

JOURNAL CITATION REPORTS

Introduction

I. Journals, References, and Citations

A citation index is based on the principle that there is some meaningful relationship between one paper and some other that it cites or that cites it, and thus between the work of the two authors or two groups of authors who published the papers.

The entire *SCI*[®] data base is stored on magnetic tape, and it is thus amenable to extensive manipulation and analysis. In the case of authors, we have been able to identify the frequency with which they and their papers are cited in the literature, over any chosen time period. Counts of this sort are strictly quantitative and objective. But even admitting this limitation, an author's or a paper's frequency of citation has been found to correlate well with professional standing. It is certainly not the *only* measure, nor one that can be used, for any purpose, in isolation. We do not claim for it the absolute reliability that critics of citation analysis have wrongly imputed to us when they have attacked it. The fact does remain, however, that it provides a useful objective criterion previously unavailable.

Basically the same principle can be used in evaluation of journals, rather than of authors' publications or single papers. When a scientist cites a previously published article, he tells us, in a sense, that he has read it and has some reason for bringing it to our attention. The more frequently a journal's articles are cited, the more the world's scientific community implies that it finds the journal to be a carrier of useful information.

Evaluating Journals

It has always been and still remains difficult to assess the relative importance of scientific and technical journals. There have been few, if any, totally objective criteria by which to measure them. Researchers and their library colleagues quickly learn what journals are most 'important' for particular disciplines, and countless studies have been carried out to establish 'core-journal' lists. But as research interest and activity extend

beyond the basic discipline, as interdisciplinary and multidisciplinary 'mission-oriented' research requires broader journal coverage, the relevance and usefulness of journals outside the disciplinary core may be difficult to determine. Even within the small disciplinary or departmental library, when a choice between journals is dictated by restricted acquisitions budgets, considerations less relevant than scientific merit may all too likely determine or force the choice--politics, sheer habit, relative subscription cost, and so on.

Thus, the *Journal Citation Reports*[®] (*JCR*[™]) extends the use of citation analysis to examine the relationships among journals rather than among articles and their authors. The *JCR* answers these basic questions: how often has a journal been cited? what journals have cited it? how frequently have *particular* journals cited it? does the cited material in the case of a particular journal come primarily from older articles, newer articles, or does the citation pattern show a chronological consistency? what journals has the particular journal itself cited? how often has it cited each of them? is it citing old material, new material? what part of these counts is due to self-citation? In other words: who uses a particular journal? how frequently? for what purposes?

The Total Framework

Like any other tool, the *JCR* cannot be used indiscriminately. It is a source of highly valuable information, but that information must be used within a total framework proper to the decision to be made, the hypothesis to be examined, and rarely in isolation without consideration of other factors, objective and subjective. For example, there are undoubtedly highly useful journals that are not cited frequently. Scientists read many such journals for the same reason people read newspapers and other non-scientific periodicals--to keep up with what's going on generally. They may rarely cite such journals in their published work. This does not mean that such uncited or infrequently cited journals are any less useful for their intended purpose than cited journals. It does mean, however, that these journals are written and read for a purpose other than the communication of original research findings and the indispensable summary of research findings provided by reviews.

Another consideration is that citation frequency is sometimes--indeed to some extent must be--a function of variables other than scientific merit. Some such variables may be an author's reputation, the controversiality of subject matter, a journal's circulation and its cost, reprint dissemination, its coverage by current-awareness and indexing and abstracting services, society memberships, the availability and extent of libraries' journal collections, national research priorities.

Compiling Journal Data

The *JCR*[™] analyzes and summarizes a massive amount of data: the 1975 listings are based on 5,395,310 citations from the references of approximately 420,000 source items published in 1975 issues of some 2500 *SCI* source journals.

Obviously, it will be easier to use information from the *JCR* if one understands how it has been compiled. The user must remember that the *JCR* is a calendar-year report, compiled from the *Science Citation Index*[®] (*SCI*[®]) data base.

The *SCI* indicates the reference/citation links between an article published during the year and all previously published articles cited in the current article's references. The *SCI* identifies every unique link between any cited article and all articles that have cited it during the year, supplying authors' names, journal titles, journal volume and page numbers, and year of publication. The *JCR* extracts from each of these unique citation links four pieces of information: two journal titles and two publication years. One of the extracted journal titles is that in which the current citing article was published. The other journal title is that in which the cited article was published. One of the publication years is that in which the current citing article was published. Since the *JCR* is a calendar-year compilation, this year date will be the same in all cases. The other publication year will be the year in which the cited article was published.

In this extraction process many similar links are generated from the millions of different and unique links identified fully in the *SCI*. The *JCR* counts how many of these similar links there now are, and tabulates the results in its two 'detail' listings, first by citing journal and then by cited journal.

Article-to-Article Links

It is important to remember the way these counts have been generated, as described above. They are counts of reference/citation links, not counts of articles, nor of journals *per se*. For example, a 1975 article published in *Journal of the American Chemical Society* may have had 40 references. These 40 references contained, let us

say, citations of only 35 *different* articles. The 35 different cited articles appeared in 10 different journals. In other words, the 40 references cited some articles--at the most 5--more than once, and cited each of the ten different journals an average of 4 times. In compiling the *JCR*, it is the number of different article-to-article links that is counted. In this case the *Journal of the American Chemical Society* is credited with 35 unique references. Their 35 citations will be distributed among the 10 different cited journals, each receiving on the average a 'cited' count of 3.5--not 4, and not 1.

Lest this point be passed over as a laboring of the obvious, the user must remain aware that the *JCR* represents only one of several possible descriptions of journal relationships. Others have been suggested above, namely, one based on data including duplicate citation links between the same two articles, and another based on data including only *unique journal* links rather than unique article links between the same two articles.

The Ever-Changing River of Journals

Many users will need no reminder that the management of serials, among which are included scientific journals, is one of the thorniest thickets of bibliography and librarianship. Even knowledgeable estimates of the number of extant scientific and technical periodicals vary so widely--by tens of thousands--that the uninitiated cannot be blamed for doubting the competence of those concerned with the problem.

Like a real river, the river of scientific and technical publication is ever-changing. Its elements are complex, its course confusing, but overall the difficulties and problems of serials librarianship in science are a reflection of the strength and force of its river's progress. Journals die but are replaced by others; journals grow, and split into sections (lettered or numbered or subtitled and resubtitled), or into new journals; journals may narrow their interest and merge with other journals under old or new titles; titles change to reflect a reorientation even when splitting and merging is avoided--a few words are added, some dropped, the language of the title itself may change.

This characteristic but vital inconstancy of scientific publication is severely problematic for an effort like the *JCR*[™] that seeks to describe journal relationships over periods of time. There is, to be sure, the additional confusion contributed by incorrect or ambiguous citations, by the sometimes truly stultifying virtuosity of title abbreviators, by the 'separateness' of original and translated versions of the same journal, etc. As irritating and time-wasting as such things are, they are

nevertheless of relatively minor significance within the total complex framework. Most are amenable to easy solution, given persistence, generous computer time, and the ability to survive seemingly endless deserts of boredom. (One very soon ceases to wonder at the reason behind some probably reasonable researcher's decision to abbreviate in yet another way the title of the *Comptes Rendus* of the French Academy of Sciences.)

When and When Not to Combine Citation Counts

The user is advised in any detailed chronological study to make use of the cross-references in the annually issued *SCI® Guide and Journal Lists*, and to consult periodical directories that provide historical and genealogical information about serials, such as Ulrich's or *CASSI*.

Compilation of the *JCR* has, as thoroughly as possible, dealt with these 'minor' problems. Major problems of identification remain, however, and the user and researcher must not expect that they have been solved. Any general attempt to do so would have been misguided and inevitably abortive. We have, thus, in compiling the *JCR* refrained from combining journal counts on the basis of 'lineage', even when it is clearly definable. Except where a title change has been so minor (usually among latter words) that it neither affects the title's position in a catalog listing nor requires additional or different entries, the *JCR* does not combine counts for related journals (replacements, supersedents, continuations, descendants, etc.). Nor does it combine counts for 'sections' of 'the same journal'. *JCR* leaves it to the user to decide whether or not his purpose recommends that counts be combined in such cases.

A particularly well-known example of this problem is that of Soviet journals and their translations. To alert the user, an asterisk after a main entry or subentry abbreviation signals that the journal appears in the *JCR* with counts for both original and translated versions. Unfortunately it would be impractical to attempt anything similar for the hundreds of journals that are lineally or otherwise related to others in these lists. When, for special purposes, counts have been combined, the user is informed.

Caution!

Caution is advisable in comparing journals, especially journals from different disciplines. The journal literature varies in its importance as a means of disseminating information in different fields. Wide citation may be necessary practice

in one field, but because of other dissemination in others a redundancy. Citation practices differ from one field to another. The difference may be complicated by a difference in the half-life of journal literature in different fields, as well as the size of the extant citable literature. Rapid obsolescence may characterize one field but not another. Thus, for example, it would be foolish to conclude merely on the basis of citation counts that *Journal of the American Chemical Society* is a 'better' journal than *Annals of Mathematics*, or to hypothesize, without a great deal of study, which serves its own field 'better'.

Other factors must be considered as well. For example, journals that do not use the roman alphabet are not as easily and economically included in the *SCI* data base as those that do. This fact may affect the ranking and citation counts of some Russian and Japanese journals. Or a journal may have published two or three articles that are cited year after year with extraordinary frequency, compared with the 'average' article it has published. Citations of such papers may distort evaluation of the journal unless their records are taken into account.

II. Why the Journal Citation Reports?®

In other parts of this introduction I have tried to explain the source of the data in the *JCR*™, to describe how the material has been summarized and displayed in its various sections, and to help the novice use it for the first time. The *JCR* answers the following types of questions immediately: how often has a particular journal been cited? what journals have cited it? how frequently have particular journals cited it? is it the older or new material that's being cited? what journals does this journal cite? how often does it cite each of them, etc.?

A merely curious browser, or even students or researchers, may reasonably and bluntly ask *why* these questions should be asked. What is the value of answering these questions? Can it justify a work of the *JCR*'s scope and expense? What is the *rationale* of such questions, beyond an academic itch to know? Who wants or needs the answers? Why is it necessary to compare journals or to determine their importance? Doesn't the mere fact that a journal is published say--with unarguable economic authority--all there is to be said? Aren't journals published because they are important to someone or to some group? Unfortunately life isn't that simple.

This introduction is no place to go into the complicated economics and politics of scientific and technical journal publication. The subject deserves several doctoral theses. In due course, the

JCR will undoubtedly stimulate students to undertake them. Suffice it to say the 'authoritative' voice of economics can speak in barely more than a whisper. Indeed it can often hardly be heard from its shaky podium of subsidized and unsubsidized society sponsorship, front- and back-door government support, voluntary and mandatory and 'mandatory-voluntary' page-charge systems, advertising and public relations programs, etc. The sheer economic chaos of much of this important activity is alone good enough reason to attempt to answer questions like those posed above.

For that very reason, the *JCR* should quickly prove itself indispensable to people who cannot rely on economic criteria alone in making basic decisions about journals, since the law of supply and demand is not always allowed to prevail. These include administrators in libraries and information service centers; individual scientists; journal editors and publishers; and those who determine science policy and measure its accomplishments.

Librarians can use the *JCR* to counteract the inertia that too often prevails with regard to journal selection. It's just too difficult; therefore, *ad hoc* decisions are rampant. The *JCR* offers objective evidence of the optimum makeup of general and special journal collections. Its yearly editions will indicate or imply changes the library should consider. The chronological spread of citation counts should be invaluable in optimizing retention schedules. Why keep twenty-five years of a journal on your shelves when 80 to 90% of its cited material is less than six years old? Few libraries in the world have a mandate to collect everything and none can afford it. Most must operate within a budget on which users' journal requests can wreak havoc. Because the *JCR* gives good indication of a journal's overall use, it provides a starting point for true cost-benefit analysis in allocating acquisition funds.

Outside the library or information center's administration offices, the *JCR* can be as useful to the librarian as to the library user. At ISI® we have found the *JCR* to be the most reliable--sometimes the only reliable--indicator of a journal's subject area, and of its orientation within the subject area. One quick scan of the columns showing journals that it cites and that cite it can often be more informative than the best title or statement of a journal's editorial objectives. This capability of the *JCR* is especially useful as multidisciplinary work takes scientists to the borders of their own fields, and perhaps over them into others with less familiar journals and journals of different types. These same cited and citing lists reveal what journals in other fields are linking up with journals in their own. And, a far from trivial matter, the *JCR* can be very helpful in deciding

where to publish to reach the audience you want to reach. If, for example, you have a paper that deals with some interesting mathematical aspects of biological problems but is nevertheless definitely a *biological* paper, the *JCR*® can show you which biological journals have the best 'connections' with math, and which are most likely to welcome the paper.

Since publication of the preliminary 1969 edition of the *JCR* we have had many inquiries from journal publishers and editors. Those inquiries seem to me to speak not only for the potential of the *JCR* but also for the managerial acumen of the scientists and business people who expressed immediate interest in *JCR*. As made plain earlier, the *JCR* cannot be used alone in evaluating a journal's performance, but it *can* alone give reliable indication that a thorough evaluation--including use of the *JCR*--may be in order. Has the number of citations dropped in relation to number of articles published? Has the rate of self-citation remained steady at the expected average? How do the self-citing and self-cited rates compare? How are citations distributed among citing journals within and outside the specialty? What is the impact of the average cited article in comparison with other comparably cited journals? How rapidly--see *Immediacy Index* among the *Definitions*--is the journal's material noted in the references of other journals?

The use of the *JCR* can be of far-ranging significance in a field about which I can say least here--science--its planning, its evaluation, its sociology, its history. Citation analysis can be used to identify and map research fronts; to define disciplines and emerging specialties through journal relationships; to determine the interdisciplinary or multidisciplinary character and impact of research programs and projects. I say least about this, to me the most exciting aspect of its potential, because the *JCR* in its present form is, for such advanced applications, only a sketch of that potential, providing little more than suggestions for further and deeper examination of the massive data bank from which its sections have been extracted. I have made plain above my regret that this book has dimensional limits. Even for the generally straightforward lists of ranked and citing and cited journals, we have had to limit the data presented. For the study of science policy and sociology those limitations are more troublesome to me. I believe the *JCR* in its present form can certainly provide material for innovative research in the field. But it will serve the field best if it does, as I hope, prompt more imaginative analyses than I am competent to attempt. I shall be very disappointed if the *JCR* does not, as any good piece of scientific work should, stimulate with every answer it gives more questions that need answers.

III. Definitions

These *Definitions* are, in some cases, actually definitions. In others, they explain usages peculiar to the *SCI*[®] and the *JCR*[®] and their editorial conventions. In still others (e.g., *cited journal*, *citing journal*, *times cited*), the definition is meant primarily to warn the reader that, in the case of the *JCR*, there is more than initially meets the eye in these apparently obvious terms, and frequently more than the memory instantly discloses. The user will need a fair command of their meaning when reading the descriptions of the *Citing* and *Cited Journal Packages*.

Citation. When one document (B) mentions, or refers to another document (A), the latter (A) has been cited by the former (B) as a source of information, as support for a point of view, as authority for a statement of fact, etc. The word *citation* is used to indicate not only the fact that document A has been cited in a reference of document B, but also for the description of document A contained in the reference (Lederberg J. *J. Bact.* 63:399, 1952). In this sense, citation and reference are frequently used interchangeably.

Citation Index. The *Citation Index* is an alphabetic list, by first author, of items cited in references from footnotes or bibliographies of a source article. Each such citation is followed by a short bibliographic description of the source article which contained the citing reference.

Cited Journal. A journal cited in a reference of an item (source item) published in an *SCI* source journal (citing journal). A cited journal is not necessarily covered by the *SCI*; that is, it may not be found in the listing of *citing journals*. Most cited journals, however, are also citing journals. *Cited journal* is used as a column heading in the *Cited Journal Package* of the *JCR*. Items in that column may include so-called 'soft' journals, and other serial publications. Such entries have been retained for their information value.

Citing Journal. A journal in which published items contained references citing another journal or published item. In the *JCR*, citing journals are necessarily *source journals* of the *SCI*.

Immediacy Index. A measure of how quickly the 'average cited article' in a particular journal is cited. A journal's immediacy index considers citations made during the year in which the cited items were published. Thus, the 1979 immediacy index of Journal X would be calculated by dividing the number of all journals' 1979 citations of items it published in 1979 by the *total number* of source items it published in 1979. It should be obvious that an article published early in the year has a better chance of being cited than one published later in the year. As a result, journals published weekly and monthly will theoretically

have an advantage, as regards immediacy, over journals published quarterly and semi-annually.

Impact Factor. A measure of the frequency with which the 'average cited article' in a journal has been cited in a particular year. The *JCR* impact factor is basically a ratio between citations and citable items published. Thus, the 1979 impact factor of journal X would be calculated by dividing the number of all the *SCI* source journals' 1979 citations of articles journal X published in 1977 and 1978 by the *total number* of source items it published in 1977 and 1978. There are other ways of calculating journal impact (see Garfield E. *Citation analysis as a tool in journal evaluation. Science* 178:471-79, 1972; especially note 27).

The impact factor is useful in evaluating the significance of absolute citation frequencies. It tends to discount the advantage of large journals over small ones, of frequently issued journals over less frequently issued ones (weeklies vs. quarterlies or annuals); of older journals over newer journals. In each such case the first is likely to produce or have produced a larger citable corpus than the second. All things being equal, the larger that corpus, the more often a journal will be cited. The impact factor allows some qualification of quantitative data. The qualification is algorithmic and objective, but nonetheless useful in journal evaluation.

Journal Title. The title of a scientific or technical periodical, usually given in the *JCR* in an abbreviated form. Abbreviation of titles in the *JCR* usually ignores subtitles and title run-ons (*Acta medica clinica--an international journal of medical practice. Zeitschrift für Neurologische Forschung und Angewandte Gebiete*). In abbreviation of journal titles, consistency is subordinated to informativeness and clarity, as far as space allows. In alphabetic listing of journals, abbreviations are alphabetized letter by letter, with a space regarded as a 'letter' preceding A and a hyphen as a 'letter' following Z. In such alphabetic listings of 'journal titles' in the *JCR*, note that it is the *abbreviation*, not the *full journal title*, that is alphabetized. An *Abbreviated-to-Full Titles of Citing/Cited Journals* list begins on page 40.

Reference. The mention or description of one document (A) in another document (B), to indicate a source of information, to provide support for a point of view, to lend authority to some statement of fact, etc. Document B is said to make reference to document A; document A is said to be cited by document B. *Reference* is also used for the document description or bibliographic data given in making the reference (Lederberg J. J. *Bact.* 63:399, 1952). Reference is made, that is, references are given, in footnotes, and more frequently among bibliographic end-notes or in bibliographic listings at the end of an article. From such references are extracted the citations which become main-entries in the *Citation Index*.

Rest. A column heading in the *Citing and Cited Journal Packages* of the *JCR*, used to mean 'Total Citations of Articles Published in All Previous Years'. Since the format of the *JCR* allows a chronological distribution of citation dates over a ten-year period, *Rest* means 'published prior to the decade just ended'.

Self-Citation. Self-citation of journals occurs when an article in journal X cites another article previously or simultaneously published in journal X. Self-citations are contained in about 20% of a journal's references.

Self-Citation Rate. Self-citations expressed as a percentage of all citations. There are two self-citation rates, the self-citing and self-cited rates. The self-citing rate relates a journal's self-citation to its total references. The self-cited rate relates a journal's self-citations to the number of times it is cited by all journals including itself. For example journal X made reference to 10000 items, including 2000 items it itself had published. Its self-citing rate is 2/10 or 20%. On the other hand, journal X was cited 15000 times in the references of all journals, including its own. Its self-cited rate is 2/15 or 13.3%.

Source Index. The *Source Index* of the *SCI* gives a complete bibliographic description of all source items processed for the *SCI*. Items are arranged alphabetically by name of first author; all coauthors are cross-referenced to first authors. The *Source Index* is, thus, an alphabetic index by author of all items published by *SCI*-covered journals during a particular year, or during the time covered by any of the cumulations of *SCI* annuals.

Source Item. Called also source document, source article, a source item is an item published in one of the source journals processed for the

Science Citation Index® (*SCI*). Source items may be original substantive articles, editorials, letters, technical notes, correction notes, meeting reports, reviews, etc. From the references provided by a source item, citations are extracted to prepare the *Citation Index* of the *SCI*; bibliographic descriptions of source items are prepared for the *Source Index* of the *SCI*; and words from the titles of source items are paired for production of the *Permuterm*® *Subject Index* of the *SCI*.

Some types of source items (e.g., news items, non-scientific and non-technical correspondence) do not by their very nature invite citation in the references of scientific reports. Such source items are excluded from source-item counts in compilation of the *JCR*. In the *JCR* only original articles, technical notes and review articles are counted as source items, except in the case of the following journals, whose meeting abstracts are admitted as source items in impact-factor and immediacy-index calculation: *Federation Proceedings*, *Bulletin of the American Physical Society*, *Clinical Research*, *Transactions of the American Nuclear Society*, and *Notices of the American Mathematical Society*.

Source Journal. A journal that is processed for the *SCI*, so called because it is the source of published items processed for compilation of the three sections of the *SCI*. In the *JCR* a source journal is a *citing* journal.

Times Cited. The *JCR* describes relationships between journals. It is, however, based on citation links between articles. The following explanations of 'times cited' may be unnecessary for most users. Some, however, may need the information, and it is given in some detail in the interest of whatever differentiation research may require.

Times Cited: Authors. In the case of authors, 'times cited' is the sum of the citation of their cited items, as described below, including journal articles, books, etc.

Times Cited: Journals. In the case of journals, 'times cited' is based on citations of articles, as described below. It is a cumulation of the number of times a particular journal has been named in citation of different articles in references of individual source items.

Times Cited: Articles. As elsewhere in these definitions, the term *articles* is used broadly for 'journal items', and includes technical communications, letters to the editor, editorials, etc.; in other words, individual items published in journals. An article cited three times in the refer-

ences of the same *SCI* source item is counted as having been cited by that source item *once*. Thus, 'times cited' in the case of articles is the cumulative number of times the article has been cited once or more by single *SCI* source items. In the case of articles, therefore, 'times cited' is equivalent to the number of source items that have cited the article.

Times Cited: Books and Other 'Non-Journal' Items. The references of journal items contain citations of many different types of publications. About 80% of the references cite other journal items. The remaining 20% cite books (single- or multi-authored monographs); edited collections of single- or multi-authored 'contributions' or 'chapters' or 'sections'; variously compiled and formatted collations of reports and papers produced by meetings, symposia, congresses; technical reports of academic, industrial, and governmental origin; personal communications; items in press; theses; 'unpublished' reports; collected works of classical and modern authors; handbooks, textbooks, data compilations; encyclopedias and other reference works; etc.

A great deal of such material presents prob-

lems for citation analysis that the journal article does not. First, styles of citation vary widely and wildly. Second, internal citation (of a single page, series of pages, section, chapter, etc.) is particularly frequent. Third, different revisions or editions, by the same author(s) or by the same or different editor(s), may be cited.

Such items cited more than once in the references of the same *SCI* source item are taken as cited as many times as there are different forms of citation. Thus, if John Smith's *Classic Chemistry* is cited three times identically as "Smith J. *Classic Chemistry*. New York: ABC Publ., 1954," it is counted as having been cited *once* by the citing article. If, however, the three references contain citations such as (1) "Smith J. *Classic Chemistry*. 1st ed., New York: ABC Publ., 1954, p. 25;" (2) Smith J. *Classic Chemistry*. 1st ed., New York: ABC Publ., 1954, p. 86;" and (3) "Smith J. *Classic Chemistry*. 2nd rev. ed., New York: ABC Publ., 1960," Smith's 'book' (and Smith) will be taken as having been cited three times. Thus, 'times cited' in the case of such 'non-journal' items is the cumulative sum of their single or multiple citation by individual *SCI* source items.

IV. Components of the *JCR*TM

The *JCR* is made up of three data 'packages' or sections. We have retained the word 'packages' in the titles of the sections from their first publication in the form of computer printouts. The three sections are: (1) *Journal Ranking Package*; (2) *Citing Journal Package*; (3) *Cited Journal Package*.

The first section (*Journal Ranking Package*) lists cited journals alphabetically and then ranks them by five different counts or indicators.

The second section (*Citing Journal Package*) shows for each *SCI*® source journal the journals it cited in 1975, and the chronological spread of items cited.

The third section (*Cited Journal Package*) shows for each journal cited by *SCI* journals, the *SCI* source journals that cited it, and the chronological spread of items cited.

Each of these sections is described more fully in the material which follows.

The *Journal Ranking Package*

The first part of the *JCR* is the *Journal Ranking Package*. It contains six listings, described in detail on pages 10-13. The first listing is an alphabetic list of journals cited in the 1975 references of journals processed for the production of the *Science Citation Index*®. The remaining five listings rank the cited journals by various counts and indicators.

The ranking lists present a great deal of useful information. Some of it is a summing of counts of references made and citations received that are broken down by cited journal and by citing journal in the two larger parts of the *JCR*. Some of

the information is presented only in these lists; for example, the number of source items published in the years 1973, 1974, and 1975 by each of the cited journals. It can be somewhat difficult initially to understand the calculation of impact factor and immediacy index, as defined in the *Definitions* elsewhere in this introduction. The summing of counts presented in the *Journal Ranking Package* gives the counts involved in the calculation of both, along with the result. Impact factor is the result of dividing the count in the fourth column of figures by the count in the seventh column. Immediacy index is the result of dividing the count in the next-to-last numerical column by the number on its left.

The fact that there are five ranking lists will, I hope, serve to remind users that ranking journals by any single criterion can be highly useful. But the result must be used with caution, and not in isolation without consideration of other rankings and other factors which may not be susceptible to any kind of ranking or any kind of objective, especially algorithmic comparison. Not un-

necessarily, the advice of due caution is repeated elsewhere in this introduction, and in much else that the author has written on the subject. The user must remember that *rank* in the *JCR* indicates relative standing on certain lists, and that the *JCR* is, among other things, a tool for evaluation of journals, not itself an evaluation of journals.

Journal Ranking Package, Section 1:

Specimen

JOURNAL RANKING PACKAGE				JOURNAL CITATION REPORTS				SECTION 1 PAGE 1				
JOURNALS IN ALPHABETICAL ORDER												
JOURNAL TITLE	<-----CITATIONS IN 1974 TO----->				<-----SOURCE ITEMS IN----->				IMPACT FACTOR	CITATIONS IN 1974 TO	SOURCE ITEMS IN 1974	IMMEDIACY INDEX
	ALL YEARS	1973	1972	73+72	1973	1972	73+72			1974 ITEMS	IN 1974	
1 A GRAEFES A KLIN E O	447	72	52	124	90	78	168	0.738	24	123	0	0.195
2 A VAN LEEUW J MICROB	157	47	53	100	62	55	117	0.855	15	63	0	0.238
3 AAPB BULL	1639	151	203	354	145	158	303	1.168	29	161	0	0.200
4 ABRASIVE ENG	1	0	0	0	25	15	40	0.000	0	24	0	0.000
5 ACCOUNTS CHEM RES	2738	326	555	881	63	56	119	7.403	65	62	1	1.048
6 ACTA AGROV HUNG	43	8	7	15	34	40	74	0.070	6	73	0	0.012
7 ACTA ALLERGOL	334	40	44	84	33	39	72	1.167	8	60	0	0.225
8 ACTA ANAESTH SCAND	287	25	37	62	34	48	82	0.408	8	61	0	0.131
9 ACTA ANAT	1212	47	84	131	141	142	283	0.463	17	157	0	0.108
10 ACTA ASTRONAUTICA	10	0	0	0	40	89	129	0.000	3	94	0	0.032
11 ACTA BIOCHIM BIOPHYS	230	15	51	66	32	51	83	0.795	7	46	0	0.152
12 ACTA BIOCHIM POL	336	34	31	65	37	37	74	0.878	11	51	0	0.214
13 ACTA BIOL CRACOV BOT	48	2	5	7	13	19	32	0.219	1	15	0	0.067
14 ACTA BIOL CRACOV ZOO	66	5	2	7	27	23	50	0.140	1	18	0	0.056
15 ACTA BIOL HUNG	237	4	15	19	27	43	70	0.271	1	15	0	0.067
16 ACTA BIOL MED GER	922	112	189	301	216	228	444	0.478	50	223	0	0.324
17 ACTA BOT HER	845	45	43	88	74	74	148	0.579	18	64	0	0.230
18 ACTA CHEM SCAND	8803	472	720	1192	548	595	1144	1.047	145	434	0	0.180
19 ACTA CHIM HUNG	904	48	67	115	197	236	433	0.450	29	152	0	0.191
20 ACTA CHIR HUNG	34	6	9	15	45	32	77	0.195	3	33	0	0.091
21 ACTA CHIR SCAND	1645	64	142	206	142	137	279	0.738	26	133	0	0.195
22 ACTA CIENCI VENEZ	64	6	14	20	77	101	178	0.112	0	10	0	0.000
23 ACTA CRYSTALLOGR	798	22	18	40	0	0	0	0.000	3	166	0	0.440
24 ACTA CRYSTALLOGR A	1793	241	275	516	141	235	376	1.372	33	166	0	0.440
25 ACTA CRYSTALLOGR B	4520	854	984	1838	630	753	1383	1.329	221	635	0	0.348
26 ACTA CYTOL	163	98	93	191	81	80	161	1.177	8	73	0	0.110
27 ACTA DERMAT-VENEREOL	840	94	122	216	120	84	204	1.049	27	96	0	0.281
28 ACTA DIABETOL LAT	281	12	44	56	46	31	77	0.882	5	39	0	0.077
29 ACTA ENDOCRINOL PAN	12	0	6	6	8	10	18	0.333	0	10	0	0.000
30 ACTA ENDOCRINOL COP	4909	708	675	1383	251	371	622	2.461	159	278	0	0.572
31 ACTA ENTOMOL BOHEMOS	79	15	23	38	51	42	93	0.409	7	44	0	0.154
32 ACTA GENET MED GEMEL	112	11	5	16	13	33	46	0.130	0	61	0	0.000
33 ACTA GERONTOL	17	11	3	14	25	19	44	0.318	0	0	0	0.000
34 ACTA HAEMATOL	637	34	113	147	88	108	196	0.418	14	93	0	0.172
35 ACTA RATIO-GASTRO	67	25	13	38	69	108	177	0.418	14	93	0	0.172

Description

Section 1 is a listing of journals cited in 1974 in the references of *SCI* source journals. The journals are arranged in alphabetic order of title abbreviation (letter by letter, with space preceding *A* and hyphen following *Z*). The first column is an item number. The second column is the journal-title abbreviation. The next four columns, bracketed under the heading 'Citations in 1974 to', give:

- (1) the total number of times the journal was cited by individual *SCI* source items in 1974;
- (2) the portion of those total citations accounted for by articles the journal published in 1973;
- (3) the portion of the total citations accounted for by articles the journal published in 1972; and

- (4) the sum of 1972 and 1973 items cited in 1974.

The next three columns, bracketed under the heading 'Source Items in', give

- (1) the number of source items published by the journal in 1973;
- (2) in 1972; and
- (3) in those two years together.

The next column, headed 'Impact Factor' gives a figure for the relative frequency with which the journal's 'average cited article' has been cited. (See *Impact Factor* under *Definitions* above.) Briefly, the impact factor is the ratio of citations to citable items published: all journals' 1974 citations of 1972 and 1973 items published by journal *X*, divided by the total number of source items published in 1972 and 1973 by journal *X*.

The next two columns show, respectively, the number of times articles in the journal's 1974

issues were cited in the references of 1974 *SCI* source items; and the number of source items the journal itself published in 1974. The last column, headed 'Immediacy Index' (see that term under *Definitions* above) is the quotient of 1974 citations divided by 1974 source items.

Thus, we see that *Acta Anaesthetica Scandinavica* was cited by all *SCI* source journals 287 times in 1974. Of those 287 citations, 62 were citations of articles published in 1972 and 1973 issues of *Acta Anaesth. Scand.* In 1973 that journal had published 54 source items; in 1972, it published 48. These 102 items (54 + 48), published by *Acta Anaesth. Scand.* in 1972 and 1973, were cited in part by *SCI* source journals 62 times in 1974, as we have seen. The impact factor is therefore 62/102, or 0.608. In 1974, *Acta Anaesth. Scand.* published 61 articles, to a few of which there were, during 1974, 8 references. The immediacy index is thus 8/61 or 0.131.

In some cases, a column will show a zero, a small bullet, or a blank. A zero is always a true zero; a small bullet indicates lack of data; a blank indicates an incalculable figure.

It should be remembered, as noted elsewhere, that the journals variously arranged in the sections of the *Journal Ranking Package* include not only *SCI* source journals themselves, but also other journals they have cited. In most cases, we have been able to supply the information on items published in the period 1972-1974 that is needed to fill out the entry for each cited journal not covered by the *SCI*. Where we have not, a small bullet appears.

There will, naturally, always be actual counts in the first column of these listings. A zero in the second to fourth columns of the 'Citations in 1974 to' group is a true zero.

'Source Items In' group is a true zero. *Abrasive Engineering*, for example, was cited only once in 1974; that citation was of an article published in some year other than 1972 or 1973, and the three columns for those two years' citations and their sum show zeros. Both impact factor and immediacy indexes are therefore also zero.

Zeros in the second group of columns headed 'Source Items In' usually indicate that the journal is no longer published or no longer published under that title. A small bullet indicates the few cases in which we have been unable to determine the number of source items. For example, *Acta Crystallographica* was cited 7598 times in 1974. Of those citations, 40 were supposedly citations of articles published by 'Acta Crystallographica' in 1972 and 1973. As the reader may know, however, the former *Acta Crystallographica* had by 1972 split into separate A and B sections. Counts for those new journals immediately follow the entry for the former title. As shown, 'Acta Crystallographica' published nothing in 1972 and 1973, or in 1974, but incomplete citations in 1974 references of some journals failed to identify which of the A or B sections was meant. The original title is still highly cited, but cannot be given either impact factor or immediacy index. Both appear for the A and B sections in the entries below. The journal origin of the 40 incomplete citations can be partially determined by consulting the *Cited Journal Package*.

As an alert for the user, an asterisk follows the abbreviation of journals (usually Russian) which appear in the listings in both original and translated versions.

Journal Ranking Package, Sections 2-6:

Specimen

JOURNAL CITATION REPORTS

JOURNAL TITLE	CITATIONS IN 1974 TO				SOURCE ITEMS IN			IMPACT FACTOR	CITATIONS IN 1974 TO		SOURCE ITEMS IN 1974	IMMEDIACY INDEX
	ALL YEARS	1973	1972	73+72	1973	1972	73+72		IN 1974	IN 1974		
Section 1												
2321 SCI PROGR	167	0	22	22	6	26	32	0.688	2	20	0.100	
2322 SCI REP RES I TOHOKU	125	1	2	3	8	14	22	0.227	0	4	0.000	
2323 SCI SINICA	183	42	2	44	43	0	43	1.023	19	60	0.317	
2324 SCI STUD	39	5	6	11	17	17	34	0.412	9	20	0.450	
2325 SCIENCE	47505	5121	8800	13781	1024	1151	2175	5.412	1208	919	1.314	
2326 SCOT MED J	360	30	41	71	35	60	95	0.842	6	48	0.125	
2327 SCRIPTA MET	900	198	212	410	234	230	464	0.884	46	271	0.170	
2328 SEARCH	92	21	34	55	70	77	147	0.188	13	82	0.161	
2329 SEDIMENT GEOL	60	9	15	24	30	36	66	0.364	0	18	0.000	
Section 2												
1 J AM CHEM SOC	98995	7855	9233	17088	1776	2123	3899	4.383	1835	1432	1.281	
2 J BIOL CHEM	81354	6319	7366	13685	1213	1129	2342	5.843	1352	1147	1.179	
3 J CHEM PHYS	62041	4496	5966	10462	1725	1860	3585	2.918	1022	1831	0.827	
4 NATURE	59206	4016	3979	7995	1222	977	2199	3.636	1404	1863	0.716	
5 BIOCHIM BIOPHYS ACTA	51491	6409	7720	14129	2314	2215	4529	3.120	946	1910	0.495	
PHYS REV	50820	63	78	141	0	0	0	0	25	0	0	
PHYS REV	47505	5121	8800	13781	1024	1151	2175	5.412	1208	919	1.314	
P NAT ACAD SCI USA	46917	6066	8451	14517	849	855	1704	0.989	1268	1195	1.061	

On next page

Section 3

41	TOPICS STEREOCHEM	296	37	7	24	4	0	4	6 000	0	4	1 500
42	J BIOL CHEM	81354	6319	7364	13605	1213	1129	2342	5 843	1352	1147	1 179
43	ANNU REV BIOPHYS BIO	178	33	130	172	11	19	30	5 733	6	14	0 429
44	CHEM SOC REV	270	126	130	256	20	25	445	5 488	11	21	0 524
45	INT REV CYTOL	1234	74	133	209	21	17	38	5 500	15	30	0 500
46	ORG REACT	164	4	41	44	4	4	8	5 500	0	2	0 000
47	ADV CELL MOL BIOL	64	0	49	49	0	4	9	5 444	0	5	0 000
48	SCIENCE	47505	5121	6660	11781	1026	1151	2177	5 412	1208	919	1 314
49	GASTROENTEROLOGY	8695	1030	1230	2260	198	221	419	5 384	191	240	0 784
50	ORGANOMET CHEM REV A	226	0	53	53	0	10	10	5 300	0	0	0

Section 4

19	ADV COLLOID INTERFAC	113	0	25	25	0	5	5	5 000	3	5	1 400
20	J EXP MED	20699	2203	3354	5557	245	223	468	11 074	347	257	1 350
21	PHYSIOL REV	3906	227	272	499	10	18	36	13 861	23	19	1 316
22	SCIENCE	47505	5121	6660	11781	1026	1151	2177	5 412	1208	919	1 314
23	BELL SYST TECH J	2321	168	145	313	95	104	201	1 537	122	93	1 312
24	ADV ORGANOMETAL CHEM	408	66	26	82	1774	2123	3899	4 383	1835	1432	1 281
25	J AM CHEM SOC	98905	7855	9233	17088	1776	2123	3899	4 383	1835	1432	1 281

Section 5

24	J APPL PHYS	19277	1509	1766	3275	1077	1025	2102	1 558	371	956	0 388
25	J CHEM SOC CHEM COMM	14454	1854	2587	4453	894	1231	2125	2 096	353	938	0 574
26	PHYS REV D	8641	2932	2372	5304	1033	815	1948	2 723	802	935	0 860
27	FIZ TVERD TELA	4497	499	562	1061	936	885	1821	0 583	114	919	0 124
28	SCIENCE	47505	5121	6660	11781	1026	1151	2177	5 412	1208	919	1 314
29	SOV PHYS SOLID ST	1317	143	227	310	936	885	1821	0 583	114	919	0 124
30	CHEM PHYS LETT	8478	1899	2304	4205	928	822	1750	2 403	423	896	0 472
31	BRAIN RES-AMSTERDAM	10227	2012	2510	4522	775	682	1457	3 104	565	893	0 633

Section 6

1	J AM CHEM SOC	98905	7855	9233	17088	1776	2123	3899	4 383	1835	1432	1 281
2	P NAT ACAD SCI USA	46917	6866	8451	15317	849	855	1704	8 989	1268	1195	1 061
3	BIOCHIM BIOPHYS ACTA	51491	6409	7720	14129	2314	2215	4529	3 120	946	1910	0 495
4	J BIOL CHEM	81354	6319	7364	13605	1213	1129	2342	5 843	1352	1147	1 179
5	SCIENCE	47505	5121	6660	11781	1026	1151	2177	5 412	1208	919	1 314
6	J CHEM PHYS	46496	6964	10462	17275	1225	1210	2585	2 918	1022	1033	0 827
7	LANCET	37047	5249	5134	10383	646	809	1555	6 677	1971	823	3 144
8	PHYS REV LETT	24275	5167	4961	10108	899	1099	1998	5 059	1416	960	1 475

Description

In Section 1 of the *Journal Ranking Package*, cited journals are listed alphabetically by journal title abbreviation. In Sections 2-6, cited journals are rearranged in descending numerical order of counts or indicators in various columns, as follows:

- Section 2. By total citations for all years
- Section 3. By impact factor
- Section 4. By immediacy index
- Section 5. By source items published in 1974
- Section 6. By number of 1972 and 1973 citations in the references of 1974 issues of *SCI* source journals.

In Sections 2-6, the first column is a 'rank' number. In these sections, journals will have the same rank number when they show the same number or value for the count or indicator that has determined the ordering of the entries. After one or more repetitions of a rank number, the next lower rank number is advanced as many times as necessary to compensate for the repetition(s). Thus, in Section 5, B CHEM SOC JAPAN, J APPL CHEM-USSR*, and ZH PRIKL KHM* all rank 37th in terms of source items published in 1974. The next journal on the list, J GEOPHYS RES, ranks 40th.

Once familiar with the *JCR* and its potential in journal evaluation, readers will find they want information about particular journals from several or all of the lists in Sections 2-6 of the *Journal*

Ranking Package. To find the rank of a particular journal on any of the lists, look it up in the alphabetic list. Determine the count or indicator in the column by which you want the journal ranked, turn to the indicated Section of the *Journal Ranking Package*, and run down the relevant column until you find the journal's count or indicator. One can of course work from any one of the Sections to any other in this manner, without beginning with the alphabetic listing in Section 1.

For example, in the alphabetic list of Section 1, *Science* is number 2325 on page 20. From that list, we find that it was cited 47,505 times in 1974. Turning to Section 2, we do not have to go far down the first numerical column to find 47,505; *Science* ranks 7th. Scanning across the row to the impact-factor column, we find a value of 5.412. Turning to Section 3, we scan barely half a page to find 5.412 and *Science*, with an impact factor rank of 48th. Jumping across to the immediacy-index column, we find a value of 1.314. Turning to Section 4, we find *Science* ranks 22nd in immediacy. It published 919 source items in 1974; turning to Section 5, we find it ranked 27th (the same as FIZ TVERD TELA and SOV PHYS SOLID ST*) in this respect. In Section 5, in the fourth numerical column, we find *Science* articles published in 1972 and 1973 were cited 11,781 times in 1974. Turning to Section 6, and starting down the fourth numerical column, we find *Science* ranking fifth.

The Citing and Cited Journal Packages

The *Citing and Cited Journal Packages* show citation-frequency relationships between pairs of journals. In the *Citing Journal Package*, one can find what journals a particular journal has cited, and a distribution by year of the publication dates of the cited material. In the *Cited Journal Package* one can find what journals have cited a particular journal, and a distribution by year of the publications dates of the cited material. Specimens with description from both appear on pages 16-19.

Relatively few journals produce most of the references processed for the *Science Citation Index* data base. Similarly, relatively few journals account for most of the citations made in those references. In either case, a list of 1000 journals will encompass well over 70% of the items. Beyond lists of 1000 journals, the 'return' in references and citations becomes progressively smaller as the lists are extended, but that return can be valuable for the information it gives about 'narrow' but important specialties and subspecialties in which journals may be few, publication infrequent, research relatively slow-paced, and so on.

Ratios like the *JCR*'s impact factor and immediacy index do much to compensate for sheer size in 'comparing' one journal in biochemistry with another, for example, or in 'comparing' a biochemistry journal to a palaeontology journal. But even with the help of such indices, we must extend the lists of citing and cited journals well beyond the select but gigantic core if we are to do justice to as many of the 'narrower' fields and subspecialties and border-marches of science as possible.

The *Citing Journal Package* includes entries for each of the 2540 journals covered by the *SCI* in 1975, provided that issues of the journal did appear during the year, or, as in the case of some 'annuals', appeared with 1975 cover dates during the early part of 1976. The *Cited Journal Package* includes entries for more than 2500 journals and other items, some of them obviously not covered by the *SCI*. As noted above, journal references contain citations of other items besides journal articles. As far as possible, citations of non-journal material have been deleted in

compiling the *JCR*. Cited subentry items in the *Citing Journal Package* and main entries in the *Cited Journal Package* will, therefore, be *journals* in almost all cases. Since exclusion of non-journal material from these listings has been algorithmic, a non-journal item may appear occasionally as a cited-journal main entry, or as a citing-journal subentry.

It would have been uneconomical to give for every citing journal all the journals it cited, and for every cited journal all the journals that cited it. To do so would have made this volume many times its actual size, but would have added to it in either case mainly long strings of singly cited or citing items under every main entry. To avoid the latter, but at the same time to avoid neglect of journal relationships in 'smaller' and 'narrower' fields, the length of subentry lists has been controlled in both the *Citing Journal Package* and *Cited Journal Package*.

The following algorithm was adopted to control the length of subentry lists. Subentry lists of cited or citing journals are limited to a maximum of 100 items, or to the number of items that account for 75% of the total references or citations. Where either condition would allow listing of items cited or citing less than 6 times in the year, the items are not printed as subentries but are incorporated in the ALL OTHER subentry, the last subentry under each main entry. Disregarding these conditions, at least six subentries in addition to the ALL OTHER subentry *must* be printed, if the main entry journal can supply them.

Complete citing and cited data on all the listed journals are available on magnetic tape for users whose research requires it. Inquiries should be directed to the Research and Corporate Development Division, Institute for Scientific Information, 325 Chestnut Street, Philadelphia, Pa. 19106, USA.

Main entries in the *Citing Journal* and *Cited Journal Packages* are arranged alphabetically by journal title abbreviation. As mentioned elsewhere, consistency in abbreviation of journal title words has been subordinated to informativeness. The same word may not be abbreviated in the same way whenever it occurs. The reader can 'decode' any abbreviations that may leave him in doubt by referring to the *Abbreviated-to-Full Titles Of Citing/Cited Journals* list beginning on page 40.

Citing Journal Package:

Specimen

JOURNAL CITATION REPORTS														PAGE 449	
CITING JOURNAL		CITING JOURNAL PACKAGE													
CITED JOURNAL		NUMBER OF TIMES THIS YEAR WAS CITED IN													
		TOTAL	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	REST	
17	MATH NACHR (CONTINUED)														
	ALL OTHER (311)	478	8	17	46	57	35	34	21	22	30	20	188		
23	MATH SCAND	215	1	14	15	17	14	12	8	14	14	11	86		
22	MATH SCAND	16	0	3	4	0	1	0	0	0	1	1	6		
22	ANN MATH	13	0	1	1	2	1	0	0	0	1	0	7		
2	ACTA MATH	8	0	1	1	0	1	0	2	0	0	0	3		
29	ARK MAT	7	0	0	0	1	1	0	0	0	0	0	4		
51	B AM MATH SOC	7	0	1	0	0	0	0	0	0	0	0	5		
48	T AM MATH SOC	6	0	0	0	1	0	0	0	0	0	2	0		
	ALL OTHER (90)	158	1	9	24	13	12	12	10	6	10	3	58		
47	MATH Z	1090	26	92	113	95	70	66	49	41	43	42			
47	MATH Z	151	5	24	18	12	19	6	9	6	7	36			
38	MATH ANN	40	4	3	4	3	5	1	7	1	1	2	34		
48	T AM MATH SOC	46	1	3	1	3	2	6	2	1	2	4	21		
77	J ALGEBRA	40	0	3	10	7	1	5	5	1	4	0	4		
1	22 ANN MATH	37	0	1	2	0	1	3	2	1	0	0	27		
30	P AM MATH SOC	29	0	1	7	5	0	4	0	0	1	10			
77	ARCH RATION MECH AN	25	0	3	3	4	1	3	4	0	2	1	6		
47	AM J MATH	24	0	0	1	1	0	2	0	0	1	0	18		
51	B AM MATH SOC	23	0	3	4	2	0	1	0	3	0	2	8		
59	COMMUN PUR APPL MATH	19	0	3	3	1	1	4	0	0	0	0	7		
31	J LOND MATH SOC	19	0	3	0	0	0	0	0	0	0	0	8		
33	COMMENT MATH HELV	18	0	0	0	0	1	0	0	1	0	1	12		
27	PAC J MATH	18	0	2	0	0	1	2	0	0	0	2	8		
31	CAN J MATH	18	1	1	3	0	0	2	3	0	0	1	4		
22	ARCH MATH	16	0	3	2	0	1	2	2	0	1	0	5		
31	ILLINOIS J MATH	14	0	0	1	0	2	1	0	0	1	0	9		
80	INVENT MATH	14	1	0	0	3	2	0	2	4	2	0	0		
2	08 ACTA MATH	13	0	0	0	1	0	0	2	1	1	0	8		
	ABH MATH SEM HAMBURG	12	1	0	0	0	0	0	1	2	0	0	8		
	CR HERD ACAD SCI	12	1	1	2	0	0	0	0	0	0	1	7		
	FUND MATHEMATICAE	11	1	0	1	1	0	1	1	0	0	0	6		
35	J REINE ANGEW MATH	11	1	0	0	0	0	0	1	0	0	0	8		
53	P LOND MATH SOC	11	0	2	0	0	3	1	0	0	1	1	3		
29	DUKE MATH J	10	1	0	0	0	0	0	0	0	0	0	7		
	INDAGATIONES MATH	10	0	2	0	0	0	0	0	0	0	0	4		
	J COMB THEORY	8	0	1	1	0	2	1	0	2	1	0	0		
34	MANUSCRIPTA MATH	8	3	0	0	0	0	0	0	0	0	0	0		
	J DIFFERENTIAL GEOM	7	0	0	0	2	1	1	2	1	0	0	0		
49	SIUD MATH	7	0	0	0	0	0	0	1	0	3	0	3		
	TOPOLOGY	7	0	0	0	0	1	1	1	1	7	1	0		
36	ANN I FOURIER	6	0	2	0	0	0	0	0	0	3	0	1		
25	B SOC MATH FR	6	0	0	1	0	0	0	2	0	0	0	3		
	J FUNCT ANAL	6	0	3	1	0	0	0	2	0	0	0	0		
30	J MATH SOC JAPAN	6	1	0	0	1	0	0	1	0	1	0	2		
	MAT SB	6	0	0	0	0	0	0	0	0	0	0	6		
	SOV MATH DOKLADY	6	0	0	2	1	1	1	1	0	0	0	10		
	ALL OTHER (217)	356	5	28	40	41	24	15	12	18	9	14	150		
33	MATHEMATIKA	88	3	13	13	13	13	11	10	12	11	10	39		
33	MATHEMATIKA	12	0	3	4	1	0	2	0	0	0	0	2		
1	25 J FLUID MECH	5	1	0	0	2	0	0	0	2	0	0	2		
51	B AM MATH SOC	4	0	0	0	0	1	0	0	0	0	0	3		
31	J LOND MATH SOC	4	0	0	1	0	0	0	0	0	0	0	3		
31	J NUMBER THEORY	4	0	0	1	2	1	0	1	0	0	0	0		
39	P CAMB PHIL SOC	3	0	1	1	0	0	0	0	0	0	0	1		
	ALL OTHER (41)	56	2	5	5	8	1	2	1	0	2	1	29		
04	MATRIX TENSOR QUANT	38	0	0	3	8	8	8	7	8	7	3	12		
	IEEE	4	0	0	1	1	0	0	0	0	0	0	0		
1	04 J MATH PHYS	4	0	1	0	1	1	1	0	0	0	0	3		
25	J FRANKLIN INST	3	0	0	0	1	0	0	0	0	1	1	0		
39	SIAM J APPL MATH	3	0	0	0	0	2	0	0	0	0	0	0		
	J SOC IND APPL MATH	2	0	0	0	0	0	0	0	0	0	0	2		
	ADV CALCULUS	1	0	0	0	0	0	0	1	0	0	0	0		
	ALL OTHER (17)	17	0	0	0	0	0	0	1	0	0	0	9		
1	00 MAYO CLINIC P	2312	75	278	203	224	145	152	127	113	72	88	855		
6	99 J CLIN INVEST	80	3	13	7	12	2	5	2	2	1	2	31		
8	36 N ENG J MED	78	1	16	6	8	7	3	4	5	1	5	27		
6	67 LANCE	72	3	10	5	8	2	2	6	5	3	3	25		
4	41 AM J MED	57	0	8	2	12	1	4	1	2	2	1	24		
2	41 AM J PHYSIOL	54	0	6	8	8	0	6	4	2	7	1	12		

Description

Citing journals are listed in alphabetical order of their abbreviated title. Thus, in the specimen shown, the entry for *Mathematische Zeitschrift* (MATH Z) comes before the entry for *Mathematika* (MATHEMATIKA). The first line of the entry for each citing journal gives its impact factor, abbreviated title (in most cases), and total number of unique references from articles the journal published in 1974. The total is asterisked. Succeeding columns of the row distribute the reference total by year in which the articles cited in the references were published. The last column includes counts for 1964 and previous years.

Thus, the specimen shows that articles published by *Mathematische Zeitschrift* in 1974 pro-

duced 1090 references with unique citations (citations of the same article in a single article's references are counted as one). Twenty-six of the 1090 references contained citations of articles published in 1974, 92 references cited articles published in 1973, 115 references cited articles published in 1972, etc. The last column in the row shows that 432 of the 1090 references contained citations of material published in 1964 and earlier years.

Under the total line for each citing journal are listed the journals cited in the references of the citing journal named in the main-entry line. These cited journals are listed, in descending numerical order, by the frequency of their citation in references of the citing journal named in the main-entry total line. The abbreviated title of

each of the sub-entry cited journal is preceded by the impact factor of that journal if it has been possible to determine it. The total citation count for each sub-entry cited journal is shown, and then distributed, as described above, by year of publication of the cited items.

Thus, *Mathematische Zeitschrift* cited itself 151 times in the references of articles it published in 1974. Of those 151 citations, 5 were of articles published in 1974, 24 of articles published in 1973, 18 of articles published in 1972, etc. Thirty-six of the 151 citations were of articles published in 1964 and earlier years. Similarly, *Mathematische Zeitschrift* cited *Mathematische Annalen* (MATH ANN) 60 times in the references of articles it published in 1974. Four of these references contained citations of articles published by *Mathematische Annalen* in 1974, 2 contained citations of articles published by *Mathematische Annalen* in 1973, and so on. The chronological distribution shows that more than half (34/60) of *Mathematische Zeitschrift's* citation of *Mathematische Annalen* was of material published by *Mathematische Annalen* in 1964 and earlier years.

The last sub-entry cited journal in the main-entry summarizes data on journals that were cited less than 6 times in the references of articles published in 1974 by the journal named in the main-entry line. (Exceptions to the 'less-than-six' convention are explained elsewhere). Thus 'all other' journals cited in 1974 references of *Mathematische Zeitschrift* numbered 217, and these unnamed cited journals accounted for 356 articles. The total for 'all other' journals is distributed chronologically, as described above for named cited journals.

This specimen shows that about 40% (432/1090) of the articles cited in 1974 references of *Mathematische Zeitschrift* were published in 1964 and earlier years, that its self-citing rate is 13.8% (151/1090), that language seems to be of little hindrance in mathematical studies (there are English, French, German, Russian, Japanese journals on this cited list), that *Mathematische Zeitschrift* seems inclined to an interest in physical and applied mathematics, and that 42.6% (464/1090) of the articles it cited in 1974 were published in 1969 or thereafter.

Cited Journal Package:

Specimen

JOURNAL CITATION REPORTS													
CITED JOURNAL PACKAGE													
CITED JOURNAL CITING JOURNAL		NUMBER OF TIMES THIS YEAR WAS CITED IN											
		TOTAL	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	REST
AM J PHARM EDUC (CONTINUED)													
26 J AM PHARM ASSOC	2	0	0	0	0	0	2	0	0	0	0	0	0
67 PHARMAZIE	0	0	0	1	0	1	1	0	0	0	0	0	0
ALL OTHER (110)	10	0	1	3	1	2	0	2	0	2	1	0	0
25 AM J PHYS													
25 AM J PHYS	243	7	60	44	34	14	10	17	5	10	8	34	0
2 01 J CHEM PHYS	29	0	1	0	0	0	0	0	0	0	0	0	0
49 NUOVO CIMENTO	29	0	0	0	0	0	0	0	0	0	0	0	0
2 86 PHYS REV B	25	0	0	1	4	5	2	3	2	0	0	0	0
2 61 PHYS REV A	21	1	0	0	1	7	0	0	2	1	0	3	0
75 LETT NUOVO CIMENTO	18	0	2	2	1	1	0	0	0	0	0	0	0
2 72 PHYS REV D	17	0	2	3	1	0	1	0	0	0	0	10	0
1 53 FOUND PHYS	14	0	1	5	2	0	0	0	0	0	0	0	0
1 55 J APPL PHYS	14	0	1	0	4	1	4	1	1	1	0	0	2
1 04 J MATH PHYS	13	0	0	2	3	4	0	0	0	0	1	1	2
2 01 J OPT SOC AM	12	1	0	1	3	0	2	1	0	0	0	0	4
89 AM J PHYS ANTHROPOL													
89 AM J PHYS ANTHROPOL	250	2	8	34	23	30	22	16	7	12	2	94	0
69 HUM BIOL	61	0	3	11	0	9	6	4	4	2	3	19	0
52 J HUM EVOL	57	0	10	12	5	3	8	0	1	4	2	16	0
7 13 AM J HUM GENET	26	0	4	5	3	3	0	0	1	0	0	10	0
BIOCHEM PHYSIOL VISU													
2 78 J COMP PHYSIOL	1	0	1	0	0	0	0	0	0	0	0	0	0
1 00 Z NATURFORSCH C	1	0	1	0	0	0	0	0	0	0	0	0	0
73 BIOCHEM SOC TRANS													
3 62 BIOCHEM J	73	9	44	0	0	0	0	0	0	0	0	0	0
73 BIOCHEM SOC TRANS	18	28	10	0	0	0	0	0	0	0	0	0	0
3 12 BIOCHEM BIOPHYS ACTA	29	4	25	0	0	0	0	0	0	0	0	0	0
3 04 FEBS LETT	21	5	16	0	0	0	0	0	0	0	0	0	0
2 91 J ENDOCRINOL	18	0	17	1	0	0	0	0	0	0	0	0	0
3 01 EUR J BIOCHEM	12	2	10	0	0	0	0	0	0	0	0	0	0
3 53 J NEUROCHEM	12	6	6	0	0	0	0	0	0	0	0	0	0
ORIGINS LIFE	7	0	6	1	0	0	0	0	0	0	0	0	0
47 GENETICA	6	0	6	0	0	0	0	0	0	0	0	0	0
2 16 J GEN MICROBIOL	6	0	6	0	0	0	0	0	0	0	0	0	0
4 67 LANCET	6	2	4	0	0	0	0	0	0	0	0	0	0
1 49 PURE APPL CHEM	6	0	4	0	0	0	0	0	0	0	0	0	0
ALL OTHER (131)	234	32	197	5	0	0	0	0	0	0	0	0	0
BIOCHEM J													
5 12 BIOCHEM BIOPHYS ACTA	131	0	0	0	0	0	0	0	0	0	15	18	98
5 84 J BIOL CHEM	115	0	0	0	0	0	0	0	0	0	0	0	0
5 87 EUR J BIOCHEM	100	0	0	0	0	0	0	0	0	0	0	0	0
3 62 BIOCHEM J	77	0	0	0	0	0	0	0	0	0	11	5	61
MOL CELL BIOCHEM	73	0	0	0	0	0	0	0	0	0	0	0	0
4 71 BIOCHEMISTRY-US	64	0	0	0	0	0	0	0	0	0	0	0	0
2 24 N-S Z PHYSIOL CHEM	55	0	0	0	0	0	0	0	0	0	5	5	43
ARCH BIOCHEM	52	0	0	0	0	0	0	0	0	0	0	0	0
1 71 J BIOCHEM TOKYO	37	0	0	0	0	0	0	0	0	0	4	3	25
3 04 FEBS LETT	29	0	0	0	0	0	0	0	0	0	0	0	0
3 74 BIOCHEM BIOPH RES CO	27	0	0	0	0	0	0	0	0	0	0	0	0
6 98 P NAT ACAD SCI USA	27	0	0	0	0	0	0	0	0	0	1	1	25
2 72 J BACTERIOL	26	0	0	0	0	0	0	0	0	0	5	2	19

Description

Cited journals are listed in alphabetical order of their abbreviated title. Thus, in the specimen above, the entry for *American Journal of Physics* (AM J PHYS) comes before the entry for *American Journal of Physical Anthropology* (AM J PHYS ANTHROPOL). The first line of the entry for each cited journal gives its impact factor, abbreviated title (in most cases), and total citations received in 1974. The total is asterisked. Succeeding columns of the row distribute the citation total by year in which the cited articles were published. The last column includes counts for 1964 and previous years.

Thus, the specimen shows that *American Journal of Physics* (AJP) was cited 800 times in 1974 by SCI source journal items. Fourteen of the articles or other items cited in 1974 were published by AJP in 1974, 95 in 1973, 104 in 1972, etc. Of the 800 citations, 230 were of articles published by AJP in 1964 and early years.

Under the total line for each cited journal are listed the journals in whose references citations of the main-entry cited journal appeared. These citing journals are listed, in descending numerical order, by the number of citations each contributed to the citation totals for the cited journal named in the main-entry total line. The abbreviation for each of the sub-entry citing journals is preceded by the impact factor of that journal, if it has been possible to determine it. The total citation count for each sub-entry citing journal is shown, and then distributed, as described above, by year of publication of cited AJP items.

Thus, *American Journal of Physics* (AJP) cited itself 243 times in references of articles it published in 1974. Seven of those references contained citations of articles published by AJP in 1974; 60 of the 1974 references cited 1973 AJP articles, and so on. Similarly, *Journal of Chemical Physics* (J CHEM PHYS) cited AJP 29 times in references of articles it published in 1974. None of those 29 references cited 1974 AJP articles. Of the 29 references from *Journal of Chemical Physics* in 1974 that cited AJP, 1 cited a 1973 AJP article, 4 cited 1972 AJP articles, 2 cited 1971 AJP articles, etc. In eight cases, *Journal of Chemical Physics* cited articles that had been published in AJP in 1964 or earlier years.

The last sub-entry under each cited journal main-entry summarizes data on journals whose

1974 references included fewer than 6 citations of AJP in 1974. (Exceptions to the 'less-than-six' convention are explained elsewhere.) Thus, 'all other' journals whose 1974 references contained citations of AJP numbered 153. These 153 journals contained in all 262 citations of AJP articles in their references. The total for these 'all other' journals is distributed chronologically, as described for named citing journals.

This specimen shows that AJP has a self-cited rate of 30.4% (243/800); that 28.8% (230/800) of 1974 citations of the AJP were citations of older material published in 1964 and earlier years; that *Science* in 1974 cited AJP as often as *Solid State Communications* cited AJP, and interestingly enough, that *Science* cited newer AJP material, while *Solid State Communications* cited older material.

The specimen below opposite shows several features whose significance users will soon understand at a glance. BIOCHEM PHYSIOL VISU was cited only twice and the cited items are from the same year. The cited work is *Biochemistry and Physiology of Visual Pigments*, a symposium product published in 1973. When all citations, as in this case, are confined to the same year, the cited item is likely to be a 'soft' journal, as in this case, or as mentioned elsewhere a book of some type. Where citations are confined to two or three years, each separated by a lapse of several years, the cited items are likely to be successive reports from irregularly held symposia, conferences, etc., or successive editions of a book.

BIOCHEM SOC TRANS was cited only 502 times. The journal is *Biochemical Society Transactions*, which began publication in 1973--hence the zeros in most of the right-hand columns. The seven citations for 1972 items are the result of incorrect references. The array of zeros on the right alerts the user to the fact that the journal is relatively new. As a matter of fact, it replaces a proceedings section formerly included in *Biochemical Journal*.

BIOCHEM Z was cited 2420 times. It shows no impact factor, and practically no counts for cited items published after 1966. In fact 84% (2038/2420) of the citations refer to items published before 1965. *Biochemische Zeitschrift* ceased publication with issue number 5 of volume 346 in January 1967. It was superseded by *European Journal of Biochemistry*. The ten counts for cited items published after 1967 are the result of incorrect references.