Analysis of Recorded Biomedical Book and Journal Use in the Yale Medical Library*

Part I: Date and Subject Relations

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ABSTRACT

Analysis of book and journal circulation is based on cancelled charge slips collected over a one-year period in the Yale Medical Library. About two-fifths of material circulated were monographs. Books and journals in seven subject fields provided over half of the circulation. Approximately two-thirds of both books and journals used had been published during the most recent nine years. A subject-by-subject examination of the ratio of books to journals circulating revealed that, in subjects where proportionally more journals than books were taken out of the Library, books were of more recent imprint dates than were journals, contrary to the overall pattern. Date distribution of books and journals by subject was also studied. Results are illustrated with graphs and tables.

SEVERAL studies have been devoted to analysis of recorded library use of biomedical journals and books (1–4). One of the most important findings has been that two-fifths of items borrowed in a large biomedical library were monographs. Both books and journals, however, have been studied independently, or in any case, results have been stated separately. Comparative studies of the recorded circulation of books and journals are not available, and the findings that techniques of circulation analysis offer have not been exhausted. Available information deals with subject and date distribution of books considered separately, date distribution of journals, and identity of heavily-used journal titles.

In the present study, thanks to the aid of a computer, it was possible to investigate recorded use of biomedical journals and books in more detail than the Yale Medical Library had done in the past. In addition to following up the findings of past studies, the authors attempted to find answers to two questions heretofore unanswered: (1) How does medical library book and journal use compare in terms of subject and date? and (2) Are there identifiable date distribution patterns within specific subject literatures? The answers to these questions will hopefully shed more light on the characteristics and relative importance of biomedical journal and book usage.

MATERIAL AND METHODS

For the purposes of this study, "journal" or "periodical" means a biomedical or related serial published four or more times a year; otherwise it is called a "serial." The Library has well over 100,000 journal and serial volumes and, on May 31, 1965, was receiving 2,305 titles of which 1,874 were journals. On this date, 340 titles were kept in the Reading Room, the rest were shelved in an open stack; 121 titles were received on duplicate or multiple subscriptions. The book collection consists of about 260,000 volumes, nearly half of which is

* This project was supported by U.S. Public Health Service Contract No. PH43-65-631.

an unclassified collection of European and other foreign medical theses which is not included in this study. Biomedical books published within the last eight years are shelved on the mezzanine level of the Reading Room, the rest in an open bookstack.

Monographs on reserve, the most complete set of multiple-copy journal titles, and unbound issues of journals shelved in the Reading Room are restricted to overnight circulation only. Otherwise, books circulated for two weeks and journals for one. Each borrowing transaction is recorded on a marginally punched slip in triplicate form (5), which is then placed in a charge file. When an item is returned to the Library, the punched charge slip is withdrawn from the file and cancelled.

For a number of years the Circulation Department has been saving cancelled charge slips each day, recording date of cancellation. Charge slips cancelled during the period of June 1, 1964, to May 31, 1965, supplied data for the present study. Charge slips contain enough bibliographic and personal data to identify fully the borrowed item as well as the borrower. For journals, title, volume number, and date of the borrowed copy are indicated. Recorded for books are the full call number, which at Yale consists of the Library of Congress classification and date of publication, author, and title. For all transactions, name, address, and telephone number of the borrower are on the charge slip.

From the middle of June until September 1965, coders transferred data from charge slips to numbered coding sheets designed for the project. About twenty-seven charge slips were coded on every sheet, each library transaction yielding one line of coding. Charge slips for books and journals were segregated and coded on separate sheets. Journals and serials were further distinguished by a number code on each line of coding. The staff coded the following items: (a) for books, the full call number with LC classification and the publication date in separate columns, and (b) for journals and serials, an abbreviation of title according to the form used by *Index Medicus,* a code for the subject of the journal according to a subject list by A. N. Brandon (6) of biomedical journals, and the year of publication of the copy borrowed. For both books and journals, a code corresponding to the type of borrower was recorded. As a coding sheet was completed, charge slips coded on it were marked with the number of the sheet and were saved.

In groups of about 200, coding sheets were sent to the Service Bureau Corporation for keypunching and verifying. Thus, conversion into machine-readable form proceeded parallel with coding and was finished shortly after coding was completed. From approximately 36,000 charge slips, the coding staff produced 1,302 coding sheets. Keypunching yielded 36,333 punched IBM cards, one for each item borrowed from the Library. The Service Bureau Corporation numbered all punched cards in the order of punching; thus, it was possible to refer from punched card to coding sheets and from coding sheet back to the original charge slip to aid proofreading.

An IBM 1401 computer was used to transfer the data from punched cards to magnetic tape, producing tape records which contained complete card images. This tape was then sent to the Yale Computer Center (YCC) for sorting. Using the IBM 7090/7094 Sort Program, the Center sorted the tape records on the Direct Coupled System (DCS), an IBM 7094 computer coupled to an IBM 7040. Records now appeared on the output tape in alpha-numerically sorted order, books by call number, journals and serials by title. Proofreading and correction of data were done from a printed version of the sorted tape prepared on the 1401 with one line of print for each tape record, i.e., for each punched card or each library transaction. Call numbers on the printout were matched with the shelflist, and journal titles with the list of journals indexed by *Index Medicus.* In all, 341 punched cards, or less than 1 percent, were discarded from the data. Of these, 287 were discarded because they stood for nonmedical material, such as biographies, dictionaries, etc., and 54 had information on them too incomplete to be corrected. Mistakes were found in 4.5 percent of the data, or 1,665 punched cards, which were repunched and replaced. Thus, the corrected file of data contained 35,992 punched cards ready to process.*

The next step was to transfer the proofread

* A more detailed description of the coding, keypunching, proofreading, and correction procedures is available on request.

and corrected data to magnetic tape, again to prepare the material for sorting. With the aid of the 1401, data cards were separated onto two tape reels, one containing records of books and one with journal or serial transactions. At the same time, the format of individual records was edited so that sorting on the DCS would be simpler. Using the 7090/7094 Sort Program again, YCC performed nine different sorting operations on the data. Book records were sorted in these arrangements: (1) by classification number, then publication date; (2) by publication date, then classification number; and (3) by classification number, then borrower code. Journal and serial records were sorted in six arrangements: (4) by title, then borrower; (5) by borrower, then title; (6) by subject, then borrower; (7) by date, then subject; (8) by subject, then date; and (9) by subject, then title. The sorting completed, three tape reels contained all records of book transactions in three different sorting arrangements, and, similarly, six versions of journal transactions were on six separate tapes. Each tape could be used to compile a variety of lists. For instance, the printed version of the sorted Tape 8 would contain 20,563 lines of printing, one each for every journal record. The lines would appear in alphabetical order by subject: e.g., the first 31 lines would have the subject code Allergy followed by 570 lines of Anatomy, etc., i.e., 31 borrowing transactions involving journals with the subject Allergy took place during the period of investigation. These first 31 lines would in turn appear in numerical order by publication date: two lines for 1954, three for 1958, and finally seven for 1964. With the aid of a program written for this purpose (program USEP–1), two lists could be produced on the 1401 computer from Tape 8, one giving the count of occurences of each journal subject among all transactions (31 for Allergy, 570 for Anatomy, etc.), and another giving the count of each year of publication within each subject (USEP–1 counts the number of times a specified data field in successive tape records has identical contents). The above two counts are achieved by varying the length of the field to be counted with the aid of control cards: for the first list, the field includes the subject code only, while for the second, it includes date as well as the subject. USEP–1 thus produces a summary count of sorted tapes which can appear as printed output, tape output, or both simultaneously.

From the nine sorted tapes, 31 summary lists were prepared on the 1401, both in printed form and on magnetic tape. These lists were, of course, arranged in alpha-numeric order, as on the nine input tapes. Tape version of the 31 lists were then again sent to YCC to be sorted numerically by the figures of the count generated by USEP–1, and the output of this sorting was printed. The 31 summary lists were now each printed in two versions: one, an alpha-numeric list of data codes with the figure of the count for each, and the other, a rank list of the count of occurrences in descending numerical order with relevant data codes indicated for each figure. Graphs, tables, and summarized lists, which were compiled manually from these lists, reduced the data further.

Results

Among 35,992 library transactions analyzed, 20,563 were found to be journal charges, 14,262 were books, and 1,167 were serials. The latter group comprises only 3.3 percent of the total charges, too small a sample to be reliable for this study. Hence, serials were not further analyzed, and figures relating to books and journals actually refer to the remaining 96.7 percent of total data (i.e., 34,825 books and journals). Journal charges comprised 59.1 percent of this figure, while books made up 40.9 percent. This book percentage is somewhat lower than the 41 and 43.7 percent previously reported (7) and recently confirmed by Helen Kovacs' article in the Bulletin (3). Still, it confirms the finding that two-fifths of the items borrowed from a large biomedical library are books.

Figure 1 shows the relation of journal and book charges for 21 subjects in percentages of total circulation. The 21 subjects shown include the 18 most heavily-used subjects for books (Fig. 3), and the 14 for journals (Fig. 2), comprising 75 percent of the book and journal circulation respectively. All charges in the aggregate 21 subjects account for 82.2 percent of total circulation. In subsequent tables and graphs, data based on the same 21 subjects are presented.

Journal titles were classified according to subject listings published by Brandon (6). The 67 subject headings of this list were correlated

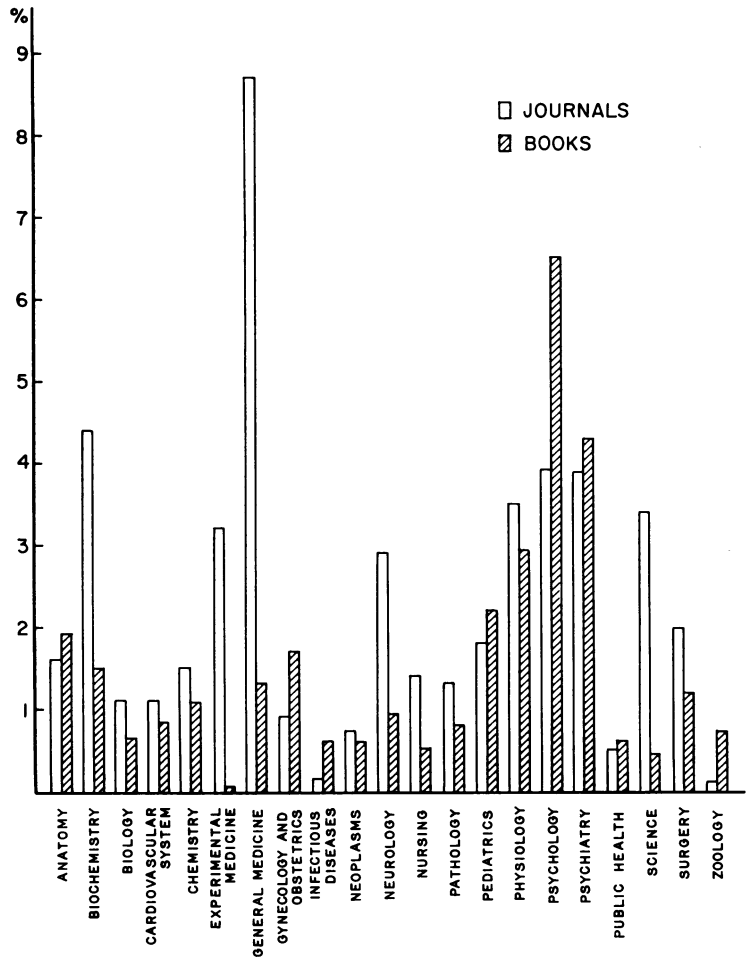

FIG. 1.—Percentages of journal and book charges in 21 subjects

with the B, Q, and R sections of the Library of Congress classification scheme to obtain a comparable array of subjects for books. The correlation was successful in most subjects but failed in others, as the unduly low proportion of books under Experimental medicine, General medicine, and Science in Figure 1 indicate. For example, a goodly number of journals fall under the heading Experimental medicine, while LC classifies books on this subject with various branches of medicine. The structures of Brandon's list and of the LC classification scheme render them incompatible in some subjects. Perhaps the National Library of Medicine classification for both books and journals could have been used more efficiently. However, certain shortcomings are inherent in any comparison of journal and book literature by subject—for example, such heavily-used titles as the *New England Journal of Medicine* or the *Journal of the American Medical Association,* carrying articles on virtually all topics, clearly must be classified as General medicine, while monographs of such broad coverage are few, other than handbooks and surveys.

Subjects comprising 75 percent of journal and book circulation are shown in Figures 2 and 3. The graphs depict cumulative percentage of charges for each subject. It is interesting to note that for both books and journals the first seven subjects account for over 50 percent of circulation. Of the combined circulation of books and journals, again seven subjects provide 50 percent: Psychology, General medicine, Psychiatry, Physiology, Biochemistry, Pediatrics, and Neurology. Among the 14 subjects

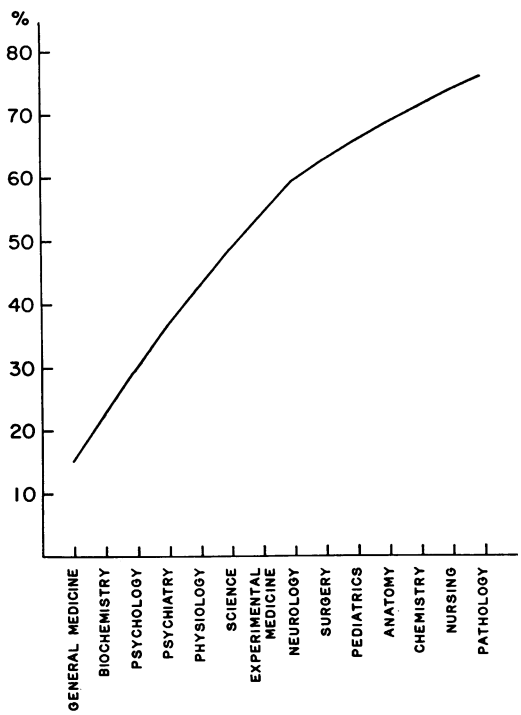

FIG. 2.—Cumulative percentages of journal circulation for 14 subjects: 75 percent of total journal circulation.

in Figure 2 and the 18 in Figure 3, 11 subjects are common to both lists. Science, Experimental medicine, and Nursing are heavily-used journal subjects, but are not among the subjects comprising the first 75 percent of books used. Conversely, seven subjects, Gynecology and obstetrics, Cardiovascular system, Zoology, Public health, Biology, Infectious diseases, and Neoplasms are important book subjects not found among the 14 leading journal subjects.

The ratio of book and journal charges varies considerably from subject to subject. In order to put these varying ratios into perspective, one can use the ratio of all books and journals circulated to compute an "expected" distribution of book and journal charges for each subject included in the total. This expected distribution can then be used to compute the deviation of the actual distribution from the expected, which in turn can be used to rank the various subjects by their relative orientation toward journal use. Table 1 shows the actual and the expected frequency of distribution of books and journals for each of 21 subjects. Expected frequency is calculated according to the formula:

$$\text{Expected frequency} = \frac{(\text{Column total}) \times (\text{Row total})}{(\text{Grand total})}$$

where Row total is all charges (journals and books) within one subject, Column total is all journal or all book charges for all subjects, and Grand total is the combined journal and book circulation for all subjects. Deviation is the difference between expected and actual frequency, i.e., between columns B and C in Table 1. In column D, the deviation is shown with a positive (+) sign when the actual number of journal charges is higher than expected and with a negative (−) sign when books are higher. Table 1 is arranged according to a "deviation quotient" in column E, which is the percentage of the charges within a subject that the deviation represents. Table 1 thus shows a spectrum of 21 subjects with the most heavily journal-oriented subjects on top of the list and those most heavily book-oriented at the bottom. Apart from Experimental medicine, Science, and General medicine (whose heavy journal orientation may be partly due to the shortcomings of the

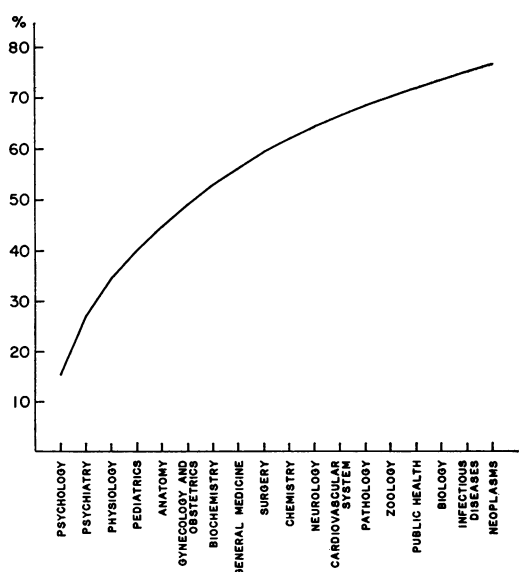

FIG. 3.—Cumulative percentages of book circulation for 18 subjects: 75 percent of total book circulation.

TABLE 1

ACTUAL AND EXPECTED DISTRIBUTION OF BOOKS AND JOURNALS BY SUBJECT

	Total Circulation	Number of Charges		Expected Number of Charges		Deviation	$\frac{D}{A} \times 100$
		Journals	Books	Journals	Books		
	A	B		C		D	E
Experimental medicine	1,171	1,157	14	690	481	+467	+39.9
Science	1,395	1,231	164	821	574	+410	+29.4
General medicine	3,580	3,125	455	2,108	1,472	+1,017	+28.4
Neurology	1,378	1,036	342	810	568	+226	+16.4
Biochemistry	2,126	1,574	552	1,254	872	+320	+15.0
Nursing	698	503	195	411	287	+92	+13.2
Biology	638	409	229	376	262	+33	+5.2
Surgery	1,120	707	413	659	461	+48	+4.3
Pathology	742	462	280	437	305	+25	+3.4
Chemistry	919	536	383	541	378	−5	−.5
Cardio-vascu'ar system	698	397	301	411	287	−14	−2.0
Neoplasms	480	262	218	283	197	−21	−4.3
Physiology	2,312	1,255	1,057	1,361	951	−106	−4.6
Psychiatry	2,932	1,390	1,542	1,725	1,207	−335	−11.4
Public health	419	191	228	246	173	−55	−13.1
Anatomy	1,250	570	684	735	515	−169	−13.5
Pediatrics	1,432	643	789	843	589	−200	−14.0
Psychology	3,756	1,411	2,345	2,209	1,547	−798	−21.3
Gynecology and Obstetrics	926	312	614	545	381	−233	−25.2
Infectious diseases	278	54	224	164	114	−110	−39.6
Zoology	293	42	251	173	120	−131	−44.7
Subtotal:							
21 Subjects	28,547	17,267	11,280	16,856	11,691	+411	+1.4
(All charges in all subjects)	34,825	20,563	14,262				0

method of correlating book and journal subjects), Neurology, Biochemistry, and Nursing are the most heavily journal-oriented subjects used at Yale. Zoology and Infectious diseases on the bottom of the list have the smallest number of charges among the 21 subjects, therefore their high deviation quotients may not be statistically as valid as those of other subjects. The mean for 21 subjects is shown on the second-to-last line in the Table, and the quotient +1.4 indicates that the total literature in 21 subjects is slightly journal-oriented. The middle of the list, subjects with the numerically smallest deviation quotients, are those with closest to expected ratio of journal and book charges.

Figure 4 shows the date distribution of journals and books circulated during the period of study. The total circulation is shown, rather than just the 21 most heavily-used subjects. A close comparison of Figure 4 with a similar graph for the 21 subjects revealed virtually no difference in the curves, which gives reassurance that characteristics of the literature for the 21 subjects can indeed be regarded as representative of the total. Percentages of imprints circulated for each year are shown on the lower part of the graph, while the ascending curves indicate cumulative percentages. The lines end at 90 percent, which means that 90 percent of journal issues circulated were published after 1944, books after 1938. The graph shows that the peak year of publication for journals charged out is 1964, representing 15 percent of the journal circulation. The peak for monographs is 1962, two years earlier, and it is also a substantially lower peak, 11 percent. The lines for cumulated percentages indicate that 71

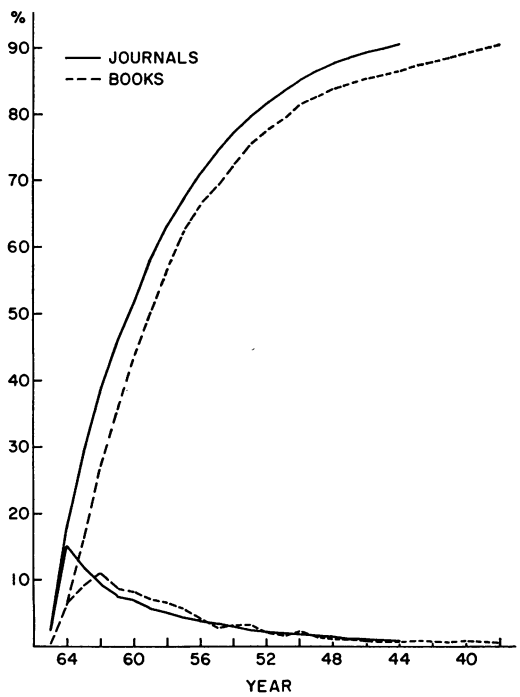

FIG. 4.—Date distribution of books and journals (total circulation).

percent of journals circulated appeared during the last nine years, while the same period supplied only 66 percent of monograph circulation.

Figure 4 illustrates the mean distribution of publication dates in all subjects. A detailed study was made of the date distribution of individual subjects for both journals and monographs. Graphs and tables are available on request from the Library; only some observations are reported here. Generally, books display more varied patterns in different subjects. Journals have usually just one peak in 1964, then descend gradually into nonuse with age. Books quite often have two high peaks two or three years apart, and secondary and tertiary smaller peaks are not infrequent for material ten or fifteen years old.

Some of the more interesting details of date distribution of individual subject literatures are sufficiently worthwhile to justify elaboration. Highest peaks of publication date are for Science and Biology, both for journals and books —but in reverse order. For journals, Science (25 percent) is highest, then Biology (24 percent), both for 1964. For books, the highest is Biology (22.5 percent) for 1962, then Science (21.5 percent) for 1961 (this is the second peak for Science books, the more recent one is for 1963, 17 percent). Journal subjects with the lowest peaks are Neurology (8 percent) and Psychology (8.5 percent) for 1964. Public health has the lowest percentage of charges (5 percent) for 1964, peak year for most subjects, while it has higher figures for 1963 and a peak for 1962. Certain other journal subjects as well have peaks for material older than 1964: Nursing (19 percent), Pediatrics (14 percent), and Psychiatry (10.5 percent) have their peak for 1963; Gynecology and obstetrics (15.5 percent) and Public health (15 percent), as just mentioned, for 1962.

Among books, for 1964, Nursing (9 percent) has the highest percentage of charges and General medicine (1.5 percent) the lowest; for 1963, Science is highest (17 percent) and Anatomy and Psychiatry (both 5.5 percent) are lowest; and for 1961, Science (21.5 percent) is high, and Nursing (4 percent) is low. Biochemistry books display an unusually high peak for older material, 18.5 percent for 1959 imprints, while highest percent for 1959 journals is 9 percent in Nursing.

Figure 4 shows that, as expected, journal literature on the whole is more compact than books in the sense that a larger portion of journals used is concentrated among recent years of publication; imprints from the most recent 22 years provide 90 percent of journal circulation, while for monographs, 90 percent of the items were published over the last 28 years. There is considerable variation by subject, however. In terms of the length of the publication period providing 90 percent of circulation, the most compact journal subjects are Nursing (12 years), Science (13 years), and Cardio-vascular system (15 years); and the least compact are Anatomy, Pathology, and Psychology (all 30 years). For monographs, Biochemistry (12 years), Neurology and Neoplasms (both 17 years) are most compact, and Surgery (42 years), Biology (39 years), and Infectious diseases (37 years) are most dispersed.

The relative date distribution patterns of books and journals by subject display some interesting regularity. As far as could be ascertained, this aspect of date distribution had not yet been studied. Visual representations of date distributions of 21 subjects seem to fall into four distinct graphic patterns. Figure 5 illus-

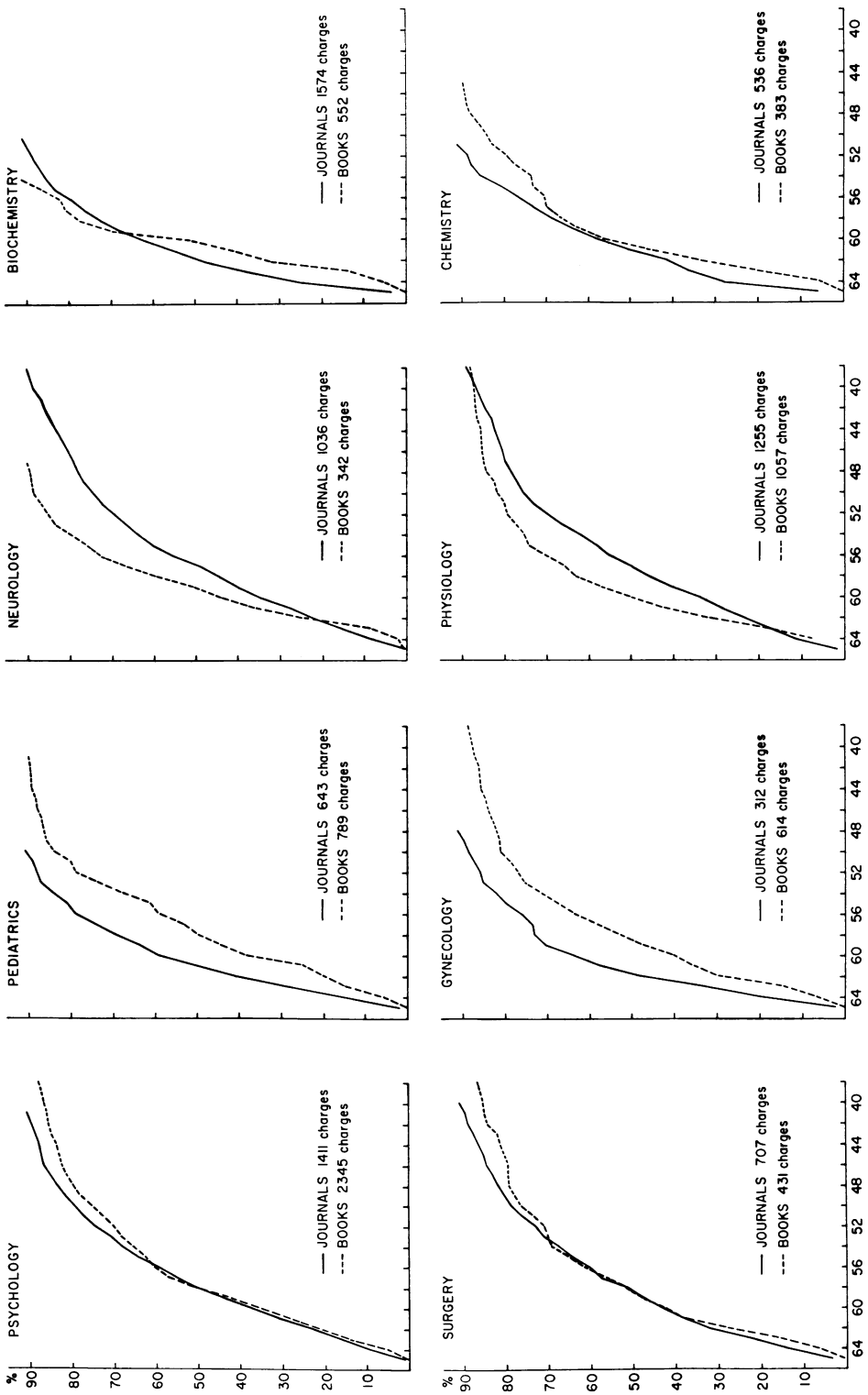

FIG. 5.—Patterns of relative date distribution of books and journals in various subjects.

trates these four patterns, giving two examples for each. The graphs all show the cumulative percentages of charges for each year of publication for both books and journals by individual subjects, in the same manner that Figure 4 does for total circulation. Subjects in the first group (Group I) display no great difference between book and journal distribution over the years. For the first two or three years, a larger proportion of journals than books enjoys use, but then the lines converge for roughly the recent 12 years, so that the percentages are nearly equal. Subjects in the first group are Psychology, Surgery, Anatomy, Psychiatry, Zoology, and Infectious diseases. These are subjects where both journal and book literature appear less compact than average. Group II shows a pattern most closely conforming to the average and to what is generally expected. In these subjects, Gynecology and obstetrics, Cardio-vascular system, Pediatrics, Nursing, Public health, and General medicine, the journal literature is quite compact, while monographs are not, and the lines for each are progressively divergent: journals enjoy much heavier use for recent years than do books. Group III displays a surprising pattern. Although journals are more heavily used for the most recent two or three years of imprints, monographs three or more years old experience more concentrated use than do journals. After an initial lead of journals, the lines cross and continue to diverge in favor of books. Books published over the last four or more years comprise a much higher portion of book circulation than do journals published during the same period, i.e., book literature is actually more compact than journal literature. This is the smallest group of subjects among the 21 examined: Neurology, Physiology, and Pathology belong here. The last group of five subjects (Group IV) is somewhat similar to the third group. Here, in Biochemistry, Chemistry, Biology, Science, and Neoplasms, journals of the recent five years or so have significantly more concentrated use than do books, but beyond that, books take over or at least approach the proportion of journals used.

Discussion

Data presented in this paper are based on recorded circulation and thus reflect only materials used outside the Yale Medical Library. L. Miles Raisig has shown recently that such material does in fact contain useful information in over 78 percent of cases (7); thus, recorded circulation, at least for books, reflects active use. Total use of biomedical literature is not studied here, and conclusions concerning total use should be drawn with caution—although it has been concluded in the past that recorded circulation is an adequate reflection of nonrecorded use (8).

Results tabulated in Table 1 suggest that relative use of books and journals varies extensively from subject to subject. If it is accepted that in fast developing subject fields, monograph literature is less used than journal literature, then the list of subjects in Table 1, in conjunction with findings illustrated in Figure 5, can perhaps be used as a general guide to indicate the relative rate of scientific progress in fields of biomedical research. Book-oriented subjects, listed on the lower part of Table 1, should then be more slowly developing fields than those on top of the list. Comparison of Table 1 with graphs of date distributions in cumulative percentages of books used (as in Figure 5) yielded confirming data. The last eight subjects in Table 1 are not only heavily book-oriented, but among the books used a smaller proportion are recent publications than for journal-oriented subjects. 1949 was found to be the overall date of publication dividing brisk and sluggish circulation of books: pre–1949 imprints enjoy but sporadic use in most subjects. A subject-by-subject tabulation of the percentage of pre–1949 monograph imprints yielded an average of 21 percent of monographs for the last eight subjects in Table 1, and 11 percent for the first five subjects (Experimental medicine was not considered). The two groups of subjects were defined by having a numerically higher deviation quotient than 10. In the remaining seven subjects, the middle portion of the list, 17 percent of books used were published before 1949. Significant reliance on older material seems to indicate that older findings are still valid today, and 21 percent reliance on publications 17 years or older was found for the most book-oriented subjects.

This, of course, is an average, and there are some exceptions. In Pediatrics, for example, pre–1949 imprints yield only 14 percent of the book circulation, although it is the fourth most book-oriented subject. On the other hand, 307 or 39 percent of the 789 circulated monographs

in Pediatrics were taken out by students of the University of Connecticut School of Nursing, and Pediatrics is their most heavily-used monograph subject. Nursing students discounted, Pediatrics would not be so book-oriented, and the lower proportion of older imprints used would not disrupt the pattern.

Table 2 shows percentage use of publications having imprints in the most recent nine years as reported in three previous circulation studies (2, 3, 9) and compares those findings with present results. For both journals and books, present findings agree admirably well with one other result, while there is a slight difference compared to another study. From a statistical point of view, the percentages 66 and 71.5 (books published over the last nine years among books circulated at Yale and at Downstate) based on a circulation of twelve- to fifteen-thousand items, are significantly different. However, the practical implications of this difference may be minor or negligible for library practice. It can be said with certitude that the proportion of recent journals used is slightly higher than that of recent books, and in both cases over two-thirds of items borrowed were published during the last nine years.

TABLE 2

PERCENTAGE USE OF PUBLICATIONS HAVING IMPRINTS IN THE MOST RECENT NINE YEARS

	Institution	Percent
Books	Yale Medical Library (present study)	66
	Yale Medical Library—1961	67*
	Downstate Medical Center Library	71.5*
Journals	Yale Medical Library (present study)	71
	Downstate Medical Center Library	72*
	UCLA Bio-Medical Library (9)	67

* From unpublished information.

Date distribution of the 21 journal subjects considered is much more uniform than that of book subjects. One of the most surprising findings was the remarkable compactness of journal literature in Nursing. Past studies at Yale Medical Library had found no evidence of such great concern with recent published material among student nurses. Among journal-oriented subjects, Neurology journal literature appeared to be less compact than others. Only eight percent of circulation were 1964 issues, and each publication year between 1963 and 1955 supplied between 7 and 4 percent of all Neurology journal charges. This may appear to contradict what was said about the more rapid development of journal-oriented subjects. It should be remembered, however, that pre–1949 book, rather than journal, material was considered there, and the statement about development referred to the last 17 rather than 9 or 10 years. Pre–1949 journal material has such low incidence of use in all subjects that no valid statement could be made from the data.

The date distribution patterns of individual subjects, expressed in graphs of cumulative percentages of circulation by year of publication in Figure 5, fall in strikingly distinct groups. The meaning of these groups of patterns is not wholly clear, but some relation between the date patterns and the distribution of journal-book ratios shown in Table 1 seems to exist. All subjects in Groups III and IV are found among those on the first half of Table 1, the most heavily journal-oriented subjects and the middle range between the journal- and the book-oriented ones. Compactness of monograph literature in a field seems to go hand in hand with a relatively heavy journal orientation. Further investigation into the exact nature and validity of this relationship promises to be fruitful from the point of view of budget allocations for acquisitions, as well as selective retirement of collections. The first check on validity might be a statistical study of the relationship between the ratios of journals and books used and the journals and books held by libraries.

CONCLUSION

The present study confirms past findings that two-fifths of material borrowed from large medical center libraries are monographs. Both the date and subject distributions of biomedical literature appear highly skewed. Over half of books and journals borrowed fall into 7 out of 67 subject fields: Psychology, General medicine, Psychiatry, Physiology, Biochemistry, Pediatrics, and Neurology, in that order; and 21 subjects supply over 82 percent of borrowed material. Approximately two-thirds of both books and journals used have been published during the most recent nine years. A compari-

son of the date distribution of journals in various subjects revealed a consistent pattern more readily than did the date distribution of books.

The ratio of borrowed books to journals displayed a range of wide variation within individual subject fields. Perhaps the most intriguing finding of the study was a striking relationship among groups of subjects with regard to the relative date distribution of books and journals used. In subjects where proportionately more journals than books were taken out of the Library, it was found that books were more significantly skewed toward recent imprint dates than were journals. This finding is contrary to the overall pattern where journals used have a slightly higher concentration for recent years of publication. These characteristics seem to be peculiar to subjects where the most rapid accumulation of new findings is in process.

Some implications and details of the nature of this relationship between date distribution patterns and journal-book ratio are not entirely clear, but results seem to promise that further investigations will be fruitful. For example, comparison of the date distribution of various kinds of monograph literature, such as textbooks, outlines, reviews, etc., may add valuable detail to present findings and may help to clarify patterns. Confirmed results from such further investigation may become useful in formulating and evaluating administrative policies concerning the acquisition and maintenance of collections.

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