapes as data gathering and observation recording devices for research and instructional purposes is bound to increase. Videotapes have already proved much more effective in recording complex behavior for measurement purposes than the traditional pencil and paper methods (177).

The film loop is a continuous loop of film, usually 8mm, available sound or silent in cartridges of 4 to 30 minutes duration. The cartridges are readily inserted in an appropriate projector and the image appears on a rear screen built into the machine. The advantage is in flexibility of use in a library carrel or anywhere there is a power outlet. In terms of content, the short film loop can be used to focus on parts of a message for which the communicator is directly responsible. This has implications for the librarian's traditional film programs. Perhaps the film of greater length should be shown in segments. Such a method would allow more frequent checks on participant reactions and perceptions. In any event, some research has shown that when a regular length film is shown supplemented by film loops from that film, the effectiveness of the communication is improved (see *Films in Libraries*).

Television programs are largely employed in the same way as films, supplemented by techniques to encourage direct observation. Deployment in the communication enterprise requires attention to such details as clear organization and simplicity of presentation as well as opportunities for practice, motivational development, and knowledge of results. Unfortunately, most evaluation procedures used on television messages are based on the verbal content rather than on the visual information. Of course this is to be expected as long as very little attention is given to the development of viewing skills; and in such instances the latent power of the medium has not been exploited for communication purposes.

In considering the various media and their technologies, some characteristics emerge which are not only interesting in themselves, but of considerable importance to a thorough understanding of the media and their use at the programmatic level. Analogic media such as pictures and sound normally require projection equipment for use. Because of this an audience is usually assembled in one place (common

meeting room) and/or at one time (e.g., prime time in many living rooms). On the other hand, an alternative method is to queue individuals in a dial-access system where the medium being accessed and its projection equipment may have to be duplicated. In this instance, that part of the analogic store being used by more than one person is duplicated as has been done for years in traditional book utilization through reserve book service.

The explosion of concern for programmed instruction in the 1950s and early 1960s continues but with less emphasis upon the so-called teaching machines. There is an increasing emphasis upon materials stored in computers and presented in a variety of display devices including booktype documents. Computer control increases the capability of adjusting content to the unique abilities of the individual. Effective programmed materials have released the librarian as well as the teacher for consultation with individuals (52). It is significant that the deployment of programming principles in communication contexts has motivated the individual towards levels of behavior more in competition with himself than against extrinsic levels of performance.

However, there is some evidence of boredom and lack of creativity when programmed materials are too finely structured (65). Controlled correct response may be desirable for children but with adults some form of explicit response enhances the use of the medium. Individuals can learn from programmed instruction in group situations where the information is presented by large screen projection. With more sophisticated and homogeneous learners it is possible to arrive at an optimum pacing for group presentations.

The advantages of the computer as well as the videotape indicates the enhanced value of media materials and technology in the communications enterprise. For example, the computer can manage not only learning sequences, but also schedule individuals for various messages on the basis of a continuous monitoring of each person's performance as well as provide readouts and statistical analyses of individual development. Project Intrex (162) has raised exciting possibilities for automated but continuous and completely individualized library service based on information space under computer control.

There are impediments to self-service when the media are projected, transmitted, or dial-accessed. The patron may feel at a disadvantage when he cannot browse directly and may find difficulty in running the machinery. It is a skill that more people are learning to acquire. However, much media service is provided from a closed collection by clerks who project materials for patrons. Conditions such as these are rapidly beginning to change as the range of materials which are available for self-threading machines increases and as the costs come down. As is the case with microfilm, assistance need only be given to those who require it.

In discussing communications technology, many misgivings appear in librarians which may be verbalized but often remain inchoate as to any fundamental reason for disliking educational technology. Jackson (163), in discussing the teacher and the machine, considers the central issue of control to be fundamental. Librarians as well as others welcome trouble-free mechanization when they can control the on—

off switch in their homes. But an irrational fear seems to develop as soon as they step into the library media center where the communications technology must of necessity be controlled by technical specialists. Perhaps this is the reason why librarians are quicker to mechanize their homes than their libraries.

Television is widely used for communication purposes but the range and depth of its effectiveness is difficult to control or to evaluate. Intercommunication between participant and communicator at remote locations has not yet provided a desirable two-way level of communication. Underlying the problem is the fact that videotapes as well as films are based on linear models of communication. Multimedia presentations, however, despite their limitations, are based on a cybernetic model of communication under communicator control with a "live" audience. An on-line access system to films and videotapes was demonstrated over a 3-year period in four Ottawa (Canada) public schools (164). Connected by coaxial cable to a central distribution center, each classroom was equipped with a monitor and a telephone. In the case of on-demand bookings, the program could be transmitted to the classroom in less than 2 minutes.

In moving beyond audio or video or film retrieval into a random access, multimedia information terminal, the system becomes somewhat more complex (165). Each form of the media, at present, requires a different machine for projection. Complex systems can be worked out however, but they are cumbersome and resemble the old horseless carriages which were really an eclectic assemblage of mechanical devices that happened to work. More successful developments in this area (e.g., random access) await the transformation of all types of information into digital or analogic code which can be handled by a computer.

In a dial-access information retrieval system it is necessary to raise and answer questions as to the kind, amount, and structure of the information and for how many students. Essentially dial-access is a group information distribution system resembling in some aspects the sciptorium of a medieval monastery where several receivers listen or view one program. A somewhat more sophisticated system permits the receiver to interrupt the presentation. But when it comes to a situation where the receiver is to have complete control to stop and/or replay any portion of the medium, then it appears to be more feasible to have each student issued a cassette tape recorder (166).

The dial-access or remote-access information system, as it is more generally called, grew out of the language laboratory introduced in the early 1950s. Initially confined to language learning materials, remote access systems now include a wide variety of subjects. These systems include both audio and video materials and they have been moved into librarylike facilities where carrels are wired for a variety of signals. Such systems are sometimes referred to inappropriately as random access, which they are not. Crossman observes, "the problems of accessibility, of which the multitrack problem is only one example, have led to at least three different programming arrangements: serial access, parallel access and scheduled access" (156).

Remote-access equipment can play back recorded materials upon demand. "Dial-access" is a fashionable component of many media centers. Most often the

equipment retrieves information from aural materials although it is quite within the capabilities of the technology to retrieve information stored on slides, aperture cards, films, or videotapes. The remote-access system is an extension of the traditional reserve book room in most libraries. However, it overcomes some of the limitations of that traditional service by encouraging individuals to browse widely via dial-access in a range of content and in a wide repertoire of materials.

Related to remote dial access, but not limited to it, is the subject of individualized instruction in order to offset the socially bleak study carrel, equipped with teaching machines, cathode-ray display tube, tape recorder, and other kinds of gadgetry. This kind of study carrel is modeled after a pigeon conditioning box (*167*) and is well designed for members of a species having very low social needs. Individualized instruction is designed for and paced by the individual and is an aspect of self-actualizing and continuous education. In an attempt to clarify this relationship, Edling (*168*) has classified individualized instruction into four major types which could help librarians in their own instructional programs Table 2 (*52*).

TABLE 2

Classification of Individualized Instruction

		Objectives	
		School determined	Learner selected
Media	System determined	Type A Individually diagnosed and prescribed	Type C Personalized
	Learner determined	Type B Self-directed	Type D Independent study

The technological advances in media communications and the new arrangements necessary to accommodate them require of the librarian new roles and insights. The preparation needed by recruits (*36*) and the competencies of the media communicator (*37*) have been identified and their role in professional training considered (*35*). There are two ways in which the alert professional may continue his education in media materials and equipment. The first is to organize his thinking and develop agency policies about the function of media in the communication processes. The other is to develop agency procedures that will test the effectiveness of the newer technology in the context of library service to the individual, group, and the community.

Library service to the community exhibits all the characteristics of a coordinating structure, a function that is so desperately needed in the disordered community endeavors of our time. By means of a continuous community study, which includes the identification of scarcely verbalized needs and interests as well as the community resources, the library lays the basis for discharging its responsibility as a community clearinghouse. The library is in a better position than any other agency or organization to serve such a function and to program in the areas of controversial

issues. In addition, the library more readily than any other agency can organize the groups that can promote evaluation and research in terms of community goals and objectives.

Library service to the community has traditionally been the broadest based of all agencies serving the community. There is no individual or group that does not have a claim to its informational and educational services; it is open to adults without regard to race, creed, or color. Theoretically, its knowledge base is all encompassing; there is no boundary on the knowledge to which it has access and which it diffuses in order to bring about social change. The library collection provides the basis for an interface with the community. However, the library collection has always been considered to include print materials, and where illustrations do occur these are almost exclusively print illustrations.

Various media exist as technological extensions of the library service program and can be used to so saturate the awareness of the community as will make it difficult for citizens to avoid thinking about problems and concerns. In addition, electronic developments are currently available that can be used to bring library service to people where they are located and not require them to travel to where the library happens to be situated. Such developments as the videophone and cablevision, when fully implemented, will probably make obsolete the branch library service as we know it today and extend the present limited availability of service to a 24-hour, 7-day a week basis.

Significant changes in the character of the population as to education, mobility, and sophistication in the use of information services will increase the librarians' defensiveness about scarcely warranted and almost totally uncoordinated types of library service. More people will expect to receive service at point of contact regardless of whether the service outlet may be administered by a public or any one of the special library agencies. Cooperative activity among librarians of various types will of necessity increase as the burden of overlap, conflict of interest, and duplication of materials and services become increasingly onerous.

Another serious problem which may underlie those already mentioned is the absence of almost any planning, especially of a long-range nature, that would take advantage of the various media and other electronic developments on the horizon. Stone (33) has made it obvious that the library function needs to be redefined. Technological developments already exist, even without the videophone and cablevision, to bring library service to people where they are and not where the library happens to be located. All that is lacking is the will to use available resources (1). Certainly capital investment in the new technology would not seem to be beyond the realm of possibility if public librarians, at least, were seriously to reexamine expensive present services such as those to children and youth and the branch library system which, with the videophone and cablevision, have already become obsolete.

With greater community involvement, librarians will begin to give deeper attention to the significant issue of freedom of access to all media of communication, especially audio, visual, and referent stimuli wherein information surprises may be sought. Community involvement requires considerable motivation on the part of

many people, and this is in no way better provided for than in programming in areas where the surprise value of information is high. Commitment to the identification of referent stimuli which may be audiovisualized will open up avenues of growth for librarians but dimly perceived in the traditional and logically organized collections of print materials. Freedom of assembly and the audiovisualization of sociodramas will become a way of life that will make it possible for more people in the community to become involved in decision making processes and release the energies of the power structure for more creative and cooperative endeavors.

For better or worse, the library profession long ago gave up professional responsibility for archival, museum, and gallery concerns; and the audiovisual profession is almost exclusively concerned about media in the instructional enterprise whether this be in schools, government, business, or industry. The audiovisual profession is rarely if ever concerned about the use of media for the broadly based communications objectives and the widespread needs for information surprises of modern urban society. For example, the concept and methods of community development seem never to have been considered by the audiovisual profession.

In giving up responsibility for the museum, whether art or natural, and concert hall, the library profession has turned its back upon the work of the majority of the communicators of our time. And what is even more tragic is the fact that the audiovisual profession is following behind library leadership. If audiovisual personnel sometime seem to quarrel with the librarian, it is only because of his lack of complete enthusiasm for the gadegetry of media design and not because of any disagreement with the primacy of cognitive structure and the logical concept.

Overview and Summary

Many libraries today have opened their doors to educational media and technology. The Enoch Pratt Free Library of Baltimore and the New York Public Library have outstanding film collections. The Carnegie Library of Pittsburgh has a collection of approximately 64,000 slides. Some public libraries have installed teaching machines. Regional film centers have been developed around the country, and special audiovisual departments have been initiated. Publications devoted to the newer media have appeared. Technology has provided simple, easy-to-use equipment at reasonable prices. Yet a search of the literature reveals an air of dissatisfaction and discontent with every facet of the audiovisual field. For the most part, the potential of the newer media for the dissemination of information has not been realized.

The basic obstacle appears to be somewhat nebulous in nature and may require an upheaval in the librarian's orientation to his profession. According to one leader (169), the printed record in the future may be employed as only one of the several forms of the permanent knowledge store. To date there has been a general reluctance on the part of librarians to accept nonprint materials as a major method of information storage and dissemination. Some of the blame for the nonaggressive

attitude librarians have assumed toward the inclusion of audiovisual materials in their collections may be the result of the traditional training they have received. The image they hold of themselves still appears to be that of collectors and dispensers of books, not information. Little groundwork has been laid by some schools of librarianship to instruct their students in the basics of communication theory. As a result, librarians are ill-prepared to effectively utilize all the information tools they have at their disposal for communicative objectives.

Nonstandardization, incompatability, and advancing technology have all conspired to retard widespread acceptance of audiovisual materials in the library. Lack of selection tools adequate to do the job and a breakdown in bibliographic control of nonprint materials have further contributed to the cautious approach that librarians have taken to the newer media. Serious as these obstacles are, they are not insurmountable. They can be overcome without a major upset of the library structure.

The question of compatability and standarization of equipment is a serious and very real problem. It has been recognized by the American Library Association which has established a Library Technology Project to investigate the standarization of equipment and supplies, the development of new products, the testing of existing products, and the dissemination of results (129). While these library technology reports are extremely beneficial in the selection and purchase of equipment, they have done little to overcome the confusion that results from technological improvements and the new inventions which make a piece of equipment obsolete almost before the final bill is paid.

Forsdale (170) has suggested that the solution to incompatability, at least as far as film and its related equipment are concerned, lies with the manufacturers who have sufficient resources to point the direction in which others may follow. Forsdale pins his hopes on the commercial manufacturers and not on strong leadership within the library profession. On the other hand, Cuadra (169) maintains that:

> The need for library improvement is clear, and so is the potential contribution of advanced technology. Aggressive, concerted and timely action should be taken now to effect a nationwide improvement in our libraries.

Although communication media play a secondary role in most libraries, there is no irrevocably built-in animosity towards media materials as the title of one workshop indicates, *Allies of Books* (171). As the liaison continues to increase between librarians and media specialists, patrons may yet have available a combination of both audiovisual and print media in experimental situations wherein communication can occur.

The fact that librarians may not be committed to audiovisual services cannot be laid to a fear of technology. They are the first to employ machines in their own homes. Rather it appears that the present library situation may be a product of short-sighted leadership in the past. For example, Wheeler and Goldhor (172) admonish public libraries not to consider handling phonograph records and films (the only types of audiovisual materials recognized) unless "the library has the funds to do a good job of handling books and other print."

The library approach to educational media and technology is most highly developed in libraries which serve school systems, extended secondary, and colleges. Unfortunately, many public librarians agree with Peters (*173*) that, "the public libraries as such are not likely to develop into instructional materials centers; this is the responsibility of school libraries where specialized personnel can be employed to ensure the proper instructional use of all materials." And of libraries that serve universities, Harcleroad (*41*) maintains that:

> The most promising organizational developments for using learning resources are taking place outside the library in large research universities and in a new division of educational services or learning resources which includes the library in smaller, instructionally-oriented colleges and community colleges.

However, if all librarians are instruments of continuing education as indicated by the American Library Association, and if they are educators and librarians as their written purposes, policies, and procedures suggest, then it is to the point to consider how audiovisual materials could be deployed to meet the professional objectives that have been promulgated for several years:

> Audiovisual materials are a useful and desirable means of promoting continued education. They are basic, independent resources in many subject areas and for many activities, rather than supplementary as they are generally considered. The most popular forms for libraries at the present time are the conventional 16 mm. film and 33⅓ rpm recordings. Library collections should be planned to include other speeds and other media, such as video tape, as they become available and prove appropriate (*174*).

The nature of nonbook materials does not preclude their use in any type of library situation. The obstacles come from other directions. Local production or the directing of the production of these materials is "virgin territory and it appears the field is wide open for enterprising colonization and probably will be occupied by those who get there first with the strongest claim to title, that is, those who are prepared to render the required service" (*42*). Hooper (*141*) makes the point that the "design of good instructional materials is inhibited by the absence of a viable theory of learning." McIntyre (*42*) maintains that additional professional education is needed by librarians:

> One can say that a librarian, because the library is so central to the educational process, should be prepared to function as an educator in the production, most broadly speaking, of materials for the non-print technologies. But he is not prepared to do so at the present. Conversely, psychologists, audio-visualists, and instructional technologists are usually inadequate in librarianship, and are, therefore, not properly prepared for leadership roles.

Educational media and technology have the potential to revolutionize library service even though many inservice librarians subscribe, still exclusively, to the power of the written word. At least, this is the inference from their lack of com-

mitment to a wide range of media materials in library collections, or to the emergent professional thinking which would tend to place an equal, if not greater emphasis upon audiovisual materials than the print media. Apparently a single linear reading of a passage in a book is considered sufficient to establish understanding, almost as if meaning could leap out from the printed page while the eyes continue to negotiate discrete word symbols sequentially without benefit of iconic symbol.

Reading is so verbal, and logically related to a traditional or Aristotelian concept of meaning. Certainly communication by reading is in marked contrast to a perceptual theory where meaning is expected to occur as a result of the interaction among all the senses of the recipient stimulated by viewing, listening, and reading experiences. Such a transactional theory of meaning is currently being developed by communications scientists and media specialists (see *Communication Science*).

Of course, there is another concept of meaning wedged in, halfway between the other two, which stems from behavioristic psychology, and is often referred to as S-R (stimulus–response)—an explanation of learning frequently acceptable to information science and to an extent to adult educators. Here the analogy is to the cybernetic prototype, the servomechanism, where if one variable is increased there is a direct response in a second dependent variable until feedback cuts off pressure in the first, and homeostasis or equilibrium is reached.

There is nothing particularly wrong with the S-R explanation of learning, nor for that matter with the single reading or logical theory except that neither accounts for the full complexity of the human individual. The tragedy of the situation lies in the fact that librarians subscribe to the autonomy and dignity of the individual on the one hand while, on the other, they confront him with a service program based on an oversimplified and now more or less archaic theory of communication and meaning. Greater involvement with educational media and technology will in the end force upon librarians a communications role and function.

The limitations imposed by this traditional approach to meaning may be found in the prevalence of libraries that are simply reading stations, or remain distribution points for reading materials. If listening and viewing are encouraged at all, which is the exception, audio and visual materials are considered as strictly supplementary to the book and certainly not vice versa. In addition, in those instances where mechanization and automation are being considered, the discussions heard are frequently limited to the specific merits of particular gadgets. Considerations of use patterns scarcely ever occur within the framework of systems analysis of the library and information needs of the individual, the group, or the community.

Where services exist, such as reference and "readers advisory," these continue to depend upon the resources of the traditional book-oriented library. Where the library has become a switching center for materials access over a broad geographic area there is little evidence that the available collections should include *all* types of materials and should serve as interrogation centers for information transfer within the nation rather than limiting any search being negotiated to a collection of materials preparation centers. Librarians should promote a wide utilization of all kinds of materials in the community informational and educational enterprise.

Educational media and technology may have the potential to revolutionize library science, but there is no clear evidence that librarianship wants to expose the individual patron to an environment totally programmed for learning. The profession has always taken a stand on the individual's responsibility for his own self-learning unmediated by teacher or social do-gooder. Of course, there is a philosophical question at stake in the minds of many librarians. However, this should not negate the possibility of placing some part of the library collection and services under programmed control with learning objectives built into instructional multimedia units. In fact, such components might serve as developmental guides to the unfocused masses as well as the focused library patron in some instances.

However, while considerable research exists on motivating people to learn, very little research activity has been applied to the use of media in motivating people to participate, or "public relations" as librarians call it. This is a problem of pressing concern to the entire field of adult and continuing education. In the absence of almost any research, only intuitive guesses can be hazarded from the practice and methods of art and other museum work where multimedia exhibits are arranged around themes taken from the pressing issues of our time. If art and museum methods could be linked with audiovisual programming and in turn with the complete individualization of learning pace and responsibility, good library service might result from a revitalized and socially relevant profession.

It is not the purpose here to speculate whether media science is one or two professions, that of audiovisual and information science. In fact, the approach taken has been that of a symbiotic relationship. Each profession has its peculiar strengths and weaknesses. Audiovisual and library science complement one another. The weakness of library science has been in the absence of any movement towards communication theory which would support its role as a change agent in the lives of people. The audiovisual profession has remedied this lack in part by accepting learning theory and educational methods. However, more work is needed in communications theory and research to support the widespread applications of media science in a great variety of communicative contexts.

The use of communications media makes it possible to transmit ever greater amounts of information. If the transmission of information is more important than the facilitation of communication, as some in the profession appear to believe, this particular power of the media seriously retards library service as an educational force. Communications technology can be made to be innovative and facilitate the development of an everchanging learning environment. Transmission, just because it can be done efficiently, can overload the patron with uninterpreted data.

Librarians, helping to prepare individuals for a world which will be different from what we now know, must provide an environment that communicates not information, but the ability to learn. The use of a variety of systematic approaches to communication, technology being only the vehicle of transmission most likely to have the desired effect, should be the goal of librarians. The production of media should be suited to the educational needs of individual personalities as well as multidimensional cognitive structures. In other words, the charge given producers

of media, commercially or locally produced, is to design the materials for the individual, not shape the patron to suit the media.

Developments in educational media and technology are in a phase of rapid change as the field adjusts to imperatives. Of fundamental significance is the opportunity open to it to exert leadership in the emerging profession of educational communications, which is beginning to replace the traditional instructional enterprise with its heavy emphasis on learning in the cognitive domain.

Shifting its emphasis from one of processing students for extrinsic goal determined behavior, educational media and technology appears to be on the threshold of more appropriately professional behavior. In order to more widely produce situations within which communication can occur, increasing attention will be given to environmental change and control—a cybernetic approach to the contexts within which continuous individual, group, or community self-development can occur.

As yet, only the instructional field has begun to turn more often to educational media and technology for a sense of direction. Eventually the highly structured field of library and information science will be infused with its communicative dynacism and hopefully will be transformed into communicative professions. At the moment, librarians and information specialists look with disdain upon the lack of structure in mediagraphic control in both its descriptive and content specifications. There are, however, some encouraging signs that the joint efforts of both fields will produce significant results.

But the interesting fact and often overlooked but significant difference between the two fields is that communications media is not determined by its technology anywhere near the extent to which the field of library and information science is. In fact, the library profession appears from the historical record to have deliberately excluded any concerns that tended to interfere with its central mission of bibliographic and network control. Unfortunately, the concerns sacrificed have been those which have possessed communicative potential: teaching, museum work, adult education, reading, audiovisuals, and possibly information science.

There appears to be a more symbiotic relationship between library and information science than between either of these with communications, only because information science has been more concerned with its technology than with the development of its communicative role. Fortunately, the communications media profession has so far maintained its communicative perspective. It welcomes those librarians and information specialists who want to join its ranks and put its mediagraphic and technological house in order. But even that lack does not deflect the media profession from its central endeavor: communication. Perhaps librarians will in time develop a similar perspective.

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PATRICK R. PENLAND

EDUCATIONAL MEDIA COUNCIL (EMC)

Formally incorporated on July 12, 1960, as an "organization of organizations," the Educational Media Council, Inc. (EMC) has served its members for a decade as a forum for discussion of basic professional issues, a "current-awareness" information service, and as a managing agent for special projects — projects which, for one reason or another (e.g., size and possible rivalries), might best be handled by the council as such. EMC offices are located at 1346 Connecticut Avenue, N.W., Washington, D.C. 20036. Operating with an annual budget which ranges from $30,000 to more than $300,000, EMC employs an executive director, Miss Harriet Lundgaard, clerical aides, and special project personnel as needed. The seventeen professional and trade organizations interested in educational uses of modern communications media which are presently members of EMC are:

American Library Association
American Society for Training and Development
Association for Educational Communications and Technology
Association for Supervision and Curriculum Development
Association of American Publishers
Educational Film Library Association
Electronic Industries Association
Magazine Publishers Association
National Association of Educational Broadcasters
National Audio-Visual Association
National Educational Television
National Instructional Television Center
National Society for Programmed Instruction
National University Extension Association
Society of Motion Picture and Television Engineers
University Film Association

In July 1970 the EMC officers were:

President: Robert de Kieffer (Director, Bureau of Audiovisual Instruction, University of Colorado, Boulder, Colorado)

Vice-President: Robert Filip (Director of Studies, Institute for Educational Development, El Segundo, California)

Secretary: Howard B. Hitchens, Jr. (Executive Director, Association for Educational Communications and Technology, Washington, D.C.)

Treasurer: Virginia Matthews (Director of Reading Development Services, Association of American Publishers, New York, New York)

To date, the chief work of EMC has been supported by contracts awarded by the U.S. Office of Education and by token contributions received in the form of dues (originally $100 per member organization). Two or three meetings are held annually for transaction of regular EMC business by the official representatives, usually the president and the chief executive officer (or their alternates) of each organization belonging to EMC. Business meetings are occasionally scheduled back-to-back with larger invitational conferences held for in-depth review of selected subjects having wide interest among media specialists [e.g., copyright legislation and the future of instructional television (ITV)].

Among the more significant projects undertaken by EMC have been development of the *Educational Media Index* in 1963 (first major cross-media guide to instructional resources covering nonprint materials); annual publication of an *EMC Directory of Summer Session Courses on Educational Media;* drafting of five "national guideline" studies covering *Educational Media in Transition;* and a study on media in vocational education and on programs for the culturally disadvantaged. An EMC newsletter is issued several times each year for EMC member representatives.

Looking ahead, assisted by results obtained from a 2-year "self-study" program completed in 1969–1970, EMC officers and staff anticipate the continuation of those advisory and service functions already established, sponsorship of some new planning activities designed to improve relationships between industry and education, and intensification of publishing efforts. Two publications are *Media Milestones in Teacher Education* (1970), by Robert and Melissa de Kieffer, and *New Relationships in ITV* (1968) (papers issued to report a recent EMC conference).

Although plagued from the start by an opportunism in project work made necessary by the need simply to obtain sufficient dollars to hold meetings and offer basic services, EMC has managed to eke out a meager existence for more than 10 years by completing special tasks for government. Today, the need for the organization and its services is believed by constituents to be greater than ever. Council functions as a professional forum and arbiter are considered especially important in light of the current uncertainties regarding the future of education in the United States, uncertainties caused in significant measure by recent changes in the personalities as well as basic program priorities within the Executive Branch of the Federal Government. Also, according to EMC staff, the major concerns of media specialists have remained concerns, and EMC energies and resources must continue to focus upon ever-growing demands for improved professional education (both in-service and pre-service); the need for more cross-communication among agencies and associations working in all fields of educational communication and technology; and upon opportunities now opening up (stimulated at least in part by modern computer capabilities) for application of newer methods and media to such special problems of instruction as may be encountered in working with the physically handicapped, the economically deprived, et al. There is also a continuing requirement for increasing public awareness and support of educational services which will utilize more effectively than in the past all types of learning and information resources.

As for long-range objectives, it might be noted that several precursors of EMC

including the Audiovisual Commission on Public Information (launched informally in 1956) and various joint committees formed to assist cooperative planning of activities by associations (e.g., that composed of representatives of the Department of Audiovisual Instruction-NEA, the National Educational Television and Radio Center, and the National Association of Educational Broadcasters, which met several times in 1959) demonstrated clearly the worth of a councillike type of organization which could bring together for mutual benefit all interested professional and trade organizations serving the educational media fields. The purposes and functions proposed originally and adopted in 1960 by the EMC have been judged equally valid as EMC goals for the 1970s. Broadened somewhat by interpretation through the years, these goals may now be said to read as follows:

1. To serve as a sounding-board for the participating organizations and for the U.S. Office of Education (and other governmental agencies) in connection with new ideas and developments in the media fields. The Council might serve . . . as a professional advisory group to meet and discuss plans . . .
2. To serve as a clearing-house for exchange of information among the participating organizations and to clear up conflicts and misunderstandings which might arise when information is not available or has not been distributed to all . . .
3. To provide on the professional level a forum on educational media problems; to analyse, discuss, and evaluate new ideas and developments . . .
4. To serve a project-managerial function in cases where certain projects and activities might appropriately go beyond the scope or approved intentions of any single organization or even beyond those of a group of organizations represented on the Council. . . . Possible projects, for example, might include studies of the recruitment and training of media specialists, the nature and function of new instructional devices and their impact upon various media fields, problems arising out of future technical advances, etc. . . .

Regarding achievement of these and other related long-range EMC goals, it is just to note that EMC has not become and is not likely ever to become stronger than its weakest member wishes, a fact which still accounts for operational difficulties. Also, a division of interest among some members regarding the degree to which EMC should be "action" vs. "discussion" oriented is likely in the future (as in the past) to create conflict in reaching decisions about EMC projects.

Be this as it may, the EMC's aims can probably be weighed best in relationship to the fields served in terms of their relevance and actual EMC accomplishments. The years from 1958 to 1965 were notable for crucial self-studies in education and for legislative redefinition of both federal and state responsibilities for proving basic support as well as leadership in educational innovation. EMC meetings and projects did reflect these interests.

The last 5 years have been marked by gross changes in the emphasis given technology as such by all concerned with education in America. (Indeed, four members of EMC have changed their structure, goals, and/or names within the past 3 years to reflect broadened interests, partly for this reason.) The last 5 years have also been marked by establishment of more regional compacts among educational institutions (frequently located across state lines) for the sharing of costs and scarce

resources. And, in particular, there has been a rapid development by educators of computer network services which soon will span oceans as well as continents via satellite relay systems. Another recent innovation can be seen in the growing number of experimental partnerships established for direct classroom conduct of teaching and learning sessions by private and public organizations working together; for example, for teaching reading in San Francisco. A special feature of such ventures tends to be extensive use of modern instructional technology (i.e., TV, computers, and films). EMC conferences, studies, and reports have also reflected these developments.

In the future, serving both in its established roles as a forum, clearinghouse, and project manager, and in a new, hoped-for position of "key" advisor to interested federal agencies, business, industry, and educational institutions, the EMC may be expected to plan its work in terms both of trends now becoming evident as well as in light of specific objectives such as those set forth in a report issued in the spring of 1970 by the Commission on Instructional Technology. Among its recommendations the EMC members have already singled out for special attention those that aim at achieving closer alliance and cooperation between professional educators and those who also serve education through business and industry — a choice which, in light of its organizational structure and past functions, would appear uniquely appropriate.

C. WALTER STONE

EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

The Educational Resources Information Center (ERIC) is a nationwide information network for the dissemination of educational information. It is designed to accomplish three main objectives: (1) Guarantee ready access to the world's English-language literature relevant to education; (2) Generate new information products by reviewing, summarizing, and interpreting current information products on priority topics. Products include bibliographies, state-of-knowledge papers, critical reviews, and interpretive summaries; and (3) Infuse information about educational developments, research findings, and outcomes of exemplary programs into educational planning and operations.

The documentation objective has two-main thrusts. Educators should be able to turn to one comprehensive source to identify current, significant education documents on any topic or interest. Then they should be able to obtain desired reports quickly, again from one source, regardless of where the report originated.

ERIC takes these steps to achieve ready local access to educational literature including the following:

(1) Comprehensive, systematic acquisition of the separate reports from the thousands of sources in the United States and from selected English-language sources overseas, (2) Selection of only current, significant reports for dissemination. Less than one-third of reports now acquired are disseminated through the ERIC system; (3) Preparation of abstracts of the reports, so that users can decide if they want to obtain the reports, and assignment of key words and descriptors to these reports so that users can identify specific ones from the thousands disseminated annually by ERIC; (4) Informing users about new reports, by the abstracts and indexes to them, through a monthly abstract journal called *Research in Education* (RIE). About one thousand reports on many educational topics are cited in each issue of RIE; (5) Reproducing and delivering reports cited in RIE through the ERIC Document Reproduction Service (EDRS) so that users can obtain copies of any documents they want; (6) Supporting a guide to periodical literature relevant to education. This periodical is called the *Current Index to Journals in Education* (CIJE).

By carrying out its documentation function, ERIC can assure ready access to original, significant documents in education. Researchers, development specialists, and planners, for example, often require the full original documents. They are not satisfied with anything else. In contrast, decision makers, supervisory staff, and practitioners want, need and often can use only summarized and interpreted information. A school superintendent, for example, cannot use 300 reports on effectiveness of ETV. Instead, he will typically read a 30-page summary and interpretation of the generalizations based on the careful analysis of the 300 reports. So, while the knowledge base of ERIC expands monthly through the increment of screened, current reports, a parallel effort is maintained to reduce basic information to forms more useful to practitioners and decision makers through the generation and dissemination of review and interpretative summary papers.

This objective is accomplished by the independent efforts of the ERIC clearinghouses (described later) and through cooperative efforts with professional organizations and educational agencies. A guiding principle behind all planning and program formulation has been that the ERIC program should not supplant any existing information services, rather that it should help strengthen the communication efforts of professional organizations, state and local agencies, businesses, and those of other educational groups.

Several routes could have been pursued for the accomplishment of the objectives set for ERIC. One could have followed the model of other major federal information agencies, such as those in science and technology, defense, space, medicine, and atomic energy. These programs are based on the operation of a centralized information facility, sometimes staffed and manned by federal employees.

The centralized model has many attractive features, including the advantages of having all staff under one roof with consequent managerial efficiency, savings in operational costs, and fast processing of documents. This model, though, had certain shortcomings when applied to development of an educational information system. In the American education schema the professional organizations and

interest groups are decentralized and proliferated. These characteristics suggested that information services might well be organized around major content areas, problems, or administrative foci of contemporary American education. Each extreme model, a centralized information processing and disseminating facility or a large number of uncoordinated, subject- or problem-based information efforts, had several attractions and limitations.

The appeal of the centralized effort was its efficiency, lower cost, faster start-up, ease of thesaural and indexing development, and greater opportunities for tighter management control. On the other hand, there are liabilities with the centralized approach. The first of these concerns document acquisition. Aside from the required submission of reports to the U.S. Office of Education at the completion of projects, the educational report literature remained scattered. Interpersonal, discipline-based, content focused, or even problem-centered contacts certainly would aid in developing and maintaining a comprehensive report acquisition network for these materials. Given the decentralized nature of American education, a central facility probably would be less effective than the decentralized approach for acquiring documents. Next, a very practical question: How could the U.S. Office of Education or any single contractor expect to hire the number and variety of highly qualified and well-informed specialists on the many topics needed for the operation of a centralized facility and for the generation of information analysis products? Also, how could the system be assured of benefiting from the judgments of persons in leadership positions in their specialized fields? Would persons who had been active in teaching, research, writing and consulting roles progressively lose touch with current developments in their fields if they were to become full-time information specialists working on one locale?

There was also the problem of giving federal employees, or those of a single contractor, the responsibility for separating the reports to be discarded from those to be disseminated through a national federally supported system. Finally, one questioned whether a centralized processing facility without intimate ties to educational agencies would inhibit rather than optimize the movement of information through already existing communication channels of professional organizations and educational agencies.

Consideration of these and related issues argued for a decentralized system. But the decentralized route, attractive as it was, also had its drawbacks. A completely decentralized system, with each subject-based effort operating with complete autonomy, was out of the question. Costs would be prohibitive, quality would vary and users would be frustrated and forced to pay an exorbitant cost in time and money, if they had to maintain contact with each operation to find materials that straddle several topics, as most do in education.

A creative synthesis of the two approaches was attempted. This synthesis, is highly compatible with the decentralized American educational system. Consequently, ERIC was built upon the operation of decentralized clearinghouses. Each clearinghouse focuses on a major educational field or topic. The clearinghouses share in the acquisition of documents based upon their own prominent positions in

education's many invisible colleges. The clearinghouses are solely responsible for the selection of reports for national dissemination and for the operation of an independent information analysis program. Each clearinghouse also is encouraged to develop a dissemination effort with professional and other private organizations. But each clearinghouse participates in a general system in fulfilling its documentation function.

In the ERIC complex the following division of labor is attempted: Functions best conduced by professional staff in their academic and organizational settings in behalf of their colleagues are reserved to the clearinghouses and functions are centralized to which machine processes can be applied, where economics of scale become important, and where user requirements indicate centralization. As a result, from a functioning point of view, the ERIC system consists of six interrelated components: (1) a headquarters staff in the U.S. Office of Education, National Center for Educational Communication; (2) a network of specialized clearinghouses located at various universities and professional organizations; (3) a contractor who operates the ERIC Facility to provide centralized computer and technical services; (4) the ERIC Document Reproduction Service (EDRS) also operated under contract which sells full text of ERIC reports in microfiche or hard copy; (5) the U.S. Government Printing Office, distributor of *Research in Education* and other ERIC publications; and (6) Crowell, Collier, and Macmillan Information Corporation publisher of *Current Index to Journals in Education* and other ERIC products. A flowchart showing the major steps taken to disseminate reports is shown in Figure I.

The development of ERIC has progressed through three phases that coincide with the major objectives set for the program. Before information can be applied, it must be acquired and organized. Consequently, acquisition and processing of documents received top priority in the first year of the program. As acquisition networks were established and processing routinized increased emphasis was given to the information analysis functions. During the past year the third and mature phase of the ERIC program emerged—that of linking with educational organizations and assisting them in the application of information to educational decision-making and program development. Some details related to each of these follow.

The ERIC system was begun in 1965 with the production and dissemination of the *Catalog of Selected Documents on the Disadvantaged*. The first EDRS contract was awarded to the Bell and Howell Company in November, 1965. Development of the ERIC program began in earnest with the establishment of the first 11 clearinghouses between March and June, 1966. North American Rockwell was awarded the initial contract for the ERIC facility in June, 1966. The first issue of *Research in Education,* ERIC's monthly announcement bulletin, was produced four months later, in November.

During the first year the major problems that had to be faced and solved immediately included the hiring and training of information specialists at the clearinghouses, staffing Central ERIC, developing acquisition networks, working out procedures for abstracting, developing and managing a controlled vocabulary for
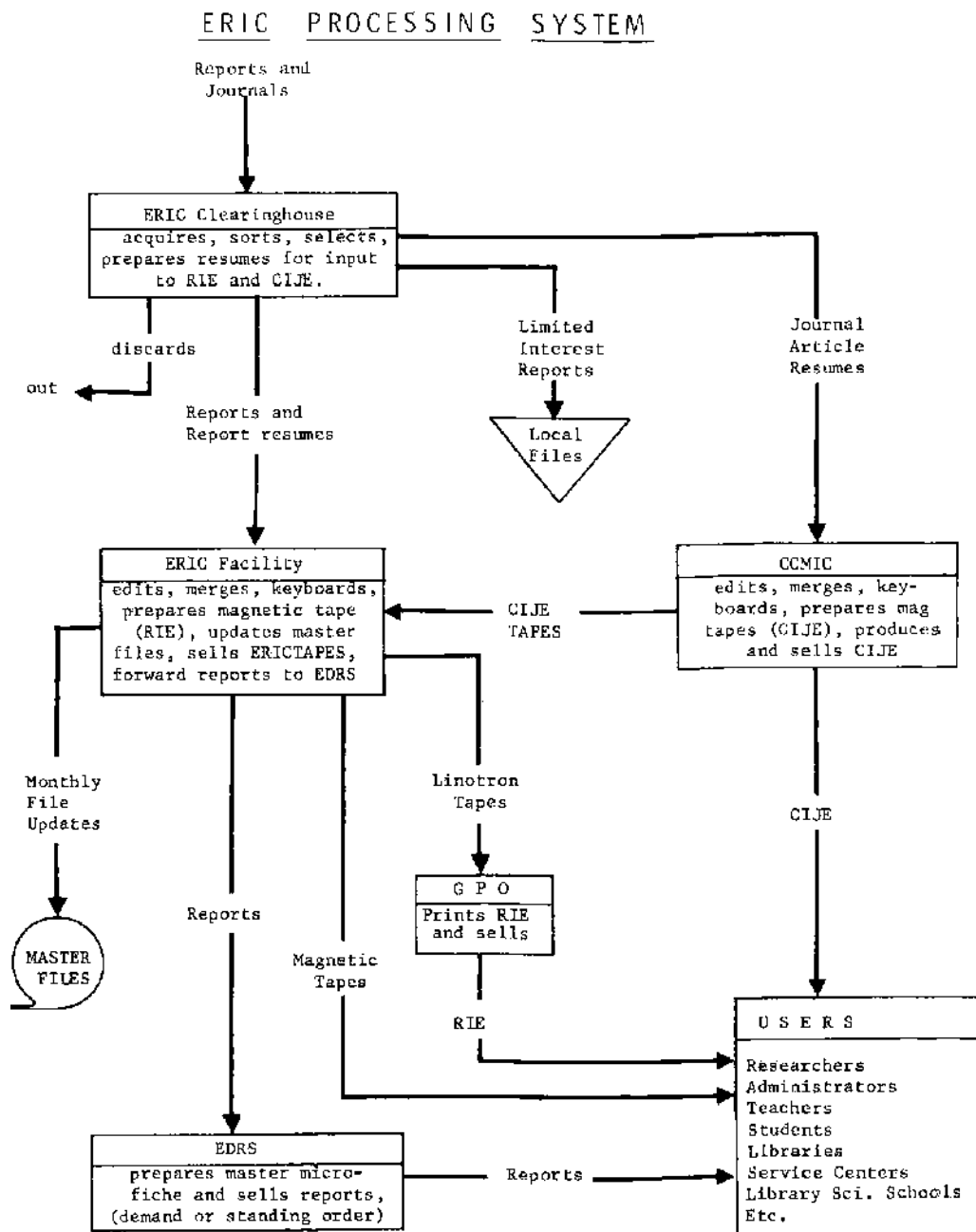
ERIC PROCESSING SYSTEM

Reports and
Journals

ERIC Clearinghouse
acquires, sorts, selects,
prepares resumes for input
to RIE and CIJE.

discards

out

Reports and
Report resumes

Limited
Interest
Reports

Journal
Article
Resumes

Local
Files

ERIC Facility
edits, merges, keyboards,
prepares magnetic tape
(RIE), updates master
files, sells ERICTAPES,
forward reports to EDRS

CIJE
TAPES

CCMIC
edits, merges, key-
boards, prepares mag
tapes (CIJE), produces
and sells CIJE

Monthly
File
Updates

Reports

Linotron
Tapes

CIJE

MASTER
FILES

Magnetic
Tapes

G P O
Prints RIE
and sells

RIE

U S E R S

Researchers
Administrators
Teachers
Students
Libraries
Service Centers
Library Sci. Schools
Etc.

EDRS
prepares master micro-
fiche and sells reports,
(demand or standing order)

Reports

FIGURE 1. *ERIC input system.*

indexing documents, and shaking down the operational functions and interor-
ganizational relationships of the program. Monthly ERIC production schedules
depended upon the close cooperation of staffs at the clearinghouses with the two
profit-making contractors and personnel in Central ERIC.

Since then, a steady flow of ERIC products and services has been maintained,
even though additional clearinghouses have been added to the system (and some

TABLE 1

Documents Cited in ERIC Bibliographic Publications (Cumulative)

Through	Research in Education	Current Index to Journals in Education	Other catalogs and indexes	Running total
June 1967	494		4,880	5,734
June 1968	6,144		6,179	12,323
June 1969	16,544	5,056	7,069	28,669
June 1970	26,658	19,432	7,446	53,536
December 1970	32,060	27,599	7,446	67,105

have been dropped). This is in spite of the fact that both contracts with profit-making firms have changed hands. The National Cash Register Company became the operator of the ERIC Document Reproduction Service in January, 1968; but in February 1971, LEASCO Information Products Co., was awarded the contract on the basis of competitive bidding. These contracts are generally put out for competitive bid every three years, LEASCO became the contractor for the ERIC Facility in January, 1970.

There are several indicators that show the growth in the document acquisition, selection, announcement, and report dissemination aspects of ERIC. Table 1 shows the growth of the file. Currently the total ERIC file is growing at the rate of about 25,000 citations per year. These, it should be stressed, are screened and selected. The current paid subscription rates for RIE and CIJE are over 4,000 for the former and slightly under 2,000 for the latter.

The growth in the sales of ERIC reports has been dramatic and is shown in Table 2. The standing orders (i.e., automatic purchase of all reports announced in RIE) account for most of the report sales.

Although ERIC tapes, which contain all of the information in RIE and CIJE,

TABLE 2

EDRS Report Sales (Titles)

Fiscal year	Hard copy	Microfiche	Standing orders (microfiche)
1966	2,000	270,000	—
1967	6,000	700,000	64
1968	20,000	3,500,000	132
1969	40,000	4,700,000	238
1970	48,000	6,200,000	290 [a]

[a] Higher education institutions, 73%; state and local education agencies, 21%; foreign and others, 6%.

TABLE 3

Access to ERIC Files via Magnetic Tapes

Educational laboratories	3
Commercial organizations	20
U.S. Government	2
Higher education institutions	35
Local education agencies	9
State education agencies	13
Foreign	6
ERIC clearinghouses	11
TOTAL	99

have been available for little more than a year, nearly 100 organizations have acquired and are using them. Table 3 shows the types of organizations requesting them.

The ERIC system views the collection, storage and retrieval of documents as only the first step in the application of information. Data, theories, and generalizations also must be repackaged into compact, understandable form. The ERIC clearinghouses are charged with responding to this challenge. The reviews, as well as interpretative summaries and selected bibliographies generated by the clearinghouses have grown from 149 produced during the year ending June, 1968, to 366 during the year ending June, 1970. A breakdown of how these products are proportioned is shown in Table 4.

One of the reasons for basing the ERIC system on the operation of decentralized clearinghouses was the belief that the clearinghouse directors, in their colleague relationships with the staff of professional organizations and educational agencies, could establish effective linking mechanisms for the transmission of information throughout the educational community. This hypothesis has largely been confirmed. Clearinghouses have established formal and informal linkages with professional organizations and educational agencies for the transmission of information to large education audiences. Newsletters containing short reviews, selec-

TABLE 4

ERIC Information Analysis Products

	Fiscal years		
	1968	1969	1970
Bibliographies	92	99	171
Reviews	32	81	142
Others	25	60	53
TOTAL	149	240	366

TABLE 5

Clearinghouse Dissemination

Fiscal year	Newsletters		ERIC journal columns	
	No.	Circulation	No.	Circulation
1968	12	56,000	13	283,000
1969	14	57,200	35	356,000
1970	17	88,000	44	505,000

ted annotated bibliographies, or descriptions of exemplary practices are distributed regularly to approximately 88,000 key educational specialists throughout the country. Another linkage mechanism has been through regular "ERIC columns" in professional journals. Several clearinghouses now produce regular columns for publication in over 40 professional journals that reach 500,000 educators monthly or quarterly. The columns feature information relevant to the special interests of the readers of the periodical. Like newsletters, they contain short reviews of current knowledge and trends, annotated bibliographies, and abstracts for a limited number of significant documents added to the ERIC collection. Everybody concerned benefits from these arrangements. The clearinghouses apply federal money to generate user-relevant information products; professional organizations receive the manuscripts at no cost and can quickly incorporate them into their transmission systems; but, most important, educators receive the information regularly, already incorporated into their journal, at no extra cost or effort. Table 5 shows the rate of growth of ERIC newsletters and columns in the last several years.

In addition to the channeling of information via newsletters and ERIC columns, the clearinghouses provide direct, personal assistance to many educators who requested that help.

Table 6 shows how this activity has grown in the last several years. Incidentally, 60 percent of the questions coming to the ERIC clearinghouses are from practitioners or decision makers.

Finally, there is interpersonal communication with the specialists in education: Each year virtually all clearinghouses present current awareness programs and

TABLE 6

Clearinghouse Direct Services

Fiscal year	Questions answered
1968	33,000
1969	43,800
1970	56,400

information-using sessions or seminars at one or more regional and national professional meetings. Through these personal contacts, thousands of specialists have been informed of ERIC information services and how to use them. Clearinghouses also host thousands of visitors annually, some of whom visit only part of a day, while others do literature searches for several days a week, even up to an academic quarter.

From the beginning the ERIC program has attempted to make it as attractive as possible for the private sector to prepare, produce and sell special publications or compilations. Several have already been produced and marketed. These are:

(1) *The Thesaurus of ERIC Descriptors*—published by CCM Information Corporation, 1970, provides the latest and most comprehensive listing of ERIC descriptors. Over 7,000 terms are listed as descriptor groups and in a rotated descriptor display. This Thesaurus also includes a 28-page discussion, by Dr. Fred Goodman of the University of Michigan, on "The Role and Function of the Thesaurus in Education."

(2) *CLASS: Reading*, a new CCM Information Corporation service that combines in eight issues annually all the reports and periodical citations related to reading that appear separately in RIE and CIJE. CLASS stands for Current Literature Awareness Service Series, and is designed for individual use by reading specialists. It is the most comprehensive source to world-wide reading literature. An annual subscription for CLASS: READING is $10.50.

(3) The Reading Micro-Library, also produced by CCM Information Corporation, provides an index to over 1,000 ERIC reports related to reading from 1966 through 1969, and contains in the same 6½ × 6½ × 14½ inch box, the full texts to these reports in microfiche.

(3) *The ERIC Education Documents Index—1966-1969*, compiled and published by CCM Information Corporation, 1970. This two volume work is a cumulative subject and author index to cover 130,000 documents in the ERIC system. Each subject heading and author entry is followed by the complete title and accession number of appropriate documents.

(5) *The Complete Guide and Index to ERIC Reports through December 1969*, compiled and published by Prentice-Hall, Inc. This volume is a cumulative index and lists individual ERIC reports under each appropriate subject term, by author, and by the clearinghouse that processed it originally, and provides the full title, by accession number for the 24,558 ERIC reports announced through December 1969.

The U.S. Office of Education staff has set several goals for the future development of ERIC:

1. Completion of coverage of major topical fields and problem areas in education: A limited number of additional clearinghouses are required to close present gaps in the coverage of educational literature. The existing structure of clearinghouses will be expanded by the application of new funds, where possible, and through a reallocation of funds previously devoted to documentation activities, particularly as documentation processes can be made more efficient and less costly.

2. Further support for operating educational information centers: In addition to the support already described, demonstration type information dissemination programs will be developed at several state agencies to test and show ways for organizing and applying information effectively to the policy and leadership functions of the state agency.

3. Development of computer searching: As the ERIC file gets larger, manual searching through the printed indexes, even with the help of annual cumulative indexes, becomes progressively more tedious, time-consuming, and difficult. Computer searching provides at least one possible avenue of fast, efficient, and intellectually satisfying bibliographic searches. Consequently, the ERIC staff has embarked on three approaches for helping educational organizations conduct computer searches of the ERIC tapes:

    a. ERICTAPES are available at nominal cost to any educational organization that wants to copy them and use them with their own equipment.

    b. To help state educational agencies use the ERICTAPES and to provide leadership in developing statewide searching and reference systems, the U.S. Office of Education has procured a software package that allows for a search, retrieval, and display of citations recorded on the ERICTAPES.

4. Support of personalized information products and services: Computer searching is one way to allow individuals to browse and explore their unique interests. However, the day is still distant when interactive terminals will be readily available to even a fraction of the educators who may want to research ERIC files. Meanwhile NCEC is encouraging private organizations to provide new personalized information services based on the monthly increments to the combined RIE and CIJE document file. Turning to private resources for these new efforts is in keeping with the basic philosophy behind ERIC that any activity which can be supported through market sales should be developed by private organizations. This has been done with the LEASCO and CCM Information Corporation (CIJE). Also, several clearinghouses have arrangements with professional societies wherein federal funds are used to prepare the manuscript and the professional organization pays the publishing and promotion costs and then retain the revenues that accrue.

5. Expansion of networks for acquiring a broader range of higher quality reports. State agencies are being asked to play a key role in encouraging local schools to report their projects in more concrete and usable terms. In another program of NCEC a manual is being developed designed to help accomplish these objectives. It will be available for use by state and local staff in the near future. Using the guide, state agency staff can then review reports, select those of highest quality, and transmit them to ERIC for national dissemination. Also, efforts are under way to expand the international acquisition of documents. Only a limited number of English-language reports from countries outside the United States now enter the ERIC system. Cooperative agreements with international organizations are being pursued so that American educators can benefit from the results and outcomes of successful educational developments abroad.

6. Exploration of all means to ensure that information becomes applied to im-

provement of educational programs: All steps described previously are simply subgoals whose accomplishment should contribute to the ultimate objective of increasing rational decision making and the development of programs based on tested knowledge and practice. ERIC never was designed to accomplish this objective by itself. It is one tool, an important one, in the total range of resources needed, and it is being developed in conjunction with related efforts to improve program planning and budgeting, to increase the impact of demonstrations and interpersonal communication, and to expand training and retraining of staffs—to mention only a few. Continued development of ERIC, based on careful applications of emerging technology and linkage to users through local "one-stop" information centers, will increase use of the expanding national and international knowledge base for improving education.

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HARVEY MARRON

EDUCATIONAL TELEVISION

In recent years, increasing numbers of people have viewed the library as more than a repository for books and other print material. Accordingly, attention has been focused on developing the library into a dynamic entity designed to house and disseminate information through a variety of media. Some, such as the University of Pittsburgh libraries, have taken an even further step and are providing the services necessary to produce and distribute nonprint information. These services include graphics production, photographic and film production, audio and videotape recordings, or combinations of the above. These services are most frequently found associated with libraries in institutions of higher education, although increasing numbers of academic and nonacademic libraries at all levels recognize the importance and relevance of nonprint materials to their purpose of disseminating information.

One of the most sophisticated media in use today is that of television which exists in three basic forms: commercial, educational (ETV), and instructional (ITV). Each is defined and identified by its purpose. The purpose of commercial tele-

vision is to provide entertainment to large numbers of people, and only secondarily to provide information in the form of news and public affairs programming. "Educational television is a medium which disseminates programs devoted to information, instruction, cultural or public affairs, and entertainment" (1). The purpose of ITV is to support academic activities associated with a formal course of study usually through an educational institution. The method of dissemination is *not* important to the categorization of program materials, although dissemination channels are usually identified as commercial, educational, or instructional (generally closed-circuit). The purpose of each program's material determines its categorization. Each type of program material can be distributed (and has been) through commercial, educational, or institutional channels, or through libraries of videotaped programs.

The history of ETV reflects its growth in terms of purpose, programs, and facilities. As early as 1901 Marconi demonstrated that electromagnetic waves, the basis of all broadcast transmissions, could be sent over long distances without the use of wires (2). At the same time, television transmission became an exciting possibility. "From about 1910 to the end of the first World War sporadic experimental attempts were made to broadcast [radio] programs for general reception" (2). By the early 1930s experiments were conducted in the broadcasting of television signals. One of the earliest experimental stations was W9XK, located at the University of Iowa, which provided programming such as engineering, botany, art, drama, and shorthand (1). These experiments, conducted between 1932 and 1939, gave recognition to the educational potential of the television medium. It was recognized that television could reach large numbers of people with carefully planned instructional material. It was thought that television had tremendous inherent influence on the viewer which would have the benefit of increasing the impact of the message. During the following three decades, ETV was recognized to be something less than a panacea, although numerous benefits were found. Today it is recognized that television can reach any number of people simultaneously with a constant level of instruction and information quality. Television can bring events of the world to people in many locations as the events occur. Television can provide for exchange of ideas, concepts, and points of view among individuals or groups, thereby facilitating communication and understanding. The application of ETV is not limited by these possibilities, for there are many more. By itself, television is of no value. How it is used, and for what purposes, determines its success or failure.

The library, as a dynamic system for information storage and retrieval, can play an important role in ETV. Historically, it has not. There has been little integration of the nonprint medium of television into the traditional print world of the library.

The history of ETV is reflected in the development and regulation of the broadcast spectrum. Early experiments in radio broadcasting, including stations owned and operated by universities, were conducted virtually without regulation. The predictable result of thousands of such experiments found the listener receiving

multiple stations on a single frequency. When a clear signal could be received, the listener was frequently subjected to medical and religious quackery. By 1924 there were more than 500 radio stations on the air (2). The then Secretary of Commerce, Herbert Hoover, concerned with the chaotic conditions of the airways, began in the 1920s to initiate a series of conferences ultimately leading to legislative action. "The Radio Act of 1927 . . . provided for a commission of five members with authority to grant, renew, or revoke station licenses. . . . It was definitely established by the Act that the radio spectrum belonged to the public and that a broadcaster acquired no ownership rights in a frequency when granted a license. Before he could be granted a license or a renewal of one, he was required to show that the public interest would be served" (2). By 1933 it became evident that the regulation of all mass communications media was necessary in order to insure a comprehensive national policy. In June of 1944 Congress abolished " . . . The Federal Radio Commission and created the Federal Communications Commission (FCC) with authority to regulate all interstate and foreign communications by means of wire and radio" (2).

As television broadcasting became more refined and frequent, jurisdiction for its regulation automatically fell to the FCC. In 1948, facing numerous requests for channel allocations and recognizing inadequacies in its table of allocations, the FCC temporarily froze all new allocations while it reevaluated the manner in which the television spectrum was to be distributed. The freeze " . . . indirectly afforded educators an opportunity to bid for federally assigned frequencies" (1).

During the following 2 years, several plans were presented as to how ETV was to be financed. Some educational groups favored a noncommercial approach, while others were willing to accept commercials so long as the station did not make a profit. In October 1950 the United States Office of Education and the National Association of Educational Broadcasters formed an ad hoc Joint Committee on Educational Television. "Thereafter, the educators called upon the FCC to reserve a number of television channels for the exclusive use of education. They proposed to operate these channels as both non-profit and non-commercial undertakings" (1).

The FCC responded with its *Sixth Report and Order* which reserved 242 channels [80 very high frequency (VHF) and 162 ultrahigh frequency (UHF)] for the exclusive use of ETV. The allocations have been subsequently increased to 116 VHF and 516 UHF channels.

Under the 1952 allocation plan KUHT (Houston, Texas) became the first ETV station on the air (May 12, 1953). By December 1970, 212 ETV stations were authorized for operation with 196 actually transmitting programs (3).

With 212 ETV stations "on the air" presently, and many more in the planning or construction phase, it is estimated that upwards of 90% of the population has or will have direct access to ETV programming. The inherent disadvantage of ETV is its ephemeral nature. The programs are presented at a time convenient for the local station or the network. The viewer has no opportunity to view the program material at a time convenient to himself. Should the program be aired at a time inconvenient to the viewer, he usually will have no further opportunity

to view the material. Nor does the viewer generally have access to material for any other purpose. The development of a centralized library system for acquisition and dissemination of ETV programming is not only feasible but practical. Such a library function would eliminate most of the aforementioned problems, and provide a new and dynamic service through the library. Such a system will be discussed later.

Since 1952, two major methods of station ownership have evolved. One has been the ownership by organizations whose primary purpose is education/instruction, usually on a specific level (i.e., elementary, secondary, higher education). Frequently the licenses are held by a single educational institution, although in many cases the licensee is a state board responsible for coordinating educational television activities on a statewide basis (i.e., Alabama Educational Television Commission). School districts, through their governing board, also hold licenses at any of the scholastic levels. The second most common method of ownership is through community or regional agencies not directly related to an educational institution. Both of these methods have obvious advantages and disadvantages, although both serve specific needs in their respective communities. One advantage of the state operation is the direct instructional need met in a wide area. Through state licensing, ETV stations provide instructional programs which would often be out of the reach of the individual school or district. Programming such as advanced mathematics or science, black studies, and the like can be provided at a fraction of the cost of having teaching specialists in each school or district, especially when the program interests only a small number of students in each school. Another important factor is the commonality of experience and the control of quality which is possible when programming is presented on a regional or statewide basis.

Conversely, the local ownership of ETV facilities allows the station the freedom of tending to the unique problems of the community in which it exists, without the problems inherent in the control coming from a central agency. It has long been the view of many concerned with ETV that the operation of a station should reflect a balance between the production and distribution of materials for instructional purposes, and for general educational/cultural/informational purposes.

As increased numbers of stations began operations, it was recognized that there was a need to provide some efficient and systematic method of sharing program materials. When money became available, stations in close proximity began establishing electronic interconnections for this purpose. As a logical extension of regional interconnections (i.e., The Eastern Educational Network, EEN), The Educational Television and Radio Center (now National Educational Television, NET) began to provide programming to affiliated stations for a yearly fee. The earliest interconnection was provided by mailing films (and later videotapes) to stations for broadcast, with some sporadic electronic interconnection.

Early in 1965 the Carnegie Corporation of New York established and funded a commission charged with the responsibility of studying educational television and making " . . . recommendations along which noncommercial television stations might most usefully develop during the years ahead" (4). Among its specific recom-

mendations was one for Congress " . . . to authorize and establish a federally chartered, nonprofit, nongovernmental corporation, to be known as the 'Corporation for Public Television.' The Corporation should be empowered to receive and disburse governmental and private funds in order to extend and improve public television programming" (4). In November 1967 President Johnson signed into law the Public Broadcasting Act of 1967 which established The Corporation for Public Broadcasting (CPB) and authorized expenditures of up to $28 million in matching grants for the construction of educational broadcasting facilities.

As a consequence of this action, the CPB has assumed the responsibility for providing interconnection between ETV stations. One of the first large-scale interconnections was in conjunction with the CPB sponsored series Public Broadcasting Laboratory in 1968 and 1969.

ETV programming is obtained from a wide variety of sources. "During the decade of the 1950's, the prime source and the principal focus of programming, both in-school and cultural, was local production" (1). In addition, commercial programs such as "The Big Picture" and "Industry on Parade" were used to round out the daily schedule. Since the 1950s, as modern recording and distribution methods have developed, it has become possible for stations to share program materials. While electronic interconnection, although expensive, was one solution, other methods were used. In the 1950s three regional program libraries were established on a demonstration basis. Today the library concept continues in operation (i.e., Great Plains National Instructional Television Library) supplying programs of all types, although some libraries specialize in one type of program.

Since its creation in 1952 NET has been one of the major sources of educational programming. Through its own resources many program hours were produced, while others were contracted through local affiliates or secured from foreign sources. With the formation of the CPB, NET was no longer weighted with the responsibility of program distribution and turned its full attention to the production of program materials.

One other major effect on ETV programming due to the CPB has been the creation of eight national production centers around the country with whom the CPB contracts for original programming. The centers are located in New York City (WNET, the prime production center for NET), Boston (WGBH), Philadelphia (WHYY), Pittsburgh, (WQED), Washington, D.C. (WETA), Chicago, (WTTW), San Francisco (KQED), and Los Angeles (KECT).

Other program sources include the colleges' and universities' ITV programs, free-lance programs, commercial programs, and industrial and business efforts among others. Throughout the country, numerous organizations have been established with the purpose of acquiring and disseminating television materials. For example, The Great Plains National Instructional Television Library and National Instructional Television make available to ETV stations and educational institutions a wide variety of instructional programming.

In the 1967 Report of the Carnegie Commission on Educational Television the commission indicated that a better term for educational television was "public

television" since it includes all that is of human interest and importance. ETV programming generally falls into one of four categories—instructional, informational, cultural, and children's programs.

Instructional programming is those programs broadcast for use by schools as part of their daily classroom activities. This type of programming is not designed for general public consumption, and is not usually considered as part of ETV, but as ITV. However, since most ETV stations carry ITV programming as a school service (most other distribution methods being too expensive), instructional programs must be considered as a program type of ETV stations.

The second program type, informational, is generally categorized by news and public affairs presentations. Under this category we find such programs as local news, the "David Susskind Show," "Firing Line," and others.

Cultural programming is designed to increase the viewer's knowledge of a broad range of subjects including the humanities and sciences, the performing arts, and the leisure arts. It would not be unusual for the "French Chef," Julia Child, to be followed by Pablo Casals at the cello, in turn followed by a program on practical electronics.

With the introduction of "Sesame Street" in November 1969 there was a sudden spurt of public interest in ETV, particularly children's programming. "Sesame Street," designed specifically for the preschool (ages 3–5) child, sought to teach the alphabet, numbers (counting), and a variety of social concepts. In designing the series careful attention was given to learning theories and other psychological variables to insure that the objectives of the producers were met. Extensive research on children throughout the country was done to measure the precise effects of the program. The meticulous planning and research on "Sesame Street" marks it as a beacon for others to follow with future educational endeavors. ETV has presented many other outstanding children's programs, including "Misterogers Neighborhood" to name but one.

One aspect of ETV and ITV programming which has been severely neglected (in quality, not quantity) is that of empirical research. Approximately 90% of all research dealing with television has shown no significant difference in results (5), principally because it compared the replication of the classroom lecture via television with the actual lecture. Television was used simply to transpose the viewer in time and/or distance. Very few of the studies done in television meet even the simplest criteria for "acceptable" research. The bulk of the research deals with instructional programming, while other educational aspects are largely untouched. The only conclusions which can be drawn from ETV/ITV research is that television, in most cases, is as good as the conventional lecture/talk method.

The history of ETV has been characterized nationally by outstanding effort and results despite an overwhelming lack of operational funds. Unlike the commercial producer, ETV has not had the constant flow of money from the sale of air time. Most stations have been supported either by the educational institution with which they were affiliated, by contributions from the public, by foundations. or by some combination. Since, in many cases, the yearly budget of an ETV station is smaller

than what a commercial producer spends for one program, the educational broadcaster has devised many ingenious methods of raising revenue. These range from telethons with local and national celebrities to on-air auctions of donated items. Frequently an ETV station will enlist the aid of other mass media in their local city to help place their cause before the public.

Perhaps the most significant single contributor to the development of ETV has been the Ford Foundation which had given over $120 million by 1966 (4). During the 1960s, the NET Network received the vast majority of its operational funds from the Ford Foundation.

The largest sources of support for educational television " . . . are state and local governments, acting through school systems, state boards of education or state instruments set up specifically for educational television, or state universities. For community stations, the funds are usually made available through contracts for the broadcast of programs to the school" (4). In the latter case, a school system will pay a yearly fee to the station which enables the system to utilize the instructional program broadcast by the station. The fee assessed is usually on a per capita basis; i.e., so much per pupil per year. Strictly speaking, the programs broadcast by the station are available to all users on a free basis; however, by paying the fee, the school receives advance program schedules, workbooks, teachers' manuals, and the right to a voice in the selection and distribution of the program materials.

The problem of financing ETV is far from being resolved, and is rapidly approaching the acute stage. The costs of production and operation are rising faster than the yearly income. Several new methods of funding ETV have been proposed including a tax on CATV (Community Antenna Television systems) but as of this writing, no new method(s) have been agreed upon.

The future role of the library in ETV is another unanswered question. Presently libraries function as largely a repository and clearinghouse of preproduced material solely for use by ETV stations and ITV systems. This system does not provide the individual audience member the opportunity of accessing the materials for his own use at a convenient time, which should be the objective of the library. What then can be done to reach this objective?

First, a basic library system exists in which materials are stored and disseminated (i.e., Great Plains National Instructional Television Library and National Instructional Television mentioned earlier). In addition, the ETV network and local stations maintain a basic library of materials produced under their auspices. These materials represent a collection to which additions are continually made, representing the total output of major programming efforts. The logical next step for such libraries, local stations, and networks (educational and commercial) is a consortium arrangement through which copies of program materials are made available to public and academic libraries. The technology *now* exists to accomplish this end.

Using "Sesame Street" as an example, the system might work as follows. The Childrens' Television Workshop is the producer of "Sesame Street," which is distributed through the CPB. Each program in the series is made available to a

national television library consortium who contracts with a program duplication service to provide multiple copies of the program. Each public and academic library who wishes to provide the program service becomes a member of the consortium and pays a yearly fee for the service. This fee would cover the overhead costs of the consortium and one copy of each program provided under one or more specific categories of program materials. Since television materials can be classified by purpose and content, it is desirable to provide categories of membership based on the interests of the libraries' patrons. A large metropolitan library system (i.e., the New York City Public Library) may wish to subscribe to all categories, while a graduate academic library may wish only certain categories of materials. Should demand for a particular program or series mandate additional copies, they would be available at modest cost.

The local library affiliate purchases a basic compliment of playback equipment and provides carrels in which the material can be viewed. In addition, the affiliating library provides a modest compliment of playback equipment which can be borrowed by a patron, taken into the home, and the material viewed on the patron's home television set. The affiliate library member may wish to assess a nominal fee for the use of such materials as a means of covering the costs of the service.

This consortium arrangement might be best applied through a regional library association. Since it is unlikely that any one library would need all programs, the regional association would serve to coordinate acquisitions and arrange for interlibrary loan among members.

"Sesame Street" leaps from the realm of a twice-a-day program series into that of a dynamic educational force that the child and both parents can watch together. It makes it possible for the home and the library to become an educational force far beyond its present capacity. The potential for such a system extends beyond the bounds of present day ETV, into a world where the patron/learner can access informational, educational, and entertainment materials in a medium combining sight and sound, pursuing a new kind of learning environment as he would now a book.

While this idea may strike many as expensive and impractical, it need not be. The introduction of the cassette/cartridge television system has made a tremendous impact on the world of commercial television. Much as music is now available on cassette and cartridge for the home, car, boat, etc., soon entertainment programs will be sold at a neighborhood shop. The playback hardware will market at less than $200 and will attach to the home set with only a screwdriver. For the first time, television programs will be the viewers' choice, both in content and time of viewing.

ETV today is a fluid and dynamic enterprise which continues to suffer the pains of growing. It faces problems of financing, programmatic philosophies, responsibilities, and so on. That it provides the television audience with a viewing choice, and that it provides a service of inestimable value to the cultural and educational needs of our society are the major contributions of ETV. It is impossible to predict with accuracy the future of ETV; however, some general observations can

be made. It is likely that all ETV stations will be electronically linked during the 1970s. Further, it is possible that during the same decade direct satellite transmission of ETV programming into the home will become a reality. The technology which makes the library consortium idea feasible will allow a home viewer to record programs "off-air" and thereby keep a library of program materials in his home. This library can be changed or modified by the viewer as easily as he now makes and changes audiotapes. It is predictable that ETV will explore the use of satellites to transmit programs to, and receive programs from, foreign countries for direct rebroadcast. It is feasible that ETV stations will divest themselves of the role of distributing formal (in-school) instructional programming, that function to be taken by a separate network.

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Robert T. Jones

EDUNET

In 1966 EDUCOM (The Interuniversity Communications Council), a consortium of colleges and universities, proposed the establishment of a nationwide interuniversity educational information-processing network, EDUNET (*1*). This pilot network was designed to evaluate how such networks can assist education, particularly higher education. Among its justifications were that it could make possible the sharing of informational resources among institutions, equalize access to information, facilitate long-distance interpersonal interactions, provide better bibliographical services, make life-saving information instantaneously available,

decrease production of unused copies of a wide range of informational materials, improve continuing education. and decrease administrative delays in higher education. By such a network universities could share library materials, data banks, computing facilities, instructional programs, and laboratory know-how.

Students and faculties at the smaller and less wealthy colleges and universities have always had poorer libraries and less adequate access to information than those at the larger and richer institutions. The availability of information also differs from region to region of the country, being poorer in the South, the mountain areas, and certain other regions than it is, for example, in Boston, New York, Washington, Chicago, and San Francisco. This is surely not in the public interest. With traditional libraries it would cost too much to correct this disparity. A network, however, could provide much more uniform dissemination of information throughout the country. Simply adding more wings to libraries and buying more books to put in them is not an acceptable solution. Through a network, small colleges and universities would be able to use the expertise of personnel trained in information processing, the hardware, and the software of large computing facilities that they could not themselves afford. It could also save students and scholars much time and accelerate scholarship throughout the academic world.

Assurance of rapid access to information would make studies feasible that are not possible now, and make investigations attractive that are not practical now because they require great expenditure of time and effort. There would certainly be changes in scholarly behavior if citations, abstracts, and full texts could be obtained at remote terminals. On-demand access to taped television programs, as contrasted with scheduled access to traditional broadcast and closed-circuit programs, would quite probably make educational television more effective.

More rapid editing, reviewing, and publication are greatly needed in some fields. With publication lags in scholarly journals commonly 9 months to a year, it takes a long time for new work to become widely known and even longer for critical reviews of it to appear. A network might decrease the lag and at the same time improve the processes of screening and editing.

Much time and money are spent by faculty in traveling to conferences. For some purposes direct face-to-face human interactions are undoubtedly best, and there will always be such conferences. For other purposes, such as periodic committee meetings of universitywide committees in multicampus universities, live "teleconferencing" over a network might provide the necessary communication, be cheaper than travel, and permit the participants to spend more time on their home campuses. Under present procedures when two or more persons want to participate in a joint interactive intellectual process, such as jointly writing or editing a manuscript or a computer program, it takes on the average about 2 weeks to get a single letter of reaction from a colleague. A network could speed up the interaction.

In a network which gives access to computerized information storage and retrieval systems and data banks, materials could be kept current with a lag of only a few days or hours. If the task of inputting were divided among several individuals or institutions on the net, the costs could be made reasonable for

all concerned. Networks could provide on-line access to machine-readable shared union catalogs. These could tell on demand, in an updated form, where the nearest copy of a desired book is located, on either one's own campus or some other campus. Such information could greatly increase the efficiency of interlibrary loans. Such records of holdings could also make possible much more efficient library management and might avoid undesirable local or regional duplication of books and journals, making many purchases unnecessary. Networks could also significantly cut down the costs of ordering, cataloging, and shelving a journal or book, functions which constitute a significant fraction of the purchase cost.

With electronic storage and retrieval of citations, abstracts, and full texts, documents would not be unavailable because they were in use, lost, stolen, or misshelved. As many copies or displays could be provided at one time as there were readers to use them.

On-line systems providing selective dissemination of abstracts or documents to users at remote terminals of a network could be developed. The connectivity and switching capability of a network could direct an enquirer to the information he desires or at least to the person who has the information. Much of scholarship involves such searching. The network would make it easier and faster.

It is essential that rapid access be provided to data banks of poison control information and drug toxicity information. A hospital records exchange service could speed hospital records over a network to whatever part of the country the patient may be in, saving precious minutes in emergencies.

Networks can save money by eliminating the need to duplicate copies of little-used materials. Copies would not be made until they were asked for, and many would never be requested. One copy of anything in electronic storage is enough. Barring accidental destruction, it will always be there. Access will always be possible with the network, and displays or hard copies of the needed information can be had at any remote terminal, as desired.

When a network is in operation, it can be used in other places besides academic centers—in an office, home, or wherever a remote terminal could be installed. Consequently such a network could inject new life into programs of continuing lifetime education, in fields as diverse as teacher education, business, engineering, health sciences, physical sciences, and military science.

As large organizations like universities grow they frequently develop increasing delays in routing administrative paperwork. This unquestionably decreases their efficiency. The rate of transmittal of personnel, budgeting, planning, and other administrative documents in industry is being accelerated by computers and use of networks with on-line terminals. Computers and networks can be used to good effect both inside universities and in interuniversity exchanges of references, student transcripts, and student records.

The following procedures were recommended for the establishment and evaluation of a pilot EDUNET:

In collaboration with member universities, EDUCOM proposed to establish an EDUNET laboratory made up of three or four integrated but geographically dispersed branches. This laboratory would plan, design, operate, and help in the

evaluation of the pilot EDUNET. It would compare the various alternate approaches to the desired ends; determine performance specifications of the network; plan, determine the sequence, and assign responsibility for the specific tasks which must be carried out before the network can operate; decide how many persons and what time are required to perform these tasks; and determine how to keep account of and evaluate progress toward the desired ends.

1. The EDUNET laboratory would fulfill the following functions:
   a. Determining what services will be provided by EDUNET.
   b. Designing, selecting, and testing equipment and configurations of equipment to make up the pilot network.
   c. Determining the requirements of EDUNET compatibility, i.e., the structural and functional specifications for hardware, software, and procedures of EDUNET.
   d. Writing and debugging software systems essential to the operation of the pilot network and the use of its services.
   e. Indexing and maintaining an on-line directory to the services and materials available through EDUNET, with information on how to obtain and use them and what they cost.
   f. Switching, i.e., putting the user on-line to the services or materials he wants, whether they are located near him or far away.
   g. Maintaining records of use and accounting for costs.
   h. Evaluating the usefulness of EDUNET, determining the degree of satisfaction of its users, and comparing performance with costs.

The pilot network would be designed:
   a. To provide information and communication required to augment academic instruction, research, services, and administration.
   b. To be extendable to other institutions if the initial network proved itself.
   c. To take advantage of satellite communication when and if such technology turns out to be available and advantageous.
   d. To provide experience in both long and short distance communication.
   e. To provide experience in mixing of scheduled and unscheduled network operations.
2. Each branch of the EDUNET laboratory would have a computer equipped with direct-access files and with devices to connect the computer with communication channels.
3. In addition to the EDUNET laboratory branches, several EDUNET switches would be included in the pilot EDUNET. To link each participating organization with all the others through private lines would, of course, be too expensive. The linking would be accomplished with the aid of switchable channels. The switching points would be the EDUNET laboratory branches and the EDUNET switches. The main purpose of the latter would be to provide an economic and convenient way for EDUCOM universities other than those near EDUNET laboratory branches to gain access to EDUNET. Users at such universities would be able to reach switches from several types of terminals through common carrier, leased, or private lines. EDUNET switches would be equipped with small computers to implement network procedures, such as user identification, accounting, and route selection; there would be directories to files but no substantive information files at the switches. The switches would be capable of both line switching (the kind of switching employed in setting up a telephone call) and message switching (receiving a message and the address to which it is directed, storing them until an appropriate channel is available, and then transmitting them to another location nearer or at the destination—hence, "store and forward").

Figure 1 shows the proposed organization chart of EDUCOM and EDUNET. The EDUCOM Summer Study generated a long list of services which could be logically provided by EDUNET, including:
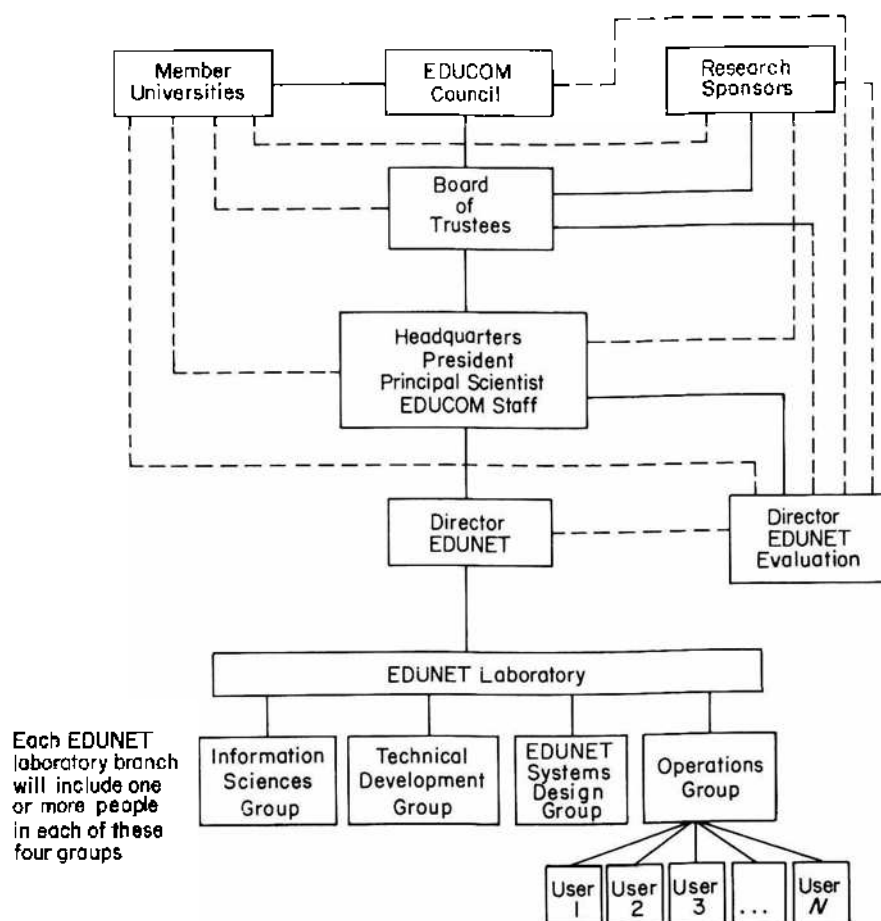
FIGURE 1. *EDUCOM organization chart.* (——) *Line of responsibility.* (——) *Line of liaison relationship.*

1. Catalogs and directories of bibliographic materials.
2. Abstracts and full texts of documents.
3. Directories of on-going research, theses, proposals, grants, and contracts.
4. Directories of existing data banks and computer programs.
5. Directories of persons with special knowledge and skills.
6. Data banks in various subject-matter fields, e.g., meteorology, drug effectiveness and toxicity, political behavior, city management, land-use, word-use.
7. Diagnostic, therapeutic, epidemiological, and toxicological information (document contents and data banks).
8. Data banks of computer programs.
9. Current awareness services and automatic dissemination services.
10. Collocation of data from geographically dispersed sources.
11. Access to knowledgeable people for "on-line consulting."
12. Computer-assisted instruction.
13. Sharing of experimental facilities.
14. Holding of live classes, seminars, conferences, and professional meetings at dispersed locations.
15. Continuing education.

16. Facilitation of joint authorship and "on-line reviewing" of manuscripts.
17. Computer services to remote locations and to computer-poor groups or institutions.

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1. Cf. G. W. Brown, J. G. Miller, and T. A. Keenan, *EDUNET, Report of the Summer Study on Information Networks*, Wiley, New York, 1967.

JAMES G. MILLER

EDWARDS, EDWARD

Edward Edwards (1812–1886), librarian, the son of an unsuccessful London builder, was born on December 14, 1812. He was largely self-educated and, as a young man, agitated strongly for the improvement of the services provided by the British Museum, then almost the only real public library in Britain. He joined the British Museum staff in 1839 and was employed there as a cataloger until 1850, on ever increasingly bad terms with his chief officer, the Keeper of Printed Books, Antonio Panizzi. He continued to publicize the need for better national and more publicly accessible local libraries and in 1848 began to advise William Ewart (q.v.). In 1849 he was the first and most influential witness to appear before the House of Commons Select Committee on Public Libraries. Its Report prepared the way for the first Public Libraries Act of 1850, but this came only after acrimonious controversy caused originally by the now impossibly strained relationship between Panizzi and Edwards. Edwards was dismissed by the British Museum Trustees in May 1850.

Edwards became the first public librarian of Manchester in 1851 and from then until 1858 built up the pioneer large town municipal service. The premises available, a disused and "jerry-built" "Hall of Science," erected 10 years earlier for Robert Owen's "Rational Religionists," were poorly sited and local opinion on the project was much divided, including the all-important opinion of the financing authority, the City of Manchester. Nevertheless, the bookstock which he accumulated and the public service begun by Edwards laid the essential foundations of one of the best municipal reference services in Britain. But his relationship with his governing bodies deteriorated steadily and, in October 1858, he was dismissed from his post by the Manchester City Council. Edwards' years at the British Museum could be regarded as failure, had it not been for his public work. His years at Manchester could be viewed as similar failure, had he not also been writing *Memoirs of Libraries*.

Memoirs of Libraries, which became a standard work and a pioneer library textbook both in Britain and the United States, was published in two volumes by Trubner in January, 1859. The first volume and the first half of the second are primarily history, from the earliest times up to the Annual Reports for 1857. The second half of the second volume contains an "economy of libraries," divided into four books:

Book collecting; Buildings; Classification and Catalogues; and Internal Administration and Public Service. This, with all its faults and shortcomings, was one of our first modern textbooks. Naturally enough, most of *Memoirs* has long since been superseded. But contemporary readers may yet agree that, in innumerable places in his book, Edwards showed that he had a twentieth century rather than a nineteenth century mind.

After his dismissal from Manchester, Edwards earned his living mostly by authorship, handicapped, as he always was, by his chronic inability to write only to the length originally proposed by himself or stipulated by his publishers. He also held temporary posts for some years in Oxford, at the Bodleian Library and at the Queen's College. His later books on librarianship, i.e., *Libraries and Founders of Libraries* (1864), *Free Town Libraries* (1869), and *Lives of the Founders of the British Museum* (1870), may be regarded as supplementary to *Memoirs* and, indeed, as substitutes for a new edition of that work which its publisher, with many copies of the original printing still in his stockroom, was obliged to discourage. Edwards also wrote a two volume *Life of Sir Walter Raleigh* (1868) which still holds its place in the bibliography of the great Elizabethan, if mostly now for the laboriously collected letters; and edited the Rolls Series *Liber Monasterii de Hyda; Comprising a Chronicle of the Affairs of England from the Settlement of the Saxons to the Reign of King Cnut; and a Chartulary of the Abbey of Hyde in Hampshire, A.D. 455–1023.* In addition, he wrote many articles for the 8th edition of the *Encyclopaedia Britannica.* At the end of his life he retired to the Isle of Wight and died in extreme poverty on February 7, 1886.

Edwards, seen in perspective, was a librarian of quite exceptional talents, if not of outstanding genius. He was the forefather of the modern British municipal library as well as of our modern library literature. But he was a bad manager — of his own professional and private life, of his writing, of his personal finances, and of his personal relationships. He irritated and made enemies of many influential people who, handled differently, might have helped him. He seems to have been something of a paranoiac. But it was seldom easy in Britain, in the last century, for a self-educated man from a poor home, with ideas to communicate, to learn to live comfortably with formally educated middle- and upper-class people. When a final balance is struck, modern librarians have many reasons to be proud of Edward Edwards and to cherish his memory.

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W. A. MUNFORD

EDWARDS, JOHN PASSMORE

John Passmore Edwards (1823–1911), philanthropist, was born at Blackwater, a village near Redruth in one of the Cornish mining districts, on March 24, 1823. His Calvinistic Methodist father, William, was Cornish and an unsuccessful carpenter, brewer, and market gardener; his Baptist mother, Susan, came from Newton Abbot in Devonshire, a small town which was later to acquire its public library as one of her son's memorials to her.

Edwards, educated only at the local village school, began to read quite widely from an early age and, having literary ambitions and a keen interest in the growing Anti-Corn Law movement, sought his fortune in the obvious place, Manchester. But the attempt was unsuccessful and his subsequent career as a London publisher of periodicals was even more disastrous as, by the time ill-health forced him to seek a settlement with his creditors, he owed them several thousand pounds sterling. He tried again in London and, as he later wrote himself, "by working hard and waiting, by contributing to newspapers and magazines; and so accumulating experience," he was able to acquire and make financial successes of two ailing periodicals, *Mechanics Magazine* and *Building News*. He was even more fortunate with other purchases and for some years owned a prosperous pioneer halfpenny newspaper, *The Echo*, started by Cassells in 1868. By 1866 he was already sufficiently well-to-do to be able to repay all his earlier London debts. His astonished and gratified compounded creditors entertained him to a complimentary dinner and there presented him with a watch and chain.

As a young man Edwards was strongly influenced, like many others, by the transcendentalism of Channing and Emerson and became a disciple of Cobden and Bright. In his case this adherence meant acceptance of the full international program of the "Manchester School," most of which, other than the Anti-Corn Law and Free Trade aspects, is now overlooked or forgotten. He consequently became politically active and an industrious pamphleteer in a variety of liberal causes, including peace through arbitration (he was to oppose the South African War at the turn of the century just as strongly as he had opposed the Crimean War nearly half a century earlier); the introduction of the ballot box; the ending of the taxes on paper and newspapers; the promotion of national education; and even the earlier closing of shops in the interests of the staff employed in them. He represented Salisbury as a Liberal in the House of Commons from 1880 to 1885 but found Parliamentary life already too party-ridden for enjoyment or personal achievement.

By the middle 1880s Edwards was a wealthy man with a great deal of money to spend. What now was he to do with that wealth? Should he live in Park Lane; build a garden city; finance explorers? He claimed to have seriously considered these and other possibilities but, assuming his social and political opinions, the issue was not long in doubt. In his own words:

In all such questionings one idea was uppermost. As I had accumulated mainly by the labour of others, I thought, and think, it was only reasonable and just that others should share in the garnered result; and to act accordingly was a duty and a privilege—a duty as a citizen and a privilege as a man. I also thought, and think, that the great working class—the foundation and bulwark of national existence and the chief producers of national necessities—are entitled to primary consideration in such matters. I consequently decided to do what I could for their welfare, and thought that the best thing to do was to help them to help each other, and that this could be most productively done by promoting institutional activity.

Granted such ambitions, the scope was so vast that a philanthropist deploying resources which, while considerable, were still modest by Carnegie standards, must needs restrict the area of his benefaction. Edwards began, like Carnegie, in his birthplace and in 1889 presented a reading and lecture room to Blackwater. He gave similar institutes to nearby towns and villages and then extended his gifts to the rest of Cornwall and to and for the working class areas of London. From 1890 until his death he presented to the appropriate authorities nine hospitals; seven homes for orphans, cripples, and epileptics (noting sadly that the siting of these in attractive rural places in south eastern England was frequently opposed or obstructed by the wealthy inhabitants of the neighborhoods selected); five schools of art and science; four museums and art galleries; six clubs, institutes, and settlements; a public park; a lifeboat; an Oxford scholarship; and an unchecked number of medallions and busts of famous (mostly literary) notabilities; together with several drinking fountains for humans and dogs in London streets and public parks.

At the opening of the pioneer British municipal library in Manchester in 1852 Charles Dickens had pointed out that the term "Manchester School" could surely also mean a public library, i.e., "a great free school, bent on carrying instruction to the poorest hearths." Edwards must have agreed wholeheartedly. He gave public libraries special support because, again in his own words,

> they are educative, recreative and useful; because they bring the products of research and imagination, and the stored wisdom of ages and nations within the easy reach of the poorest citizens; because they distribute without curtailing the intellectual wealth of the world; because they encourage seekers after technical knowledge, and thereby promote industrial improvement; because being under the public eye, they are economically conducted; because they teach equality of citizenship, and are essentially democratic in spirit and action inasmuch as they are maintained out of the public rates and subject to democratic control.

So he presented twenty-five buildings to local library authorities, subsequently paying for the enlarging of one of the most successful, at a total estimated cost of not less than £100,000. Additionally he gave to them and to other libraries a total of nearly 100,000 books (including the technical reference library of 2,000 books on the printing trades presented to the St. Bride Institute in the City of London) and even, in a few cases, endowed lectures for them. The buildings presented, listed under the names of the local authorities of 1971, with the dates of opening, were as follows:

Cornwall

Camborne-Redruth Urban District Council
    Camborne (1895)
    Redruth (1895; extended 1968)

Falmouth Borough Council
    Falmouth (1896; extended 1928)

Truro City Council
    Truro (1896)

Cornwall County Council
    Bodmin (1897)
    Launceston (1900; new building to replace this 1970)
    Liskeard (1897; extensively remodeled 1968)
    St. Ives (1897; extensively remodeled 1967–1969)

Devonshire

Newton Abbot Urban District Council (1904)

London Boroughs

Ealing
    Acton (1900; extended 1954–1957)

Enfield
    Edmonton (1897)

Hackney
    Haggerston (1892; extended 1893 and 1937)
    Shoreditch (Hoxton) (1898; remodeled 1930; closed, due to war damage, 1941; rebuilt 1956, facades as original design but interior remodeled)

Hammersmith
    Shepherds Bush (1896; extended during 1950s)

Newham
    Plaistow (1903; opened by Andrew Carnegie)
    Plashet (1899)

Southwark
    Borough Road (1899)
    Dulwich (1897)
    North Camberwell (1901)
    Nunhead (1896)

Tower Hamlets
    Bromley St. Leonard (1895 but closed 1906 following opening of larger library presented by Carnegie)
    Limehouse (1901; extended 1931)
    Poplar (1901; extended 1950; but closed as library following opening of new building in 1962 and now used for other community purposes)
    St George-in-the-East (1898; demolished by enemy action 1941 and not rebuilt)
    Whitechapel (1892)

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W. A. MUNFORD

EGYPT, LIBRARIES IN

Egyptian librarianship has a long continuing history. During the early periods of human civilization the ancient Egyptian temples must have contained the first organized library collections. Libraries are reported to have existed for 6,000 years in Egypt. There were private collections of books, and there were small deposits associated with schools, royal palaces, and temples such as these at Heliopolis, Dendarah, and Edfu, the latter known as the "House of Papyrus."

The library of King Ramses II (Ozymandyas), ca. 1304–1237 B.C., is as famous as the name of the king himself. He is said by the Greek historian Diodorus Siculus to have established a library of sacred literature in Thebes and to have placed over its entrance the inscription "Medicine for the Soul." The contents of this royal library are thought to have numbered as many as 20,000 rolls and to have included works concerned with agriculture, astronomy, history, and irrigation, and works of poetry, fiction, and correspondence. That the King Ramses II Library was the largest in Egyptian antiquity may be uncertain, but there is no doubt that in later centuries many temple libraries were maintained under the care of priests.

In addition to carved inscriptions and rolls of papyrus which tell us about the existence of large royal and private libraries in Egypt, there have been found at Thebes the tombs of two librarians (or archivists), father and son, named Neb-Nufre and Nufre-Heteb, indicating that librarianship in ancient Egypt was regarded as a learned profession.

Under the influence of the new Hellenic civilization Alexandria was the leading intellectual center, and a great library was established in this newly founded city. The library and the museum were maintained by the long succession of the Ptolemies in Egypt from the beginning of the third century B.C. The library survived for many centuries until its destruction in 47 B.C. when Caesar besieged Alexandria.

The Arabs were accused of destroying the library of Alexandria; an accusation which has long been relegated to legend and is also in complete contrast to the spirit which animated the Arabs at the time of the conquests. This spirit, which became very clear later, was not of violent proselytism or fanatic destructiveness, but rather that of respect for the superior civilizations with which they came into contact.

Following the Islamic conquest of Egypt which put an end to the Roman influence in this part of the collapsing Roman civilization, Egypt began to play a vital role in the growing Islamic civilization. Cairo was later preferred to Alexandria and gradually it assumed the cultural and intellectual leadership in the Arab-Moslem Empire, competing with its rivals Baghdad and Damascus.

In Cairo, Arab-Moslem libraries were founded and endowed by princes and private individuals for the benefit of scholars, sometimes for those of a special sect or for some particular study. With the zeal of literary pursuits and the ever increasing composition of books, after the period of conquests, men of literary tastes accumulated handsome private collections of books. It later became a custom for authors to deposit copies of their works of reference in the mosques of their town or quarter.

These mosque collections, later developed into large libraries, were actually the nuclei of public and academic libraries and not private libraries for the princes or scholars. A great impulse was given to the development of the Arabic-Islamic book and to Egyptian libraries by the importation of the art of paper-making which made books less expensive and, consequently, within easy reach of the masses. As late as the fourth century after Hegira (tenth century A.D.) books were still written upon parchment and papyrus which, due to their scarcity, made books and reading the privilege of the very few. It was when the art of paper-making came from China by way of Samarkand that Arabic books became available in greater numbers and at less cost. Hence the number of libraries increased and book collections became larger.

Later, in the ninth century, when the number of students increased and book collections grew, mosques became inadequate for providing the necessary facilities for learning. It was then that the *madrasas* came into existence and advanced studies no longer remained confined to mosques. The *madrasah* (English plural, *madrasas*) refers to a school or college which to a great extent resembles European colleges in the Medieval period. In these *madrasas* instruction had a wider scope than the religious education which was dominant in mosques.

The first such *madrasah* and its library were founded in Cairo by the Fatimid Caliph al-Hakim and became in reality the first lay university in Egypt. Its curriculum and its library collections included mathematics, astronomy, medicine, and grammar. Libraries and book collections in these *madrasas* were made public and did not remain the preserve of the professors and students alone.

Among the many academic libraries that the Fatimids established in Egypt from the tenth to the twelfth centuries was *Bait al- 'Ilm* (House of Learning or House of Science) which was founded by Caliph al-'Aziz (975–996). Later, in 1004, the library collection was transferred from Bait al-'Ilm to *Bait al-Hikmah* (House of Wisdom) which was founded by Caliph al-Hakim. The Arab historian Ibn al-Qifti wrote that in 1043 the Wazir Abu Qasim 'Ali Ibn Ahmad took charge of the affairs of the library, cataloged it, and repaired worn bindings.

From early historical sources we learn that books were acquired at the library partly by purchase and partly by the copyists attached to the libraries copying

manuscripts. al-Maqrizi has preserved for us the library's budget of Dar al-'Ilm during al-Hakim's rule (996–1020). He states that the caliph spent 257 dinars* a year, allocated as follows:

Mats from 'Abbadan, etc.	10 dinars
Papers for copyists	90
Salary of the librarian	48
Drinking water	10
Wages of the attendant	15
Wages of the keeper of paper, ink, and reed pen	1
Repairing the door curtain	1
Repairing books	12
Felt carpets for the winter	5
Blankets for the winter	4

The book cases (rufūf) in the Fatimid Library were divided by partitions into separate compartments (hājiz), each of which was closed by a door with hinges and locks. The order of books in that arrangement was classified according to various branches of knowledge. Copies of the Koran usually had a special place; in the Fatimid Libraries, for example, they were kept on a higher level than the other books. The various titles were often present in several copies; this made book circulation more possible. The number of copies kept for each title reflected a policy of wide circulation. It was reported that thirty copies of the Kitāb al-'Ain of al-Khalil were kept in the Fatimid Library, twenty copies of the Tārikh al-Tabari and many copies of Kitāb al-Jamharah of Ibn Duraib.

At the death of the Caliph al-Hakīm the Cairo Library was still cared for; the vizier of his successor Abu'l-Qāsim 'Ali Ibn Ahmad al-Jarjara'i in 1043 caused a new catalog to be made of the books and the bindings repaired. But gradually the library fell into decay, especially under the Calipha al- Mustansir 1035–1094.

In 1171 Salāḥ al-Dīn al- Ayyubi became the new ruler of Egypt, and he and his dynasty also took a share in the fate of its libraries. His Vizier al-Qādī al-Fādil formed out of the books presented to him by his sovereign a large (for the time) library consisting of 68,000 volumes and deposited them in the library of the Fādiliyyah Madrasah which he founded.

The Seljukian period (tenth to eleventh centuries) proved to be the golden age of learning in the Moslem East, especially in Egypt. This was mainly due to the long peace enjoyed under the rule of the famous administrator Nidhām al-Mulk. He organized a system of education, started regular madrasas, and founded several important colleges and university libraries and endowed them adequately with generous grants from the government. Taj-ul-Dawlah was another minister of the Seljukian period who founded colleges equipped with excellent libraries under his name Tājiyyah.

The Ayyubid emirs of Egypt emulated the example of the great Seljuks in found-

* Around the year 1000 A.D., 257 dinars were worth the equivalent of 120 Egyptian pounds ($264.00).

ing colleges and libraries. After the Ayyubids there followed a series of military oligarchies known as the Mamelukes, former foreign slaves, usually Cirassians, Georgians, and Kurds. This Mameluke (slave) era lasted about two and a half centuries until 1517. In spite of the fact that the Mameluke regime was an unstable one, and that conspiracies and counter conspiracies to capture power were more dominant in this era, education and librarianship continued to benefit as a result of these conflicts. The objectives of power during the period were not limited to the military victories of one Mameluke over another but also included the number of schools or *madrasas* that carried his name and the size of the mosque that was named after him and where he used to pray.

One of the outstanding academic libraries established during the Mameluke period was the library of Qaḍī al-Fāḍil Abu 'Ali 'Abd al-Raḥīm al- 'Asqalani (1135–1200) in his Cairo *madrasah*. Al-'Asqalani was one of Cairo's distinguished bibliophiles and scholars. When he founded his *madrasah* in 1184 he contributed his books to its library. The school became known as al-Fāḍiliyyah.

It was also during the Mameluke period that a library was established by al-Malik al-Manṣur Qalawun al-Ṣāliḥi (d. 1290). Among the books donated or acquired by the library were the leading medical Arabic works such as *al-Sāmil fil-Tibb* in 300 volumes. The library itself was housed in the large medical center (al-Bimaristan) at Khatt Bayn al-Qasrain.

When Egypt was conquered by the Ottoman Sultan Selim I in 1517 it became, in fact, not in function, an integral part of the Ottoman Empire and so continued until World War II. During its occupation by the Ottoman rule, Egypt was cut off from the world's civilization, especially from the growing civilization in Europe. It was not until 1780 when Egypt was first introduced to Western civilization, brought to its threshold by the French Expedition under the command of Napoleon Bonaparte.

The French expedition brought new ideas and new technology to Egypt, including the printing press which later played an important role in Egyptian culture. Even when Egypt was oppressed by the great powers, France, Britain, and the Ottoman Empire, the Egyptians managed to move toward independence and, under Mohammed 'Ali, began to disassociate itself from the Ottoman Empire until it eventually became an independent state.

Modern Egypt, most closely in contact with Europe, first felt the need for establishing libraries of the European type, and the Khedieval, now the National Library, was established in 1870 as a landmark in the nation's history and in its desire to restore what was lost under foreign domination.

The establishment of the Khedieval Library in 1870 marked the beginning of modern librarianship in Egypt. 'Ali Mubārak, then minister of education, gives the Khedive Isma'il the credit for the idea, but it was he who played a considerable part through the preparation of a section of the Darb al-Jamāmīz Palace as a research library for his teachers, in imitation of similar institutions abroad. The palace proved to be spacious enough to house the library in its expanded form, so Mubārak was commissioned to bring together the collections of books and manuscripts scattered

throughout the various government offices, mosques, and waqf properties along with other collections purchased by the Khedive Isma'il. This project was one of the important measures that preserved what was left of Arabic books, manuscripts, and rare books from being lost or sold to foreign collectors at very low prices.

By 1900 the palace proved to be too small for the growing library collection, and a new building was established in Bāb al-Khalq to which the library collection was moved and has remained. Since its transfer to this new building the library has been constantly supported by government funding, by allocations from private waqf, and by donations from scholars and philanthropists. The library attracted to its directorship outstanding European and especially German Orientalists such as Spitta, Vollers, and Moritz. Since the time of the first European director Spitta, the National Library has had a special staff of qualified copyists able to produce exact copies of manuscripts for scholars who wanted copies to edit and verify.

In 1911 the library was first organized administratively, and since then many divisions have been established and several regulations passed to bring the library administration to its current organization which places it under the supervision of the under-secretary of culture for library affairs. The library's policies are also drawn by the Supreme Council for the National Library which acts as a board of trustees to which the under-secretary reports. The National Library has its own director who supervises the deputies in charge of the different departments of the library such as the Reader's Service Department, the Technical Services Department, Public and Branch Libraries Department, and Administration and Finance.

In 1955 a special office for legal deposit was established and an international exchange service was created. Since that year the National Library has been serving as the secretariat for the Egyptian National Committee for Bibliographic Services which is responsible for developing plans for a national bibliographic organization. The legal deposit office receives ten copies of every publication printed in the United Arab Republic. The legal deposit law was passed in 1954 and amended in 1962.

The National Library is charged with the responsibility of compiling and publishing the *Egyptian Publications Bulletin* (*al-Nashrah al-Miṣriyyah lil-Maṭbu'āt*) which was first published by the National Library in 1955. The *Bulletin* can be considered as the official national bibliography of the country. It was published quarterly until 1960 and is now issued annually with 5-year cumulations.

The Egyptian National Library also functions as the main public library for the nation's capital. As a state library it supervises the twelve branch libraries located in the various districts of Cairo. It is open to the public. It was not until 1969 that the National Library found it essential to stop all outside book loans in order to keep books available in the library to be used inside the building.

In 1972 the National Library will celebrate its centennial anniversary. On this occasion the library will be moved to its new home on the Nile River bank. (see Figure 1). Construction of the new building began in 1961 when the cornerstone was laid by the minister of culture and national guidance. The new building will provide enough space for the various activities and facilities now planned including a national audiovisual center, a national exchange center, a special library for the
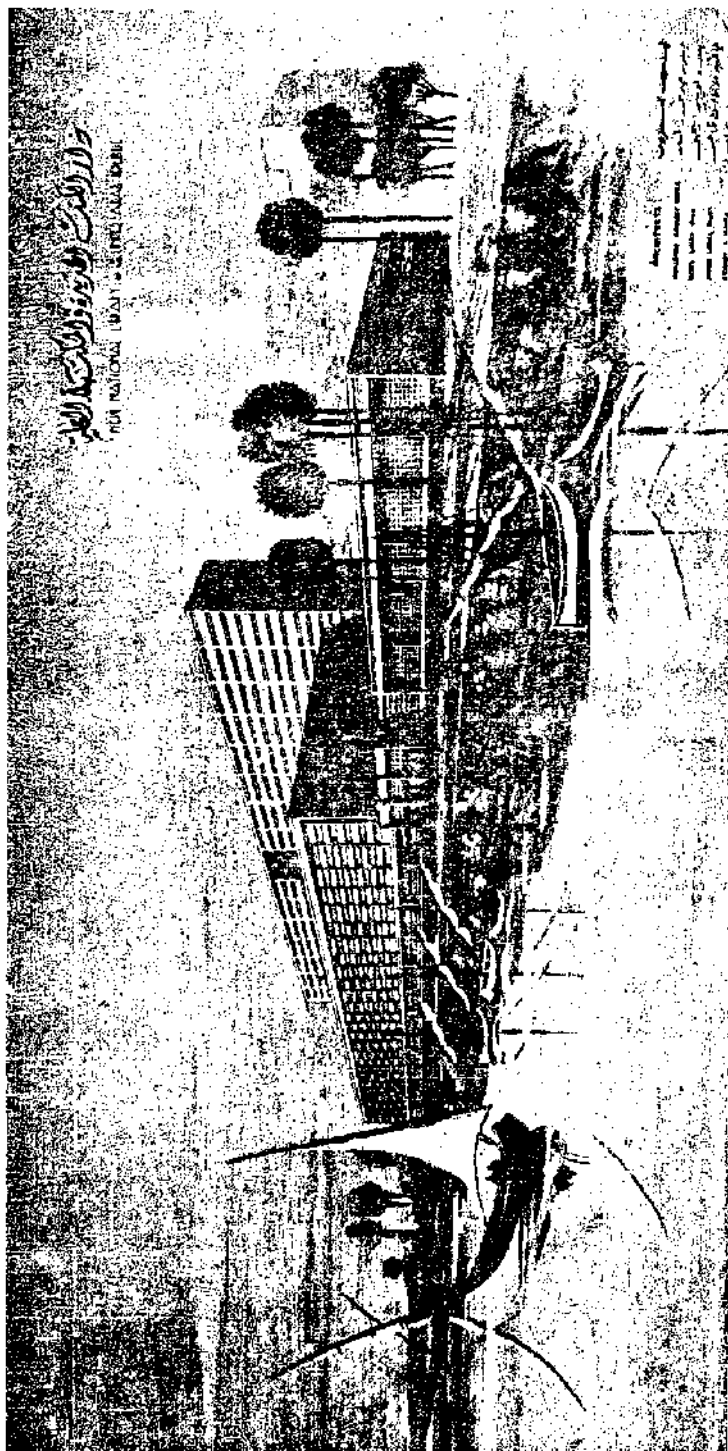
FIGURE 1. *The new National Library Building, Cairo. (Courtesy National Library, Cairo.)*

blind and visually handicapped, a special map collection division, a separate library for manuscript and papyrus collections.

The new library building will be adjacent to two new buildings, one of them will house the national archives and the other will house the official government press and the rest of the library's collection.

Until recent years public library service in Egypt was enjoyed by residents of Cairo only, while in other cities library services were inadequate or nonexistent. Until 1963 the only libraries that provided public service in cities outside the capital were the municipal libraries housed in municipal buildings and staffed by nonprofessional employees who kept books in locked stacks and provided no organized catalogs or reference services.

Unlike the rest of the nation, Cairo and Alexandria have enjoyed good and well-organized public library service. In Cairo, the National Library and its branches provided adequate library service to residents of the capital in twelve major districts. In Alexandria, the Municipal Library contains one of the country's largest public library collections which is also properly maintained and professionally staffed.

Beginning in 1963 public library service began to spread to different Egyptian cities from the lower to the upper parts of Egypt. The new cultural plans for the nation provided for the establishment of cultural centers in all Egyptian cities. The new cultural centers or palaces are patterned after the cultural palaces in Yugoslavia and Eastern Europe. There are now cultural palaces serving fourteen of the twenty-two principal Egyptian cities. Many of these buildings were newly built specifically as cultural centers while other cultural centers are remodeled old buildings. The purpose of the cultural centers is to attract young men and women who may be interested in reading or in any other social or cultural activities. Such cultural centers have helped to bring the reader and his club, coffee, and recreation center together under one roof.

The cultural centers are staffed, financed and supervised by the Ministry of Culture. The average collection in a cultural center is 9,000 volumes and five major Arabic periodicals and newspapers. At least one professional librarian is in charge of a cultural center.

Public library services have also been extended to the long unserved groups of farmers and the rural populace. In 1952 UNESCO, in cooperation with the Egyptian government, established at Sirs el-Layyan the Arab States Fundamental Education Center (ASFEC), which is now known as the Arab States Training Center for Education for Community Development. Through its library demonstration projects, the center soon took an active role in the development of rural public and school libraries. It was the first attempt to bring books and audiovisual material to the Egyptian villages. Since then the library system has taken into consideration the Egyptian villages (the smallest community unit) and from there progresses to the larger rural or urban community levels.

Bookmobile services are provided to some Egyptian villagers in remote areas of the Egyptian countryside. This type of library service is being provided and equipped by the ministries of culture and national guidance in cooperation with the local

governments. The service seeks to bring books and multimedia to the Egyptian farmer in an attempt to fight illiteracy and to educate the villagers to the best ways of maintaining healthy communities and an economically sound nation.

School libraries in Egypt have been expanding very rapidly during the past years, from one secondary school library in 1900 to fifty-nine in 1964. In 1961–1962 there were 503 intermediate and secondary school libraries for boys and girls. By 1970 there were more than 7,000 preparatory school libraries with a total of 4,213,000 books, and about 1,300 secondary school libraries with a total of 2,764,800 volumes. There are also about 6,000 classroom libraries in elementary schools. Nearly 350 modern school libraries have been opened to the general public since 1956, thus providing public library service to some degree.

Special efforts were made by the Ministry of Education to make school libraries an integral part of school education. Funds allocated for book purchasing were increased, libraries were staffed by professional librarians graduating from the Department of Librarianship at Cairo University. New regulations and laws were passed providing for open access, and a school library hour was introduced by Ministerial Act 179 (August 15, 1958). According to this act, each class meets once a week in the school library to use its services under the supervision of the school librarian. The new regulations also provided for a 10% operational loss and the right of the librarian to discard material from his library. Two model school libraries for young people were built, one in the center of Cairo and the other in Heliopolis.

In order to provide standards for school library service, a central agency for school libraries was established in 1955 in the Department of School Libraries of the Ministry of Education. The department recommends to the minister of education new regulations to improve school library service. It also serves as a general inspectorate for school libraries all over the country. Inspectors are sent to different school libraries to examine the library situation, and to report on the work of the school librarian and the role of the library in the school program. The department is also responsible for operating a centralized acquisition and book processing center that acquires, processes, and send books to school libraries. The department also provides standards for furniture and equipment to be used in school libraries. A handbook containing technical information for school librarians was published by the department under the title *Tandhīm al-Maktabāt al-Madrasiyyah (Organization of School Libraries)*.

School libraries in Egypt have played and will continue to play a very important role in the field of library service in the country. It is the general feeling of the authorities and educators that because reading begins in the early stages of school, it is there that good library service should start. The country has come a long way to achieve the current position of its school libraries, but there is still a need for a very extensive program of developing school libraries and providing them with materials for information, education, and aesthetic appreciation. Emphasis needs to be given to pure and applied science material as well as to the literature and humanities which are widely read by Egyptian students. There is also a need for increased finances to be spent equally among school libraries in Egypt, and emphasis should

be given to the integration of independent study, term projects, and other methods that encourage the use of libraries and outside books in the early stage of young adult education.

Academic libraries in Egypt can be traced historically to the library of King Ramses II. From that time a series of academic libraries were founded until 988 when the largest academic library in the Arab world was founded by the Fatimid Caliph al-'Aziz (975–996) in connection with Bait al-'Ilm (House of Learning or House of Science). Later, in 1004, the large library collection was transfered from Bait al-'Ilm to Bait al-Hikmah (House of Wisdom) which was founded by Caliph al-Hakīm.

Al-Azhar is one of the oldest academic institutions still in existence. It was founded in 969 and was turned into a university which became known as al-Jāmi'ah al-Azhariyyah in 988 to promote the Shi'ite doctrine. Like many of the Arab academic institutions, al-Azhar was first founded as a mosque which was staffed by leading scholars in the Moslem East. It has attracted students from all over the world and al-Azhar still continues the same tradition that has existed for more than ten centuries. From the time of its establishment and until the end of the nineteenth century, education in al-Azhar was purely religious. In 1896 a law was passed introducing modern subjects into the program of education. In 1961 al-Azhar was expanded as a new university of the twentieth century, combining theology, Islamic jurisprudence, engineering, medicine, and business administration.

The large and classic collection of al-Azhar library was then supplemented by new books in the above-mentioned disciplines. The library collection is very rich in old Arabic manuscripts and in Arab classics on religious and historical subjects.

The universities of Cairo, Ein Shams, and Alexandria have their own long-established libraries. Cairo University was founded privately in 1908, and in 1928 it became the State University; Alexandria University was established in 1942; and Ein Shams in 1950. Each of these universities has its own main and faculty or departmental libraries. The main library usually houses the large library collections in the humanities and social sciences while the subject collections are distributed to the special faculty libraries.

The newly established college and university libraries are not as rich as the old universities, but their collections reflect new areas of study that never before were present in academic libraries in Egypt. It is estimated that there are now forty-five colleges and independent institutions, excluding the six major universities.

In the large university libraries the following divisions can be found: acquisitions, cataloging, periodicals, secretariat/accounts, circulation, stacks, and reference. Each department has a supervisory officer or head, the exception being the circulation and reference departments which in most cases are considered to be under the direct supervision of the chief librarian.

College and university library staff can be divided into three categories (1) Professional staff, selected as much as possible from the graduates of the Department of Librarianship at Cairo University. They have no faculty rank or status and are part of the administrative staff of the university. (2) Library assistants perform most of the nonprofessional duties in the main and departmental libraries including

circulation and the supervision of reading rooms. A library assistant is usually a high-school graduate with no previous library training or experience. (3) Technicians, stacks personnel, typists, and printers; their professional or academic qualifications vary from a fair knowledge of reading and writing to the possession of prehigh-school diplomas.

Library holdings of most of Egyptian colleges and universities are very poor and in many cases outdated. Lack of scientific and technical books and periodicals, especially in foreign languages such as English, German and Russian, have hampered the efforts of professors and students alike in being informed about the latest developments in science and technology that could be utilized to aid in the country's economic and industrial growth.

Although current figures about book holdings are not available, the figures reported in *World of Learning* (1970 ed.) indicate that the richest collections, bibliographically speaking, are those of the university libraries of al-Azhar (80,000 volumes, including 20,000 manuscripts), Alexandria University Library (122,225 volumes plus 1,000,000 volumes in its eight faculty and section libraries), and Cairo University Library (215,000 volumes). Other university and college libraries have far smaller book collections and virtually no current leading foreign periodicals in the various fields of study.

Library regulations in these libraries are the product of deeply rooted restrictions which greatly hinder library use. For example, the libraries are usually open only during the hours when students are attending classes, so that the opportunities to make use of library facilities are sharply limited. Open access is very limited if not impossible in the leading university libraries, and outside circulation involves a very complex process.

To improve the current situation in Egyptian college libraries many steps need to be taken in order to adopt cooperative acquisition programs, centralized processing, shared library resources, and increased interlibrary loans. Moreover, a large percentage of university expenditures should go to building a strong, balanced library collection in each Egyptian college to provide the nation with a vital reservoir of knowledge and information.

As for government and special libraries, book collections can be found in almost all government ministries and agencies. The collections vary in size and quality from one agency to another. Most of these collections developed from archival materials that were kept in a separate section of the government building. The National Library, itself, was first established in 1870 as the library of the Ministry of Education with emphasis on materials to help teachers and scholars.

The strength of these governmental libraries is represented in their holdings of government documents, laws, archives, and foreign materials not easily available elsewhere.

Several highly specialized government libraries have been converted into documentation centers for their respective departments or institutions. Examples of these centers are the Institute of Public Administration Library (founded in 1964), Science Documentation Center of the Atomic Energy Commission (1962), Educa-

FIGURE 2. *National Research Center, Cairo.* (*Courtesy National Research Center, Cairo.*)

tion Documentation Center (1956), Institute of National Planning Documentation Center (1960), Social Research Center Library (1955), and the National Information and Documentation Center (1956).

Foremost among special libraries in Egypt is the Scientific and Technical Documentation Division, which is operated by the National Research Center at Cairo (see Figure 2). This center was developed as a result of an agreement between UNESCO and and the United Arab Republic government in November 1956. It is a successor to the National Research Council which was established in 1947 under the Council of Ministers, and the National Research Institute which was established, with the Production Council, in 1953–1956. In June of that year the institute separated from the Production Council and was renamed the National Research Center whose Documentation Division aims at collecting and distributing the maximum amount of scientific information to those engaged in research and teaching as well as in industry.

The Documentation Division consists of the following units: library, bibliography, information, patents, publications, photo-reproduction, and translation.

The Library of the Documentation Division has the best collection of scientific and technical material available not only in Egypt but also in the whole Arab world. In addition to its large number of books, the current collection has over 2,000 periodicals, some of which are translated from Russian into English. The Documentation Division also publishes guides to scientific literature and provides indexing and abstracting services.

Another outstanding science library in Egypt is the Supreme Science Council Library which was established in 1956. The council serves as a planning and advisory body to the president of the republic concerning science policy. Among its activities, the council maintains an inventory of special research apparatus available in the country, the state of this equipment, and its main functions. This inventory provides a reference guide and allows a system of cooperative utilization. The council's library contains catalogs and brochures published by various firms that produce scientific equipment.

Another leading documentation center in Egypt is the National Institute of Management and Development (NIMD) Library and Information Center in Cairo. NIMD was founded in 1954 and its library began operating in 1964. It aims at providing information about management and allied fields. The library has more than 10,000 volumes on business administration and management. The library also subscribes to more than 160 current periodicals from all over the world. The collection includes, among other items, a large collection of government documents and reports and pamphlets published by Egyptian companies and corporations.

Other major specialized libraries in Egypt include the Library of the Institute of National Planning which was founded in 1960 to provide Egyptian officials and planners with information needed for their work. The library has more than 10,000 titles and 450 periodicals. Its staff includes six full-time professional librarians, some of whom have had the opportunity to visit similar research libraries abroad.

Education for library and information science work is provided by the Department of Librarianship and Archives, established at Cairo University in 1954. It provides a 4-year undergraduate program in library science and is open to students from all Arab and African states.

Prior to the establishment of the Department of Librarianship a number of library training programs existed during 1945 and 1949. In 1949 the Cairo Library Association organized the first institute for the training of librarians working in Egyptian libraries. In 1951 the Institute of Librarianship and Archives was established and in 1954 it was affiliated with Cairo University as a department in the Faculty of Arts. Since then the program of education in the department has undergone major changes.

In 1965 the Department of Librarianship and Archives at Cairo University dropped the courses dealing with studies of archives, manuscripts, diplomatics, and allied subjects. These studies were transferred to a graduate program separate from the undergraduate department of library science. A graduate program of library science has been reorganized in three different graduate levels: the first graduate year leads to a general diploma in library science, a second year leads to a special diploma, and a third year and a theses lead to a Master's Degree in Library Science. The graduate studies for the diploma in library science began in November 1969 with an enrollment of eighty-five students holding the bachelor's degree or its equivalent from the different undergraduate programs in Egyptian universities.

The undergraduate program in library science begins with general studies during the first academic year, followed by library science courses in the following 3 years. The courses offered are: history of books and libraries; introduction to library science, library and community, descriptive cataloging, subject cataloging and classification, technical services, Arabic references, European references, bibliography; educational psychology, courses in foreign languages such as French and German, and courses in classic languages such as Latin and Greek. The department is also planning to introduce new courses in special librarianship and in information science.

In addition to the formal library education programs at Cairo University, the Ministry of Education and other ministries such as the Ministry of al-Awqaf and

the Ministry of Culture also offer summer training programs for their library staff members who have no formal academic library training.

The Arab States Fundamental Education Center (ASFEC) at Sirs al-Layan includes in its program a library demonstration project and training courses using its own library headquarters to introduce Arab trainees to modern library service as an integrated program of community development. From 1953 onward ASFEC offered courses in librarianship, including intensive in-service training. It has also produced manuals in Arabic on the organization of small public and school libraries, and on cataloging and classification.

Arab library literature is still in its infancy and in spite of the few attempts that have been made during the past few years to produce Arabic library tools, Arab librarianship still lacks the essential tools that librarians need. A translation of the abridged *Dewey Decimal Classification* was published by Sheniti and Kabesh in 1963. An Arab code of descriptive cataloging was published by Sheniti and Mahdi, a technical services handbook was published by Anwar 'Umar, and a code for Arabic subject headings was published by Mohammed Aman.

Under grants from UNESCO a number of Arabic library science reference books have been published during the past few years. *A Directory of Archives, Libraries and Documentation Centers in the Arab Countries* was prepared by Ahmad Badr, *A Bibliographical Guide to Reference Works in Arabic* was prepared by Sa'd el-Hajrasi, and an Arabic edition of *Vocabolarium Bibliothecarii* was prepared by Sheniti and Mohammed Hussain.

The first Arab library science periodical began publication in Cairo in 1958 under the title *'Alam al-Maktabāt* (Library World). It was followed by two scholarly library journals, i.e., *al-Kitāb al-'Arabī*, which began publication in 1968, and *Sahifat al-Maktabah*, which is published by the School Library Association in Cairo and began in 1969.

The first professional library association in Egypt was established in Cario in 1945 and was known as the Cairo Library Association. During 1951–1952 the efforts made to broaden its activities resulted in the creation of its first branch in Alexandria, which ceased to function few years after its establishment.

In 1952 the Cairo Library Association changed its name to the Egyptian Library Association and became a member of the International Federation of Library Associations (IFLA). At present the Egyptian Library Association limits its activities to Cairo without branches or regional representation in other major cities.

A new association for school librarians was founded in 1968 to bring school librarians together in a separate organization that will coordinate efforts to promote school librarianship in Egypt.

Although copyright laws did not exist in Egypt until 1955, the country had a Press and Registration of Books Act as early as 1799, followed in 1881 by a Publication Law which required clear identification of publications either written or printed in modern Egypt. It was not until 1955, however, that a bibliography of materials deposited in the National Library became available. The bibliography is published by the Egyptian National Library under the Arabic title *al-Nashrah al-*

Miṣriyyah lil-Maṭbu'at. It is published annually in two separate sections in Arabic and English. The latter section covers materials written in Romance languages.

Retrospective coverage of national book production in Egypt can be traced in several retrospective bibliographies such as the *Cultural Record (al-Sijil al-Thaqāfi)* for 1947–1948 and the annual bulletin of additions to the National Library covering the period from 1892 to 1949.

Official publications of the Egyptian government can be found listed in the bibliographies available from government libraries and documentation centers. Official publications from the Ministry of Education, for example, are listed by the Documentation Center in the ministry. The first cumulative listing of such government publications was issued by the center in 1961 and covers the 1950–1960 period.

The only available example of a separate retrospective bibliography of Egyptian official publications was issued by the National Library to cover select Egyptian official publications during the years 1952–1958. A bibliography of serial publications and periodicals available in the National Library was published in two volumes. It lists 2,144 periodicals arranged alphabetically by title.

Subject bibliographies have increased in number due to the growth of special libraries and the efforts of the National Library which publishes bibliographies on many national and social aspects in the country. The library has published bibliographies on Arab nationalism, Islam, cotton, Egyptian history, and biobibliographies of many Egyptian and Arab intellectuals and political leaders.

The National Library is planning to publish a comprehensive catalog of its holdings to be available during the centennial celebration in 1972.

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