printing with a special ink that it had formulated. The printing looked almost black, but it was actually a very deep brown, and had no carbon in the pigment. However, the Xerox and other newer machines—fortunately or unfortunately, depending on how you look at it—don't have this limitation.

In summary, information-reporting services can be a valuable source of current information in a particular area of business or industry. They are most useful to busy executives and managers who do not have the time to wade through the steady flow of newspapers and magazines, but who need to be right on top of current developments.

Reviews of the Chemical Literature*

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The utility of a review depends on what one expects of it. If it is to keep up with developments in one's own field, a review might not be sufficiently timely. For such a need, one might better write the review. That way one would be forced to keep in close touch with the journals that are the prime sources of review material.

Is it to keep in touch with neighboring fields? Is it to brush up on a new field to prepare for an assignment? If these are the needs, reviews will help.

THE NEED FOR CRITICAL REVIEWS

There has been much discussion in recent years that more and better critical reviews are needed to keep chemists abreast of the flow of new information on subjects where they cannot cope with the flood of original papers. Adams has asserted that the review is the practical solution to the critical problem of "keeping up with the literature," in that it "represents the first effort to synthesize newly reported information and to relate it to the cumulated knowledge of a research field" (*1*). Weinberg has pointed out the importance of "the job of sifting, reviewing, and synthesizing information—that is, handling information with sophistication and meaning, not merely mechanically" (*12*). And Weil has gone even further to assert that "an increasing number of companies have, in the past decade, recognized that they must use some of their best senior scientists and engineers" (*11*) to do this job. Good reviews will serve an alerting function that can help these scientists do their job better and more quickly.

Two studies on how research workers find information have credited reviews as the source for 4% of the "finds" (*3, 6*). In another study on information gathering habits, 25% of the medical scientists surveyed quoted review papers among their primary tools.

Fix, Campbell, and Creager have estimated that approximately 8,700 review articles in chemistry were published in 1962 (*4*). This estimate is based on the review articles covered by *Chemical Abstracts* in which the number of reviews (about 6%) increased faster than the total number of articles over the five-year period through 1962.

Distribution of review articles among types of literature has been estimated as: 55% in primary research journals, 38% in serial review publications, and 7% in annuals or other special types of publication (*4*).

Bruning has discussed the desirability of confining reviews to review journals in contrast to interspersing reviews among reports of original work (*2*). Research journals as a source of reviews are disregarded in the present study. Among the remaining literature, there are three principal types that accomodate reviews: review journals, serial review books, and proceedings.

REVIEW JOURNALS

There are four principal review journals in chemistry in the English language. They are: *Chemical Reviews*, published by the American Chemical Society; *Quarterly Reviews*, published by the Chemical Society (London); *Review of Pure and Applied Chemistry*, published by the Royal Australian Chemical Institute; and *Uspekhi Khimii*, translated as *Russian Chemical Reviews* by Cleaver-Hume Press for the Chemical Society (London).

In addition to these there are several review journals in English in allied fields that carry certain amounts of chemical material. They are: *Atomic Energy Review*, published by the International Atomic Energy Agency (Vienna); *Bacteriological Reviews*, published by the Society of American Bacteriologists; *Biological Reviews* of the Cambridge Philosophical Society; *Botanical Review*, published by the New York Botanical Garden; *Metallurgical Reviews*, published by the Institute of Metals (London); *Pharmacological Reviews*, published by Williams and Wilkins for the American Society for Pharmacology and Experimental Therapeutics; *Physiological Review*, published by the American Physiological Society; *Reviews of*

* Presented before the Division of Chemical Literature, 148th National Meeting of the American Chemical Society, Chicago, Ill., Aug. 31, 1964.

Modern Physics, published by the American Institute of Physics; and *Science Progress*, published by Edward Arnold (London). All of these volumes in the allied fields are similar to *Chemical Reviews* in format and treatment.

A number of specialized review magazines are available for particular fields. Among these are: *Battelle Technical Review*, *Borden's Review of Nutrition Research*, *Engelhard Industries Technical Bulletin*, *Nutrition Reviews*, *Platinum Metals Review*, and *Review of Coal Tar Technology*.

SURVEYS AND LECTURES

At the next level of reviews are the surveys and lectures which are published in periodicals. Some of the following periodicals are devoted entirely to this type of presentation; others include surveys and lectures as part of a larger format. Among the magazines of interest to chemists and chemical engineers are: *American Scientist*, *Angewandte Chemie*, *Chemical and Engineering News*, *Ciba Review*, *Endeavour*, *International Science and Technology* (Conover Mast), *Record of Chemical Progress*, *Research Applied in Industry*, *Science*, and *Scientific American*. Reviews in these magazines tend to be somewhat more popular than the strictly technical reviews and are not usually as well referenced. They are a good guide to current trends in the field, if one does not need to be exhaustive.

Some periodicals have the word "review" in their names but are not reviews in the sense that we are considering. Typical titles are: *Monsanto Technical Review*, *Physical Review*, *Review of Scientific Instruments*, and a host of "house organs" or company publications, such as: *Goodyear Chemical Review*, *High Frequency Heating Review*, *Liquid Air Review*, *Los Alamos Scientific Laboratory Quarterly Review*, *National Agricultural Chemicals Association Review*, *Radiation Review*, *Rockefeller Institute Review*, *Union Carbide Bakelite Review*, and *Union Carbide Metals Review*.

Early review journals were devoted exclusively to book reviews. Kronick lists no subject review serials in the modern sense in his survey of technical periodicals to 1790 (8).

SERIAL REVIEW BOOKS

The first of the still current series of serial review books made its appearance in 1904 when the Chemical Society (London) brought out its *Annual Reports on the Progress of Chemistry*. Twelve years later in 1916 the Society for Chemical Industry, also British, started its *Reports on the Progress of Applied Chemistry*. Both of these series continue today.

Ten years later in 1926 the National Research Council in the United States started the *Annual Survey of American Chemistry*, which ran through 1935. All three of these serial reviews attempted to mention every piece of significant work that had been reported in the previous year, what might be termed the "omnibus" review. Forerunner of the omnibus review was the annual report that Jöns Jacob Berzelius presented to the Swedish Academy of Science from 1822 to his death in 1849. In this report Berzelius summarized work reported in journals and through correspondence by chemists all over the world. Berzelius published in Swedish, but a German translation under the title, *Jahresbericht über die Fortschritte der Physischen Wissenschaften*, was widely distributed. The title went through several transitions, and although the report was heavily weighted toward chemistry, it was not until 1842 that it became *Jahresbericht über die Fortschritte der Chemie und Mineralogie*. Later even the "Mineralogie" was dropped.

Berzelius' *Jahresbericht* was continued for three years after his death, when it ceased publication. By this time, however, a similar review edited by Justus Liebig and Hermann Kopp was ready to take its place. It was started in 1847 under the title *Jahresbericht über die Fortschritte der reinen, pharmaceutischen, und technischen Chemie, Physik, Mineralogie, und Geologie*. It ran to 1910.

The two principal remaining omnibus reviews in the U. S. are the annuals published by the American Chemical Society as special issues of monthly journals: *I & EC Annual Review Supplement* and *Annual Reviews of Analytical Chemistry*; the latter alternates as "fundamental" one year, "applied" the next.

Some time after the two first British serials had become established, *Chemical Reviews* was started in the United States with a new pattern. The first issues carried a series of essays presented by chemists at the dedication of the Sterling Chemistry Laboratory at Yale University in 1923. The contents of the first number included "Atomic Weights and Isotopes" by T. W. Richards, "The Constitution of Polysaccharides" by J. C. Irvine, "The Theory of Membrane Equilibria" by F. G. Donnan, and "Organic Radicals" by Moses Gomberg. Acting editor was Lafayette B. Mendel of Yale, with William A. Noyes as editor-in-chief. From the first this periodical was owned and controlled by the American Chemical Society. The first number was offered as "a vehicle for comprehensive, analytical reviews, summaries, and short monographs, on topics of interest to chemists."

The pattern of *Chemical Reviews*—the monographic pattern—was picked up by J. Murray Luck, then assistant professor at Stanford University, in starting his *Annual Review of Biochemistry* in 1932. This was started as a serial review volume and is presently in its 33rd year. Seven years later Luck started the *Annual Review of Physiology*, and additional topics have been added until they now number 14.

This same style had been adopted by Beaumont and Dodds in *Recent Advances in Medicine* with the first edition in 1924. This is not an annual, but later editions with new reviews have come out at intervals, the 14th in 1963.

Two more review series were started in England during the thirties. In 1935 the Institute of Petroleum started its *Reviews of Petroleum Technology*, which ran until 1954, and in 1938 the Institution of the Rubber Industry started its *Annual Report on the Progress of Rubber Technology*. Both are omnibus reviews.

Three other series, while not strictly annual reviews, are sufficiently like them to deserve mention. Roger Adams started *Organic Syntheses* in 1921 as a medium for making available the know-how developed by his students in the summer school enterprise, Organic Chemical Manu-

facturers, which helped get the chemical industry through the World War. In 1939, Ludwig F. Audrieth and John C. Bailer started *Inorganic Syntheses* in the same pattern, with Harold S. Booth as the first editor. The third, also born at Illinois in the same pattern, is *Biochemical Preparations*, started in 1949 by Herbert E. Carter. All three continue today as annuals.

Others climbed on the serial review bandwagon in the early 40's such as *Advances in Enzymology and Related Subjects of Biochemistry* (1941); *Advances in Protein Chemistry* (1944); and *Vitamins and Hormones* (1943). There were 14 new series started in the 1940's, 43 in the 1950's, and 43 in the 60's through 1964. We have 111 titles in our list of series, although some have discontinued and not all are annual. Titles, publishers, year of first volume, and the number and year of the current volume are listed (Appendix I) in order by CODEN (*9*).

APPRAISING REVIEWS

One way to appraise these reviews is by the subjective criterion of how useful they are to the individual and his work. Objectively, there is one yardstick that can be applied—the currency of references. Aside from the evaluation and critical analysis that a review may contain, one of the principal assets of a review is the new work—the new results and new theories—to which it exposes the reader. The key to this asset is the bibliography, not only the length but the up-to-dateness of it. Thus we might say that the character and the length of the bibliography are measures of the alerting value of the review.

Table I scores bibliographies in a number of reviews for timeliness by count of references to publications in the last three years before submission of a review, or including year of publication if it was published quickly.

Table I. Currency of References

	References	% in last 3 years
Medicinal Chemistry, Vol. 6	1007	1
A.C.S. Monograph, No. 152	1706	5
Advances in Chemical Physics, Vol. 5	605	8
Vitamins and Hormones, Vol. 21	1385	21
Chemical Reviews, Vol. 63, No. 1–4	3252	24
Annual Review of Nuclear Science, Vol. 13	1647	45
Analytical Chemistry Annual Reviews, Fundamental, 1964 [part only]	2149	85
I&EC Annual Review Supplement, 1963	2733	95

Included in this table is one monograph, three periodicals, and five serial review volumes. The *Analytical Chemistry* and *I&EC* reviews are omnibus reviews; the others monographic. The figures make the difference plain.

Our grouping of reviews into two types is purely utilitarian. Leitch has analyzed reviews more deeply and has found six types (*10*): periodical, occasional, research, statistical, interpretive, and creative. Our dual classification is similar to that of Adams (*1*), whose "discipline" review corresponds to our omnibus type, his "categorical" to our monographic.

ACCESSIBILITY

How accessible are reviews? If one reads the reviews when they become available, there should be no problem. But for those who do not know about the existence of a review, either in a periodical, in a serial volume, or in a symposium or transactions, the accessibility question is a real one.

First, *Chemical Abstracts* indexes articles in serial review books by subject and lists at least the titles to review articles in journals and tells the number of references; if the title is not complete enough, a sentence or two will be given to tell what the review is about. Review abstracts are mixed in with all the other material in *Chemical Abstracts*, however, and unless the title is distinctive and easily recognizable, it becomes a chore to find it although reviews are distinguished by mention of "review" in the index entry. In a closely related field, *Biological Abstracts Subjects in Context* has since 1963 augmented the titles of review articles to include the word "review"; since this is a machine-permuted index, listings of all review articles appear together. But this system is not being used in the chemical field.

Recognizing the need, *Chemical Abstracts* established its *Bibliography of Reviews in Chemistry*, which ran from 1958 but ceased with the 1962 volume for lack of support. This is an excellent source of information on reviews in that period, however. Friedman has discussed the philosophy of this periodical and in analyzing the subject distribution of reviews reported there, he noted areas where reviews are needed (*5*).

Another useful volume is *Index to Reviews, Symposium Volumes, and Monographs in Organic Chemistry, 1950–60*, compiled and edited by Norman Kharasch, Walter Wolf, and Elaine E. P. Harrison. This volume was published by 1962 by Pergamon Press, and a new edition covering 1961–1962 was published in 1964. They are, however, confined to organic chemistry.

A specialized tool that may include some chemical topics is *Bibliography of Medical Reviews*, published by the National Library of Medicine (*1*). Its 6th volume is a cumulation of the years 1955–1961.

In considering this problem of availability, we speculated on the desirability of a complete index to reviews in serial volumes. While the library has *Vitamins and Hormones* for the past 20 years, does one of them have a round-up on folic acid metabolism? Even if the library has review sets on biochemistry, medicine, physiology, and pharmacology, it can be a job to find a recent review on blood coagulants!

Some serials have regular or occasional cumulative indexes or tables of contents, but a subject index of all review volumes would be an even better tool for such problems.

To explore the idea we have indexed review volumes published in English during the year 1963 on and related to chemistry. The index consists of permuted chapter titles for all serials from Appendixes I, II, and III for which 1963 volumes were available (Appendix IV). Of the 111 serials in Appendix I, 76 issued volumes in 1963, 35 did not (Table II).

Included in the index are as many volumes of proceedings and symposia as could be obtained. These are

Table II

Serials published in 1963	
Annual series	47
Irregular series	16
Series started in 1963	13
Total	76
Serials not published in 1963	
Irregular series	19
Discontinued	4
Not accessioned	5
Series started in 1964	7
Total	35

divided into two sets, the 19 proceedings that are published as serials (Appendix II) and the 35 proceedings of individual conferences and symposia that were published in 1963 (Appendix III). Among the latter are five titles in *Advances in Chemistry Series*, published by the American Chemical Society, and six in the *Chemical Engineering Progress Symposium Series*, published by AIChE.

Most symposia and most technical programs contain certain amounts of review material, either as introductory lectures or in the papers themselves. In *Contact Angle, Wettability, and Adhesion* is a 51-page review of equilibrium contact angle by William Zisman. *Amino Acids and Serum Proteins* carries an 11-page review on the nature and origin of the serum proteins including a discussion of Block's anlage theory. It is always a good idea to check such volumes when looking for reviews.

Whether to pick up earlier years or even to continue such an index will depend on its use in the ACS Editorial Library where the 1963 file will be available to the staff and members.

USE PATTERNS

Another way to measure the value of reviews is through use patterns—how frequently they are checked out of libraries. To explore this charge records have been compared in a number of libraries that allow their books to circulate (Figure 1). Obviously, charge records are only part of the story on use, but they are the only recorded part that is available. In-library use is not accounted for and may be much more than checkouts, particularly where use is made of reserve shelves and where graduate students have keys to the library.

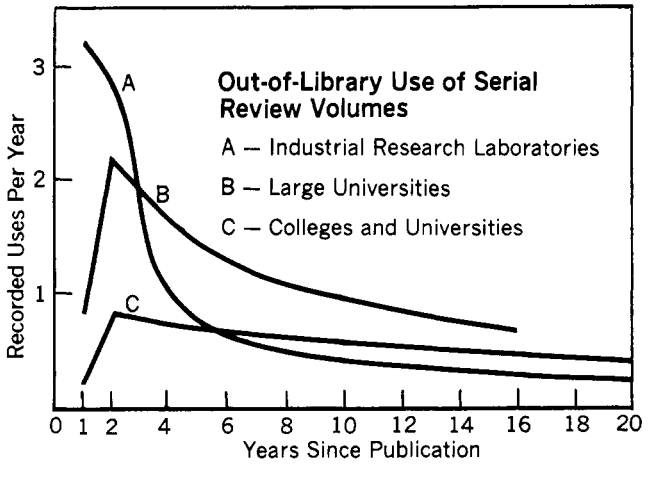

Figure 1.

Curve A is for four large industrial research libraries in which a total of 1062 books were checked: it shows heavy initial use. The other two curves are for colleges and universities. Curve B for the larger universities averages two curves with identical slope and is based on 194 volumes. Curve C is based on 299 volumes in four colleges and universities; here again, the slopes of the individual curves are very close.

These data suggest recurring assignments to review volumes in college courses and indicate that a comprehensive index to reviews might be welcomed. The heavier initial use in industry, however, points up the alerting value of reviews and suggests the need for speedy service.

CONCLUSION

In summary, we believe that reviews are useful for keeping up with nearby or unfamiliar fields. Two general types of reviews are the omnibus and the monographic. The first is characterized by bibliographies with a higher percentage of recent references; the latter by greater depth and more evaluation. To be most useful, reviews should be more accessible. To explore an index to all reviews on chemistry as a tool for accessibility, an index to reviews in 130 volumes that appeared in 1963 has been prepared.

ACKNOWLEDGMENT

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(12) Panel on Science Information of The President's Science Advisory Committee, "Science, Government, and Information" (Jan. 10, 1963), Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, p. 27.

APPENDIX I

Review Serials

(Alphabetical by CODEN. Lists year of first volume and number of 1963 volume or, if no volume published in 1963, number and year of latest volume.)

AACI Advances in analytical chemistry and instrumentation. Interscience (1960). v. 2 (1963).
ABMP Advances in biological and medical physics. Academic Press (1948). v. 9 (1963).
ABTR Advances in botanical research. Academic Press (1963).
ACCH Advances in carbohydrate chemistry. Academic Press (1945). v. 18 (1963).
ACHE Advances in chemical engineering. Academic Press (1956). v. 4 (1963).
ACLC Advances in clinical chemistry. Academic Press (1958). v. 6 (1963).
ACPB Advances in comparative physiology and biochemistry. Academic Press (1962).
ACRS Advances in cancer research. Academic Press (1958). v. 7 (1963).
ADAM Advances in applied microbiology. Academic Press (1959). v. 5 (1963).
ADCA Advances in catalysis and related subjects. Academic Press (1948).
ADCP Advances in chemical physics. Interscience (1958). v. 5 (1963).
ADEN Advances in enzymology and related subjects of biochemistry. Interscience (1941). v. 25 (1963); each volume includes index cumulative from v. 1.
ADFC Advances in fluorine chemistry. Academic Press (1960). v. 3 (1963).
ADGO Advances in geophysics. Academic Press (1952). v. 9 (1962).
ADIM Advances in immunology. Academic Press (1961). v. 3 (1963).
ADOC Advances in organic chemistry: methods and results. Interscience (1960). v. 4 (1963).
ADPC Advances in photochemistry. Interscience (1963).
ADVP Advances in pharmacology. Academic Press (1962). v. 2 (1963).
AEEE Advances in electrochemistry and electrochemical engineering. Interscience (1961). v. 3 (1963); has index to vol. 1-3.
AEEP Advances in electronics and electron physics. Academic Press (1963). Supplement 1 (1963), Electroluminescence and related effects.
AFRE Advances in food research. Academic Press (1948). v. 12 (1963). v. 11 (1962) has index to vol. 1-10.
AHTC Advances in heterocyclic chemistry. Academic Press (1963) v. 2 (1963).
AICR Advances in inorganic chemistry and radiochemistry. Academic Press (1959). v. 5 (1963).
ALPD Advances in lipid research. Academic Press (1963).
AMDT Advances in metabolic disorders. Academic Press (1964).
ANUT Advances in nuclear science and technology. Academic Press (1962). v. 2 (1964).
AOMC Advances in organometallic chemistry. Academic Press (1964).
APCH Advances in protein chemistry. Academic Press (1944). v. 18 (1963).
APCR Advances in pest control research. Interscience (1957). v. 5 (1962).
APEC Advances in petroleum chemistry and refining. Interscience (1958). v. 7 (1963).
APOR Advances in physical organic chemistry. Academic Press (1963).
APPY Annual review of phytopathology. Annual Reviews (1963).
ARBO Annual review of biochemistry. Annual Reviews (1932). v. 32 (1963).
ARCI Reports on the progress of applied chemistry. Society of Chemical Industry (1916). v. 47 (1963).
AREN Annual review of entomology. Annual Reviews (1956). v. 8 (1963).
ARMC Annual review of medicine. Annual Reviews (1950). v. 14 (1963).
ARMI Annual review of microbiology. Annual Reviews (1947). v. 17 (1963).
ARNU Annual review of nuclear science. Annual Reviews (1952). v. 13 (1963).
ARPC Annual reports on the progress of chemistry. Chemical Society (London) (1904). v. 59 (1963).
ARPH Annual review of physiology. Annual Reviews (1939). v. 25 (1963).
ARPL Annual review of physical chemistry. Annual Reviews (1950). v. 14 (1963).
ARPQ Reports on progress in physics. Institute of Physics and The Physical Society (London) (1934). v. 26 (1963).
ARPS Annual review of plant physiology. Annual Reviews (1950). v. 14 (1963); has index of chapter titles for vol. 5-14.
ARVP Annual review of pharmacology. Annual Reviews (1961). v. 3 (1963).
ASCS Advances in colloid science. Interscience (1942).
ASPE Advances in spectroscopy. Interscience (1959). v. 2 (1961).
ASYC Annual survey of American chemistry. Chemical Catalog Co. (1925). v. 10 (1935).
ATXP Advances in textile processing. Textile Book Publishers (1961).
AVNS Advances in space science and technology. Academic Press (1959). v. 5 (1963).
AVRE Advances in virus research. Academic Press (1953). v. 10 (1963).
AXPR Annual report on the progress of rubber technology. Heffer & Sons (1938). v. 26 (1962).
BIPR Biochemical preparations. John Wiley (1949). v. 10 (1963).
CBPS Comparative biochemistry of photoreactive systems. Academic Press (1960). Not continued.
CHYM Chymia; annual studies in the history of chemistry. University of Pennsylvania Press (1948). v. 9 (1962).
CRRV Chromatographic reviews; progress in chromatography, electrophoresis and related methods. Elsevier (1959). v. 5 (1963).

HPPC High pressure physics and chemistry. Academic Press (1963). v. 2 (1963).
INSY Inorganic syntheses. McGraw-Hill (1939). v. 7 (1963).
MAEC Modern aspects of electrochemistry. Butterworths (1954). v. 3 (1964).
MASY Macromolecular syntheses. John Wiley (1963).
MAVS Modern aspects of the vitreous state. Butterworths (1960). v. 3 (1964).
MBAN Methods of biochemical analysis. Interscience (1954). v. 11 (1963).
MDCP Modern chemical processes. Reinhold (1950). v. 7 (1963).
MECH Medicinal chemistry. John Wiley (1951). v. 6 (1963).
MFOS Methods of forensic science. Interscience (1962). v. 3 (1964).
MMAD Modern materials; advances in development and applications. Academic Press (1958). v. 3 (1962).
ORAN Organic analysis. Interscience (1953). v. 4 (1960).
ORRE Organic reactions. John Wiley (1942). v. 13 (1963).
ORSY Organic syntheses. John Wiley (1921). v. 43 (1963).
PBBC Progress in biophysics and biophysical chemistry. Pergamon Press (1950). v. 13 (1963).
PBCH Progress in boron chemistry. Macmillan (1964).
PCEA Physics and chemistry of the earth. McGraw-Hill (1956). Now Macmillan (Pergamon Press). v. 5 (1964).
PCES Progress in ceramic science. Pergamon Press (1961). v. 3 (1963).
PCFL Progress in the chemistry of fats and other lipids. Pergamon Press (1952). v. 6 (1963).
PCTX Progress in chemical toxicology. Academic Press (1963).
PDIE Progress in dielectrics. John Wiley (1959). v. 5 (1963).
PDRR Progress in drug research. Birkhäuser (1959). v. 5 (1953).
PEAC Progress in nuclear energy. Series 9. Analytical chemistry. Pergamon Press (1959). v. 3 (1963).
PIMR Progress in industrial microbiology. Heywood (1959). v. 4 (1963).
PIOC Progress in inorganic chemistry. Interscience (1959). v. 5 (1963).
PMDC Progress in medicinal chemistry. Butterworths (1961). v. 3 (1963).
PNAR Progress in nucleic acid research. Academic Press (1963).
PNBS Progress in nuclear energy. Series 6. Biological sciences. Pergamon Press (1956). v. 3 (1961).
PNHP Progress in nuclear energy. Series 12. Health physics. Pergamon Press (1959).
PNMF Progress in nuclear energy. Series 5. Metallurgy and fuels. Pergamon Press (1956). v. 4 (1961).
PNMS Progress in nuclear energy. Series 7. Medical sciences. Pergamon Press (1956). v. 2 (1959).
PNPR Progress in nuclear energy. Series 3. Process chemistry. McGraw-Hill (1956). v. 3 (1961).
PNRE Progress in nuclear energy. Series 2. Reactors. Pergamon Press (1956). v. 2 (1960).
PNTE Progress in nuclear energy. Series 4. Technology and engineering. McGraw-Hill (1956). v. 5 (1963).
PPOC Progress in physical-organic chemistry. Interscience (1963).
PRCY Progress in cryogenics. Academic Press (1959). v. 4 (1964).
PRKN Progress in reaction kinetics. Pergamon Press (1961). v. 2 (1964).
PRMS Progress in materials science. Pergamon Press (1949). v. 11 (1963).
PROC Progress in organic chemistry. Butterworths (1952). v. 6 (1964).
PRST Progress in stereochemistry. Butterworths (1954). v. 3 (1962).
PSEM Progress in semiconductors. John Wiley (1956). v. 7 (1963).
PSRA Progress in the science and technology of the rare earths. Pergamon Press (1964).
PSST Progress in solid state chemistry. Pergamon Press (1964).
RAVM Recent advances in medicine. Little, Brown (1924). v. 14 (1963).
RFDT Review of food science and technology. Association of Food Technologists (Mysore) (1959). v. 4 (1963).
RPSR Recent progress in surface science. Academic Press (1964).
RPTE Reviews of petroleum technology. Institute of Petroleum (1935). v. 14 (1954).
RREV Residue reviews. Academic Press (1962). v. 3 (1963).
RTXP Review of textile progress. Textile Book Publishers (1950). v. 14 (1963).
SBIP Survey of biological progress. Academic Press (1949). v. 4 (1962).
SMCC Standard methods of clinical chemistry. Academic Press (1953). v. 4 (1963).
SPGC Survey of progress in chemistry. Academic Press (1963).
SSPH Solid state physics. Academic Press (1955). v. 15 (1963); has contents of vol. 1–14.
TPHC Topics in phosphorus chemistry. Interscience (1964).
TQIC Technique of inorganic chemistry. Interscience (1963). v. 3 (1963).
VIBO Vistas in botany. Macmillan (1959). v. 3 (1963).
VIHO Vitamins and hormones; advances in research and applications. Academic Press (1943). v. 21 (1963).

APPENDIX II

Serial Proceedings Published in 1963

ACYE Advances in cryogenic engineering. Plenum Press (1960). v. 8 (1963).
AXRA Advances in x-ray analysis. Plenum Press (1957). v. 6 (1963).
BICO Biology colloquium. Oregon State (1943/44). v. 23 (1963).
DAPS Developments in applied spectroscopy. Plenum Press (1962). v. 2 (1963).
DIMC Developments in industrial microbiology. Plenum Press (1960). v. 4 (1963).
GCIS Gas chromatography. Academic Press (1958). v. 4 (1963).
HALE The Harvey lectures. Lippincott (1906). Williams and Wilkins (1927).
HETM Heat transfer and fluid mechanics institute. Proceedings.
IPCL XIXth international congress of pure and applied chemistry. Congress lectures, London. Butterworths (1963).
PCLT Low temperature physics & chemistry; proceedings. University of Wisconsin Press (1959). v. 8 (1963).
PGCR Progress in industrial gas chromatography. Plenum Press (1961). v. 2 (1963).
PPIR Proceedings. American petroleum institute. Section III—refining. American Petroleum Institute (1921). v. 43 (1963).
PPOS Proceedings. 17th annual power sources conference. PSC Publications Committee.
PRCC Conference on Carbon. Proceedings. University of Buffalo (1953). Fifth, v. 2 (1963).
RPHR Recent progress in hormone research. Academic Press (1947). v. 19 (1963).
RPMB Recent progress in microbiology. University of Toronto Press (1963).
SYMC Symposium (international) on combustion. Reinhold (1948). v. 9 (1963).
14UF Electrochemical thermodynamics and kinetics. Butterworths (1955). 10th meeting (1960).
14UI Progress in plastics. Macmillan (1951).

APPENDIX III

Nonserial Proceedings and Symposia Published in 1963

ADCS-37 Advances in chemistry series, 37. Reactions of coordinated ligands and homogeneous catalysis. American Chemical Society.
ADCS-38 Advances in chemistry series, 38. Saline water conversion II. American Chemical Society.
ADCS-39 Advances in chemistry series, 39. Nonstoichiometric compounds. American Chemical Society.
ADCS-40 Advances in chemistry series, 40. Mass spectral correlations. American Chemical Society.
ADCS-41 Advances in chemistry series, 41. New approaches to pest control and eradication. American Chemical Society.
CEPS-40 Chemical engineering progress symposium series. v. 59, n. 40. Applications of plastic materials in aerospace. American Institute of Chemical Engineers.
CEPS-41 Chemical engineering progress symposium series. v. 59, n. 41. Heat transfer—Houston. American Institute of Chemical Engineers.
CEPS-42 Chemical engineering progress symposium series. v. 59, n. 42. Statistics and numerical methods in chemical engineering. American Institute of Chemical Engineers.
CEPS-43 Chemical engineering progress symposium series. v. 59, n. 43. Recent advances in ferrous metallurgy. American Institute of Chemical Engineers.
CEPS-44 Chemical engineering progress symposium series. v. 59, n. 44. Thermodynamics. American Institute of Chemical Engineers.
CEPS-45 Chemical engineering progress symposium series. v. 59, n. 45. Pollution control engineering. American Institute of Chemical Engineers.
CEPS-46 Chemical engineering progress symposium series. v. 59, n. 46. Process systems engineering. American Institute of Chemical Engineers.
CSSP Chemical Society Special Publications. Chemical Society (London).
SCIG S.C.I. monograph no. 17. Techniques of polymer science. Society of Chemical Industry.
13DS Production and use of short-lived radioisotopes from reactors. International Atomic Energy Agency.
13MT Special ceramics, proceedings. Academic Press.
13PI Radioactive dating. International Atomic Energy Agency.
13PN Treatment and storage of high-level radioactive wastes. International Atomic Energy Agency.
13TO Advances in enzymic hydrolysis of cellulose and related materials. Pergamon Press.
13YK Proceedings of the symposium on the interaction between fluids and particles. Institution of Chemical Engineers.
14AQ Bone metabolism in relation to clinical medicine. Lippincott.
14DY Molecular structure and spectroscopy. Butterworths.
14UG Materials for space vehicle use. Society of Aerospace Material and Process Engineers, Seattle Chapter.
14UJ Recent advances in food science. Butterworths. (1948). v. 3 (1963).
14UL Evaluation of protein quality. National Academy of Sciences—National Research Council.
14UM Symposium on lubricants for automotive equipment. American Society for Testing and Materials.
14UN Photosynthetic mechanisms of green plants. National Academy of Sciences—National Research Council.
14UO Salicylates, Little, Brown.
14UP Proceedings of the United Nations conference on new sources of energy. Solar energy, wind power, and geothermal energy. United Nations. v. 1.
14UQ Materials science research, v. 1. Research conference on structure and property of engineering materials. Plenum Press.
14UT Advances in organic geochemistry. Macmillan (1964).
14UU Coordination chemistry. Plenary lectures at 7th International Conference, Stockholm. Butterworths.
14UV Siting of reactors and nuclear research centres. International Atomic Energy Agency.
14UW Advances in materials research in the NATO nations. Macmillan.
14UX Advances in glass technology. Part 2.
14UY Advances in biological waste treatment. Third conference. Macmillan.

APPENDIX IV

Permuted Chapter Title Index to Serial Review and Proceedings Volumes Published in 1963

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CEPS-40	17	Ablation under hypervelocity re-entry conditions. Behavior of pure and reinforced charring polymers during
CEPS-41	145	Ablative backing. Investigation of a passive transpiration cooling mechanism employing an
CEPS-40	33	Ablative characteristics of reinforced plastics in nozzles and thrust chambers for varying environments
CEPS-40	64	Ablative plastics. Laboratory techniques for studying thermally
CEPS-40	39	Ablative thrust chambers for space application.
CEPS-42	95	Absorber-stripper calculations with a digital computer.
14UN	717	Absorption changes in the flash spectroscopy of algae. Interference of emission changes with
PNTE-5	307	Absorption. Development of a production process for radio-krypton recovery by fractional
DAPS-2	263	Absorption edge studies of supported cobalt catalysts. X-ray
AXRA-6	403	Absorption effects in x-ray fluorescence measurement of elements in oil.
14UX	53	Absorption and emission characteristics of glasses containing rare earth ions.
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ARPS-14	271	Absorption and translocation in plants.
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13MT	411	Accelerators and amplifiers operating at microwave frequencies. Use of ceramic materials in particle
ARPS-14	65	Acetabularia and other cells. Nucleo-cytoplasmic interactions in
BIPR-10	1	Acetoacetic acid (lithium salt).
ORSY-43	25	Acetonitrile. α-N,N-dimethylaminophenyl-
INSY-7	183	Acetylacetonatomanganese(III).
ORRE-13	1	Acetylenes *via* hydroboration. Hydration of olefins, dienes, and
ADOC-4	225	Acetylenic compounds. Coupling of

ACLC-6	1	Acid–base values of blood. Micromethods for measuring
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APOR-1	1	Activation and mechanisms of reactions in solution. Entropies of
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Abstract Journals and Bulletins*

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Abstract journals have two somewhat disparate purposes: (1) to serve as a means of locating information in original literature (retrospective searching), and (2) to alert readers to the latest developments in a given area. This disparity is evident when one considers Crane's (2) *criteria* for an ideal abstracting journal: (a) covers field completely, (b) publishes good annual and collective indexes, (c) maintains high quality in abstracts, and (d) keeps service prompt. Complete field coverage and publication of good annual and collective indexes are usually cited as being most important; and so they are for a retrospective searching tool.

However, when considering abstract journals from the viewpoint of their value as *alerting services*, a modified set of criteria must be used. To serve as an adequate alerting service, an abstract journal should have the following characteristics (*7–10*):

(a) The abstract should be available quickly after publication of the primary communication.

(b) The abstract should be easy to skim. Ease of skimming is composed of a number of aspects. The following description given by Lewenz, *et al.* (*8*), would seem to sum it up. An abstract journal "should permit the busy reader to decide quickly whether the abstracted item is of interest and leave him with both time and inclination to read more abstracts." In other words, an abstract journal for alerting must be very readable from both a physical and an intellectual viewpoint. Physically, print size should be adequate and format designed for ease of reading; intellectually, abstracts should be concise and well written.

(c) The abstract journal should not be so large that users are overwhelmed by the number of abstracts. As Weil, *et al.* (*9*), said, "Even well written abstracts are not basically an enjoyable type of reading in large collections." Reduction in the size of an abstracting journal can be accomplished in several ways, among which are selective coverage and specialized coverage.

A large number of journals contain abstracts of interest to chemists. Several of these journals will be discussed for their value in alerting chemists to new developments. They have been divided for the purpose of discussion into three categories:

I. Abstracts of general chemical interest
II. Abstracts of interest to specific branches of chemistry
III. Abstracts of specific types of publication

The following information was gathered on each journal selected for analysis: (1) cost per year; (2) number of abstracts per year—1964 estimate; (3) cost per abstract to the subscriber; (4) frequency; (5) type of coverage; (6) speed of coverage. This is an estimate based on analyzing the time-lag between the publication date of the original communication and the date the abstract journal was received by the library. Unless otherwise stated, two 1964 issues for each journal were analyzed with spot

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