

PROBLEMS OF SELECTION IN SCIENCE

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Identifying the problems of selection in science has something in common with trying to decide how to vote for the next president. You can go just by the picture on your television screen, or you can review his existence back to the time when his father first smiled at his mother. Book selection can be considered a simple, daisy-picking game of love-you, love-you-not, or you can bring into the picture the entire world of publishing, selling and reading--and the lives of humankind, our readers. In this discussion, a selection will be made from the general as well as the particular, from aspects of library administration as well as the peculiarities of science literature. Problems there are many, of solutions there are some.

Many of the problems attributed to the selection of science materials are common to selecting in any field. Indeed, one may say that there is no special problem with the science books; the real problem is with the librarian who is trying to do the selection. When dealing with fiction or family life or politics or history, the librarian wades right in (sometimes with his useful aids, of course), winnowing the harvest. Science, however, carries the stigma of a mysterious and impenetrable region, which only the initiated dare enter. The barrier is primarily one of terminology; the words are esoteric and meaningless, by themselves or together in a sentence. In the social sciences, we hear no complaints of trouble, even where words, perhaps meaningful when alone, are strung together in incomprehensible titles. There, we cope; with science, we give up. The basic fear, then, is that because we do not understand science, we cannot even begin to select materials on it. None of us is an expert in all the other fields of knowledge, yet we do select in them. There is no overwhelming reason to get fluttery or hysterical about science.

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When we consider scientific book selection in the broad picture, we immediately find the basic problems being shared with all subject fields. Our first problem, of course, is the study and analysis of the community we are serving. The techniques for doing this are not within the province of this paper. Only through such an identification process, however, will we know to what extent science and technology should be emphasized in the over-all program. The suburban, the rural, the business, the manufacturing communities will present their varied patterns of interests. While, ideally, we hope to satisfy any inquiry, whatever the subject, we know that gardening, polymer chemistry, bird books, steel casting, amateur radio, and food preparation may have more or less popularity depending on the location of the library. Population characteristics also provide useful guidelines. The distribution of age groups, economic and educational levels, and occupational specialties are among the elements having influence on the direction of our buying activities. Neither should we overlook the cultural and learning opportunities generally available. In an academic or special library, the community to be surveyed is of different nature, of course. Knowledge of community characteristics in any situation is as essential to good book selection in science as it is to that in any subject area.

The types of library service being provided must also be considered. One needs to weigh the requirements for recreational reading, to decide whether research needs are to be satisfied, to estimate the volume of calls for quick reference answers by telephone or in person. Our conference chairman has nicely categorized the varieties of users of scientific material.¹ We have the intelligent layman, keeping up with the progress of science on a broad front. There is the amateur practitioner, making quite a thing out of his particular phase of science. Students carry on their studies at various levels--and never underestimate the upper or lower limits of their interest. Scientists and technicians are concerned with applications to practical ends, and the research worker of scholarly bent may deal with the basic and theoretical investigation and report. Again, we find, as with other subject areas, that collections in science are built to accord with the pattern of service and the range of users in the respective library situation.

Speaking of users, one should note a characteristic sometimes thought typical of the scientist and technician. He does not tend to be a great user of books. Thus, one group whom we intend to serve may not make his needs known. Chemists are said to be aware of the importance of keeping abreast of the lit-

erature and of looking up information. Engineers, on the other hand, are among that greater number who rely on common sense, innate ability, and personal contact to solve their problems. Their world of ideas is centered on the laboratory and shop, and the answers are felt to lie in practical trial and experiment. This approach contrasts with that of the humanist or political scientist, whose expressive outlet is in the printed word and who is therefore more accustomed to this medium of inquiry. To some extent, then, we are handicapped in identifying subject areas and needed materials for an important segment of our community. We are also challenged to provide just the right thing when this group needs it, that they may be converted from skeptics to supporters of the library.

Maintenance of proper balance in the acquisitions program is another of our so-called problems in which all subject areas are equally implicated. When related to the sciences, it is sometimes considered critical, for reasons not wholly clear. Possibly the ravaging horde of science-stimulated students, the daily announcements of break-throughs, and other demand-creating factors are expected to pressure our careful plans awry. It is true that this nuclear age develops needs unexpected and previously unknown. But what was considered "balance" twenty years ago cannot be so considered today. Even as we recognize the desirability of representing new schools of political and economic thought and new literary and visual arts, so should we admit the new sciences and technologies. And from library to library the balance changes, so that this maintenance problem must be considered relative to time and place. Proper control of acquisitions is only achieved through continuing sensitivity to community needs, to developments in man's knowledge, to the output of appropriate materials, and other elements so well discussed by previous speakers. Also useful are records of library growth and use. A classified tabulation of accessions will reveal sudden or even long-term changes of emphasis on a subject. Similarly classified figures on circulation provide some idea of demand. One recognizes, of course, the danger hereof closed-loop deductions--collection strength to use to acquisition to collection strength. Maintenance of balance must be achieved through watchful administration. Pressures from science are to be taken in stride with pressures from existentialism. If, for a particular community, a thoughtfully planned collection contains 90 per cent or 2 per cent science, so be it; it is still balanced, on its own individual center of gravity.

In evaluating the place of science in a library's program, note may be taken of many other factors not unique to any sub-

ject field but certainly capable of affecting decisions on scientific collecting. Regional responsibility may be assigned in a scientific area as surely as in the historical. The presence of The John Crerar Library has affected the collecting policies of libraries throughout the midwest. Cooperation among libraries, in planned acquisitions programs and in liberal loan policies, will have a bearing on decisions to buy or not to buy. Photocopying services, too, aid in satisfying inquirer's needs. A few judiciously selected union lists and guides to regional and national resources open up facilities far beyond the single library's power to acquire. Last but far from least, in selecting in science or any other field one must know one's own collection. The lack of anything on a subject, the presence of old or outdated or recent materials, the quality of holdings--these add to the context essential to good decisions on purchases.

Nearly all of the foregoing discussion points to the necessity of a definite acquisitions policy. Always recognized as desirable, policies are far too often insufficiently spelled out in thought, let alone set down in black and white. A number of the larger libraries have developed written statements, especially since their selection processes are the work of many minds. If we consider that building collections in science and technology is a worrisome thing, then how desirable it is to set policy, and have it available for consultation by staff and readers alike. When the problem of intellectual freedom raised its rocky obstacles, we studied them carefully and set our course, in bold statements; perhaps one of the problems with science (or any other "tough" subject) is that we have not constructed such guides.

And so to the selection process itself. As noted earlier, the biggest problem facing most librarians is the fear of the unknown. We could be trite, quoting that "there is nothing to fear but fear itself." Recall, if you will, the endless controversy over library science vs. subject training. We say that a well-trained librarian, versed in the bibliographic tools of many fields, can move easily about, picking up sufficient subject knowledge en route to meet the requirements of each occasion. Wherefore do we say now that, though we can learn to understand an inquirer's question and answer it, we cannot learn to recognize the books containing the answers? The reply, of course, is that we can learn about science, in the same manner that our readers do.

Keeping up with current publishing activity in science is indeed a problem, as it is with any active discipline nowadays. There is an urgency about science that perhaps is not felt about

religion or philosophy or economics; this is one of the many legacies of the wars and the sputniks. To the student of any subject, his present need is urgent. But, somehow, the word "latest" is attached more frequently to science books, and we therefore feel we must not miss a trick. Here is one of our problems: finding out what is coming out now--not six or ten months ago. George S. Bonn has reviewed for us many of the aids in selecting science materials; his own contributions here are considerable. In brief, we use many of the same types of sources for our information as do selectors in other fields. We scan book reviews, hoping to find that ideal presentation described by McClelland: a citation with complete and exact bibliographic information; the place of this book and its subject in the over-all "art" of the day; an evaluation of its dependability; comparison with other similar works; the style of treatment and requirement of reader background; the qualifications of the author.² In other words, an objective, competent examination and judgment according to correct criteria--what we wish we could do ourselves, the same qualities of good reviewing, in fact, needed in any subject field. Too often, however, we find the review hardly adequate for our need. It quotes from the jacket, the preface or the publisher's blurb. It often passes no judgment. And judgments, when given, are more frequently favorable than our skeptical minds will entertain as believable. Some reviewing media we do find helpful. However, preparation of the truly helpful review may well require a time beyond the period of maximum usefulness.

Publisher's releases and advertising are usually our most up-to-the-minute source--when they give publication date. Omission of date, on the other hand, can trap the unwary into buying up old stock under false impression of recency. With advertisements, too, one has little on which to base judgment, except publisher's and author's reputations and recognition of topical currency. Availability of review copies enables the selector to satisfy himself on the title's worth, assuming his good judgment; it also presents the temptation of keeping more books than are really needed, the bird-in-hand being a powerful argument. Suggestion by users is another conventional source, taken at face value. One survey found that while 44 per cent of the replying librarians used patrons' suggestions, 35.2 per cent of them did so with discretion.³

Calling on specialists to assist in book selection is commonly done, sometimes informally when "X" happens by, sometimes through establishment of panels. The small or isolated library may have few if any specialists available. Academic

and special libraries normally consult faculty or staff members for advice; occasionally, approval by such personnel is required, which solves the librarian's problem nicely by taking the reins out of his hands. The specialist, having understanding of the subject is presumed also to have judgment. Where the two qualities occur together, happy is the librarian. To some specialists, however, all books are good books, and the more available in their fields, the better. One then has a brand new problem--getting rid of the specialists. Competence in mechanical engineering, moreover, ensures no surety in electrical engineering, though both are "engineering." Scientific specialists are truly that; their scope is likely to be quite circumscribed and, for the admiring librarian, their little knowledge may indeed become a dangerous thing. One writer has, with womanly intuition, pointed out a subsidiary benefit--that men like to be asked for advice, and may thus be conjured into becoming interested and frequent users of the library.⁴

Lacking a science degree or a dependable specialist, how may a librarian evaluate materials for acquisition? In many respects, again by the same criteria used in other fields. The wise teachings of Helen Haines may be studied in this area as in others.⁵ Certain publishers are known to produce generally high-class works. Others have a good one now and then but must be watched. A few should be approached warily in all cases. The qualifications of the author are generally stated--at least, his business or academic connections or training and experience--or, in some cases, the specialist who aided him if the writer is a non-specialist. The purpose and scope of the book may be considered in relation to the library's needs for general or professional treatment, complete or partial coverage, original research or secondary reporting, critical review, summarization, or dogmatic expounding.

[Examination of the book will note any obvious errors in grammar, tabulation, and even mathematics. The logic and precision of expression can often be inferred, and if the work is a popularization, any tendency to sloppiness, writing-down, or exaggeration may be noted. Indexing and bibliographic features are standard clues to quality, where appropriate; accurate references and further readings are recognizable virtues. In scientific and technical works, illustrative material is often important. Half-tone pictures are valuable for some purposes; frequently, line drawings and cut-away views are more useful in explanation. In textbooks and manuals, worked-out examples and step-by-step instructions are invaluable to the student or apprentice. The intrinsic worth of a book may not be

completely judged in any of these ways, of course; this does require understanding of the content. But the librarian surely should not feel wholly lost; a book is still a book, and is per se subject to some evaluative measurement. Elimination of a prospective title is a positive act contributing to the selection process just as surely as approval. This type of so-called "negative selection" can be developed into a fine art, fortunately for the world of librarianship.

Note should be made here of the popularization; this is a form of science literature mentioned in previous papers at this meeting. Generally, [criteria for selection are the obvious ones of authority, clarity, readability, timeliness, etc.] The problem arises as to what proportion of the science collection is proper for this type of writing. It has been said that the major problem in selecting science books is finding sound popularizations. Aids in this process are poor, and the non-specialist librarian, as a typical "general" reader, is possibly his own best adviser.⁶ Others decry the influence of popularizations on selection trends, feeling the long view calls for purchase of materials of more permanent value.⁷

The rapidly changing profile of scientific knowledge has been vividly shown to us. Another characteristic is unique to the sciences and, as has been pointed out, to the literature; this is the factor of continuity.⁸ Rather than disparity and opposition, we find growth and the building upon what has gone before. In the literature, this results in rapid obsolescence and frequent new editions. We are faced with new books which may be better than old books, and new editions which should, perhaps, replace previous editions. In both instances, judgment requires us to have some conception of the characteristics of the subject field --how rapidly is it changing, what new developments have taken place, to what extent are older practices still valid, does the new show signs of supplanting the old or is it likely to be of only academic interest? A new edition may offer thoroughly revised and rewritten content, with up-dated tabulation and illustration, recent citations in bibliographies, and changes in emphasis. On the other hand, revision may consist of only a few paragraphs added to the end of a chapter or two, or possibly a new chapter whose content is already represented in the library's collections. Edition changes must be weighed in the light of subject requirements and cost of volumes.

The factor of obsolescence is related not only to the need for acquiring new materials but to the desirability of discarding the old. "Weeding" we call it, with twinges of conscience that not as much of it is done as should be. Our so-called "negative"

selection operates here as well as in rejection of materials for purchase. The same criteria must be applied to books in the collection which are susceptible to discard as operate in choice of acquisitions. One new factor must be considered--whether the library includes historical research among the interests which it wishes to satisfy. Few libraries will--or should--deem it necessary to retain superseded editions or early treatises for this reason; they may wish to keep old editions of reference works for lending copies, but only if this status relative to later editions is clear to the reader.

Some studies have been made of the relative rates of obsolescence of library materials. One study has shown that, in the liberal arts, perhaps 8 or 9 per cent of the collection annually becomes obsolete.⁹ A supplemental study found that engineering works, by contrast, have an obsolescence rate of about 16 per cent; that is, one sixth of a consistently growing engineering collection becomes obsolete in a given year.¹⁰ These figures have some interest in revealing how much weeding may be appropriate. Obviously, they do not answer the jack-pot question--which books do we discard. This, alas, must be answered the hard way, by examination and evaluation of individual titles. Date alone, while a leading clue, cannot be the only measure; informed judgment must play the major role in decision making.

We have heard our previous speakers describe the different forms in which the literature of science appears. We have seen how rapidity of change and sequential progression from one man's work to the next make necessary the prompt reporting of information. Periodicals, with their capability of recency in coverage, are thus not only desirable in the library's collection (as with other subjects), they are absolutely essential to knowledge and understanding in science. The hard-cover book provides our foundation stone of theory and general practice; it may also summarize and review developments of the past year or two. Only the periodical, journal, bulletin, or report can bring us news of this month, today, and next year. Thus, the problems in selection of the science collection are not limited to books but extend also to other forms, most important being the periodical.

Here again, some of our criteria of physical excellence may be applied. Reputation of publisher, status of authors, care in editing, inclusion and quality of illustrative material are reasonably identifiable in making selections for subscription. Affecting our over-all decisions is the fact that acquisition of a serial publication is not a one-shot operation as with a book. A

subscription has to be paid each year. We have to process 4 or 12 or 24 or 52 or even 365 pieces a year instead of one. Our shelf space is progressively occupied. We must decide on retention. We must somehow box or package or bind. None of These housekeeping operations relate to basic worth, but one or all of them may influence our decision in selection.

Some brighter aspects of this picture may be pointed out. One is not compelled to continue a subscription; if our decision left something to be desired, or if the quality of the periodical deteriorates, a cancellation can be made. Sometimes, presence of a back file may recommend continuance of subscription--a curious influence, when you examine it, which should usually be disregarded. Storage problems can be minimized through the use of microforms, as we have done with newspapers. Over 60 per cent of the titles covered in Applied Science and Technology Index are available on microfilm from University Microfilms, of Ann Arbor, Michigan. To purchase films at the end of the year, one must have been a subscriber; instead of binding, however, one eventually discards issues and the binding money covers the cost of the film. With a combination film reader and enlargement-printer, most users are adequately and happily served.

Full utilization of periodicals selected also requires more than conventional cataloging of titles. As with general subject fields, we must have the appropriate indexing services available. To the Applied Science and Technology Index already mentioned, we may add more specialized services as the size, scope, and acquisition and service policies may require. Their cost is often not small and must be viewed in the same context with cost of the journals themselves.

Cost may indeed be a primary problem to many libraries wishing to acquire scientific publications. Science literature is expensive, and has been getting increasingly more so. Basis of this differential is undoubtedly due to production factors. The illustrations and diagrams, cited as being desirable in science books and magazines, are not produced on a linotype machine; they require expensive art work, photographic processes, and special printing media. Tables, mathematical expressions and chemical formulae must be hand set for letter press, or special care taken in offset printing preparation. According to recent figures, art books are the most expensive category, averaging \$11.35 per volume. Next in line come science at \$9.16 and technology at \$8.09 per volume. For the nine subject areas considered, the over-all average is probably between \$6.00 and \$7.00. The per cent of increase since the base period 1947/49 has also

ranked high for these groups. Top subject here was business at 69.1 per cent, with technology second at 66.5 per cent and science third at 65.9 percent.¹¹

For periodicals, the differential in subscription rates is equally impressive. For nineteen subject categories, the over-all average is probably in the order of \$5.00 or \$6.00. The top four subjects are as follows: chemistry and physics, \$10.40; psychology, \$8.97; zoology, \$8.65; mathematics, botany, geology, and general science, \$6.43. In per cent of increase since 1947/49, the majority of subject categories range from 25 to 40 per cent. The figure for chemistry was 163.3 per cent, for zoology nearly 60 per cent.¹²

Unfortunately, the problem of cost is one about which we cannot do very much; provision of necessary funds is its only solution, from whatever source. Costs do, however, influence our book selection practices. They underline the necessity for developing some skills in building our science collections, of making sure that what we buy is really needed, and that it is the best we can afford. When faced with book prices higher than we pay for many subjects, it is tempting to go for the easy bargains. We may buy all popularized books and no textbooks or monographs; we may depend on Popular Science and Science Digest to see us through. Since science books cost a lot and are hard to choose, just forget about them. No thinking librarian adopts this attitude, of course, but he should worry about it.

Of other non-book forms of literature, science also has its share. Awareness of vertical file materials must be maintained; government documents must be considered, and the existence of dissertations and audio-visual materials recognized. Certain types of publications are primarily scientific and technical in nature and decisions must be made on selecting and acquiring them. Trade literature and manufacturer's catalogs is one category. Easy to obtain, this group presents many problems in indexing, filing, storage and weeding, not to speak of how selection is to be made of the millions of pieces available. Patent gazettes and specifications are generally found only in the larger libraries, but all technical librarians must understand their place and availability. Standards and codes are issued by government agencies and professional and trade associations; here again, decision must be made on need and representation to be provided. Although considered tools of other fields also, maps constitute important sources of geological, agricultural, and other scientific and technical data; establishing their existence and housing them when acquired are problems of some proportion.

It is in science, too, that some of our touchy areas are found. We may consider that the department of family living is supervising materials on birth control and sex education. But in collections of any size, the acquisition of works in medical science requires nice judgment, as does the handling of medically oriented inquiries. Some areas in psychology can cause the librarian anxious moments, too; remember Bridey Murphy and the protests against buying of works on abnormalities. Even the purchase of works on locksmithing, firearms, and printing may be questioned; who knows what burglars, murderers, and counterfeiters are thus assisted in their evil works?

In summary, then, we find that many of the problems of selecting materials in science are also encountered in other subject fields. Their solutions have much in common with techniques employed in these other fields. One must know the community and the library's present holdings in order to choose wisely among the flood of materials available. One must develop a program of service and a logically constructed acquisitions policy. One must locate the appropriate sources of information on new materials. One must exercise judgment to the fullest extent of one's abilities, whether it be from full knowledge of the subject or from knowledge of books as media. The collections should be recognized as subject to rapid obsolescence and replacement, and containing a large proportion of serial publications. And the obstacle of high costs of science books looms large in the acquisitions picture. Above all, in many minds, is the mystery of science, the complexity of technology, the supposedly impossible task of knowing anything at all about the subjects and the books on them. Here is truly a problem, but only if one insists that it is and evermore shall be one. As persons of high cultural standards and ingenious abilities, we will discover that the solution to this problem is to practice what we preach--to wake up and read.

References

1. Jenkins, Frances B.: Acquisition of Scientific and Technological Material. Library Trends, 3:414-422, April 1955.
2. McClelland, E. H.: Reviewing of Technical Books--The Minimum Requirements. Journal of Chemical Education, 25:380-382, 1948.

3. Zimmerman, W. E.: Technical Book Selection and Survey of Practice in Public Libraries; A Bibliographic Essay and Survey. M.S.L.S. Thesis prepared at Western Reserve University, 1957.

4. Bedinger, M.: A Technical Library Should Penetrate the Community. Library Journal, 67:195, Mar. 1, 1942. (Quoted in Zimmerman, ibid.)

5. Haines, Helen E.: Living with Books. 2nd ed. New York, Columbia University Press, 1950.

6. Carter, Mary D., and Bonk, W. J.: Building Library Collections. New York, Scarecrow Press, 1959, pp. 100-101.

7. Weinstein, F. D.: Book Selection in the Sciences. A.L.A. Bulletin, 52:509-513, July 1958.

8. Ibid.

9. Gosnell, C. F.: Rate of Obsolescence in College Library Book Collections. Ph. D. Thesis prepared at New York University, 1943.

10. Budington, W.S.: Obsolescence of Engineering Books. M.S. Thesis prepared at Columbia University, 1951.

11. Kurth, W. H.: U.S. Book and Periodical Prices--A Preliminary Report. Library Journal, 85:54-57, Jan. 1, 1960.

12. Welch, Helen M.: Cost Indexes for U.S. Periodicals: A Progress Report. Library Resources and Technical Services, 4:150-157, Spring 1960.