50th Anniversary Feature—

A Statistical Profile of *College & Research Libraries*

Paul Metz

Recent trends in authorship and referencing practices in the pages of College & Research Libraries *are studied. A dramatic increase in the use of quantitative techniques, beginning around 1970 and peaking in the period 1980–84, is also demonstrated.*

As the Association of College and Research Libraries celebrates its fiftieth anniversary, an examination of the past accomplishments of the association is in order. This examination would be incomplete without an analysis and appreciation of the role that *College & Research Libraries (C&RL)* has played. The publication of a high quality journal devoted to the unique challenges and problems of academic and research libraries has always represented one of ACRL's major commitments to its membership.

From the beginning, *C&RL* has been a major instrument of communication among academic and research librarians, and one of the most widely respected journals in librarianship. A study by Robert Swisher and Peggy Smith found that *C&RL* was read by nearly 90 percent of ACRL members working in academic libraries, placing it behind only *American Libraries* in both their 1973 and 1978 surveys.[1] A 1982 survey by David Kohl and Charles Davis found that ARL directors consider *C&RL* to be the most prestigious journal in terms of its value for tenure and promotion decisions at their institutions. When the deans of library schools were asked the same question, publication in *C&RL* was ranked third behind publication in the *Library Quarterly* and *Journal of the American Society for Information Science (JASIS)*.[2]

Citation data reported in *Social Science Citation Index (SSCI)* further support the significance of *C&RL*'s role. For the period 1981 through 1986, *C&RL* was the third most heavily cited library journal covered by *SSCI*, trailing only *Library Journal* and *JASIS*. The impact factors for *C&RL*, reflecting citations per source article, have consistently been among the highest for any library science journal.[3]

A qualitative analysis of the themes which have occurred, and recurred, in the pages of *C&RL* could provide a fascinating and perhaps amusing insight into our past. Academic status; the treatment of nonprint materials; reclassification projects; collection evaluation, including the identification of the percentage of a collection that has never been used; union catalogs and their impact on interlibrary loan—who among us would not recognize these themes from volume 1, published in 1939?

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The most useful overview of *C&RL*'s history, Gloria Cline's "*College & Research Libraries:* Its First Forty Years," provides a wealth of bibliometric information describing the history of *C&RL* up to ten years ago. Although Cline coded the subject of each article and reported those findings, the majority of her data describe objective and quantifiable attributes of authors and their citing practices.[4]

The major conclusion of Cline's analysis was that *C&RL*'s history from 1939 to 1979 showed "an overall trend toward greater adherence to the norms of scholarly publication in other disciplines."[5] Among the major trends Cline discerned were the appearance of longer articles with more references on the average and an increase in the incidence of collaborative authorship. Cline found that the references cited by the authors of *C&RL*'s articles had consistently been drawn from the literature of library science and had come disproportionately from recent publications. Both the recency and the subject concentration of cited literatures can be taken as signs of a mature or well-defined field, as Cline suggested. Finally, Cline's research showed a stable tendency throughout the forty years for about 80 percent of authors in *C&RL* to be male.

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The purpose of the present review is twofold: to update selected aspects of Cline's analysis through Volume 49, 1988, in order to determine whether the trends she discerned have continued; and to assess the degree to which *C&RL* has published quantitative research throughout its long history. For this purpose, all articles in Volumes 41–49 were coded on a number of the parameters Cline used and all 2,075 articles in Volumes 1–49 were coded on four new measures designed to assess *C&RL*'s use of quantitative methodology.

BIBLIOMETRIC TRENDS

Cline's data showed that after having previously averaged around 250 articles per five-year period, *C&RL*'s output of articles fell to 163 in the period 1970–74, then recovered partway to a level of 194 articles for the 1975–79 period. The decrease in the number of articles was accompanied by a commensurate growth in the size of the average article. "Whether the increase to 194 in 1975–79 indicates a restabilization of production remains to be seen," she noted.[6]

The current data show that *C&RL* has apparently stabilized the number of articles at a level of just over 200 articles per five-year period—still somewhat below previous levels. For the 1980–84 period, 204 articles were published. The 172 articles published in 1985–88 extrapolate to a level of 215 for the current period. The provision in 1981 of a "Research Notes" section explicitly reserved for short reports of empirical studies may help to explain the partial recovery in article productivity.

Cline's conclusion that *C&RL* had begun to evince higher scholarly standards was based in part on the number of references cited by its authors. Cline noted an uninterrupted increase in the extent of cited literatures throughout *C&RL*'s history. As table 1 shows, this trend has continued. After a small decline in 1980–84, the level of referencing has recently

TABLE 1
REFERENCING CHARACTERISTICS OF *C&RL*, AFTER CLINE

Time Period	% of Unreferenced Articles	Average No. of References/Article
1939–44	45	2.9
1945–49	47	3.2
1950–54	41	3.6
1955–59	39	4.1
1960–64	33	5.9
1965–69	25	9.2
1970–74	13	10.6
1975–79	9	15.5
1980–84	9	14.5
1985–88	8	24.1

Note: The years 1939–44 may be considered a five-year period because one combined volume was published in 1944–45. References to the various five-year periods should not of course obscure the fact that 1985–88 covers four years, with only four volumes.

climbed dramatically. While an increase in bibliographic references could theoretically be attributed to a trend toward the publication of review articles, this is apparently not the case. An inspection of all 5 articles with over 100 references in the most recent time period found that not one was explicitly a review article.

Although the number of references in *C&RL* articles has grown, there has been no significant change in the rate of self-citing, another bibliometric dimension Cline explored. Of the citations in *C&RL* articles, 11.6 percent of the 1980–84 citations and 10.6 percent of the 1985–88 citations were to articles in *C&RL*. These percentages are comfortably within the range of variation Cline observed for the journal's first forty years of publication.

A dramatic increase in the representation of women among *C&RL*'s authors has been perhaps the most notable change in the journal's recent history. Whereas there had previously been only minor deviations from an average of 80 percent male authorship and no observable trend, the percentage of male senior authors (after discounting authors whose sex could not be determined) has fallen sharply in each of the most recent periods. Even a slight continuation of this trend would lead to an even balance in the gender of authors by the next five-year period. Table 2 documents this trend.

Cline's data included a breakdown of the institutional affiliation of senior authors, though these data were reported in the aggregate only, and not by time period. The recent data, presented with Cline's in table 3, show that foreign authors, special librarians, and nonlibrarians have gained prominence as authors in *C&RL*. Authors from government and public libraries, however, have nearly disappeared from the pages of *C&RL*. Analyses of authorship trends in other library journals would provide an interesting test of the possibility that the various kinds of librarianship are becoming increasingly specialized, or alternatively that academic librarianship has moved further away from public librarianship, but closer to special librarianship. The academic library's use of increasingly diverse electronic resources to provide information to specialized researchers would help to support the latter interpretation.

TABLE 2
SEX OF SOURCE AUTHORS, AFTER CLINE

Time Period	% Male Sex	% Female Sex
1939–44	78	22
1945–49	77	23
1950–54	78	22
1955–59	87	13
1960–64	85	15
1965–69	77	23
1970–74	80	20
1975–79	79	21
1980–84	65	35
1985–88	56	44

TABLE 3
TYPE OF INSTITUTION OF SOURCE AUTHORS, AFTER CLINE

Type of Institution	% 1939–79	% 1980–88
Academic libraries	58.70	56.12
Other (nonlibraries)	11.27	17.29
Library schools	8.56	10.11
Government libraries	6.25	0.27
Unknown	3.72	0.80
Foreign libraries	3.55	6.65
Special libraries	3.38	6.38
Public libraries	3.16	1.06
Library associations	1.41	1.33

The final bibliometric measure of Cline's, which this report will extend, is her analysis of collaborative authorship in the pages of *C&RL*. Cline found a continuous decrease throughout the years in the percentage of articles having been written by one author. She noted that this trend paralleled changes in scientific publication patterns observed by Eugene Garfield and I. H. Sher.[7] As table 4 indicates, the trend toward multiple authorship has continued.

A separate analysis revealed that even among articles having multiple authors, there is a pronounced trend toward the sharing of authorship among three or more individuals: whereas 24 of the 189 coauthored articles in 1939–79 had three or more authors (12.7 percent), in 1980–88 this rate had risen to 35 of 144 (24.3 percent).

TABLE 4
EXTENT OF COLLABORATIVE AUTHORSHIP, AFTER CLINE

Time Period	% Articles Having No Coauthors
1939–44	95.7
1945–49	95.6
1950–54	93.5
1955–59	92.7
1960–64	94.0
1965–69	85.9
1970–74	79.1
1975–79	72.7
1980–84	68.1
1985–88	54.1

QUANTITATIVE METHODS IN *C&RL*

While trends in authorship and referencing practices can reveal much about the nature of scholarship and research, such data cannot measure the kinds of evidence and means of manipulating or presenting data which are considered valid and important in a given discipline. Even the most cursory review of the history of *C&RL*, or indeed of many other journals in librarianship would make apparent an increasing reliance on methodological techniques imported from the social sciences, specifically on the use of statistical analysis.

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An interesting study by Soon Kim and Mary Kim has demonstrated the increased reliance on quantitative techniques in the pages of *C&RL* in the period 1957–76.[8] Comparing the decade 1967–76 to the previous decade, Kim and Kim noted a near tripling in the frequency of quantitative studies—from 15 percent of articles in 1957–66 to 43 percent of articles in 1967–76. Survey research techniques, most frequently based on the use of questionnaire data, were employed in the majority of these articles.

Kim and Kim noted that research studies had become more rigorous in the second decade under review. Research hypotheses were more likely to be stated explicitly. Sampling designs had improved and been reported in greater detail. The use of accepted statistical tests had increased. For example, correlations were reported in 8 percent of the articles in the second decade as opposed to 3 percent in the first.

Kim and Kim's study raises two obvious questions for further analysis:

1. to what extent did *C&RL* report the results of quantitative studies in the years previous to their report; and
2. have the trends Kim and Kim discovered continued?

In order to assess *C&RL*'s dependence on statistical techniques in particular, but more generally on the use of objective and quantifiable data, all articles from volumes 1–49 were coded on four new measures. Compared to Kim and Kim's approach, less emphasis was put on specific techniques of data gathering and analysis, and more was placed on the ways in which data were presented. The definitions of the four measures employed in this part of the analysis are given below. A single occurrence of any of the characteristics listed caused an article to be coded positively for the presence of the attribute in question.

1. Use of schematic displays.

A *schematic display* was considered to be any figure or chart used to illustrate a typology, to demonstrate causality, or otherwise to make explicit the relationship between variables. Examples include flow charts; illustrations of the relationships between variables; and gantt charts. Photographs or sketches of physical phenomenon were excluded.

2. Numeric charts

A *numeric chart* was defined as a chart (not a table) presenting explicitly numeric data. Numeric values are either explicitly reported, as in most pie charts, or may be estimated by reading row or column headers. Any chart with numeric labels was coded unless the only numbers were dates; such a chart would be considered a schematic display.

TABLE 5
PERCENT OF ARTICLES DISPLAYING
VARIOUS FEATURES OF QUANTITATIVE METHODOLOGY

Time Period	Schematics	Numerical Charts	Data Tables	Measures of Association
1939–44	3.0	2.4	14.6	1.0
1945–49	0.7	0.0	15.0	0.4
1950–54	2.6	1.5	26.3	0.5
1955–59	1.0	0.5	13.7	0.5
1960–64	1.9	3.7	21.5	2.3
1965–69	4.8	6.3	38.5	3.6
1970–74	6.5	6.5	39.3	14.3
1975–79	3.1	8.7	42.9	9.2
1980–84	4.9	14.7	60.8	23.0
1985–88	5.8	8.7	45.9	19.2

3. Data tables

Conventional tables reporting quantitative data or the presence/absence of specific attributes were coded as data tables. Most consisted of numeric reports in column and row format, but in some cases authors simply reproduced their survey instruments and included the results.

4. Measures of association

Articles containing one or more measures of association, such as correlation, or of statistical significance (chi-square, *t*-tests, etc.), were coded positively on this measure. As a rule, measures of association appear in articles attempting to demonstrate causality by analyzing statistical data.

The percentage of articles from each five-year period which displayed each of the attributes of quantitative or semi-quantitative research style described above is shown in table 5.

As the table makes clear, articles in *C&RL* continued to become more quantitative beyond the years of Kim and Kim's study. The high watermark for three of the four measures of quantitative style was reached in the years 1980–84. During that period, three-fifths of *C&RL*'s articles displayed data in tabular form and nearly one-quarter used one or another measure of association. Three of the four measures show a considerable decrease in quantitative techniques for the most recent period, though all four measures remain higher than they were previous to 1980.

It can be argued that library research has been modeled loosely on the approaches and techniques of the social sciences. It would be consistent with this view to maintain that library research has been sorting out its paradigms; that quantitative techniques appeared at one point to have gained the ascendancy; and that research has since become more eclectic, with quantitative methodology accepted as one of a variety of fully legitimate and useful research approaches from which researchers may select, depending on the task at hand. That quantitative methodology in library research apparently reached its peak somewhat later than in the social sciences themselves would be consistent with the argument that in its research techniques library science is somewhat derivative of the social sciences.

CONCLUSION

Authorship and citation patterns in *C&RL* show that the journal has continued to follow scholarly models. Both the incidence of co-authorship and the prevalence of references to the existing literature continue to increase. Female authors have reached near-parity with males in their representation in the pages of *C&RL*, but are still seriously underrepresented relative to their numbers among academic librarians. Quantitative methods have established an apparently permanent place in academic library research but will apparently not become the sole acceptable means of supporting arguments.

Trends are best observed and described at a comfortable remove. For that reason, an authoritative summary of the directions *C&RL* is taking and what they may tell us about academic librarianship must await future analysis. We can look forward to discovering what future retrospectives of *C&RL* will reveal.

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With a clear mandate to promote the diffusion of knowledge, librarians have a much more dynamic role to play than simply that of "deciding what to conserve and what to neglect." They have to devise ways and means of taking these "useful ideas" to the people. They have to be active agents in the process of communication, and so far they have only just begun to perform this task. It is the performance of this task—the task of helping to keep the people in touch with the knowledge uncovered by modern science—that is the peculiar challenge of librarianship.

—Glen Burch, "Communication and the Community" (September 1945), p.395