

**AN ANALYSIS OF JOURNALS USED IN
RESEARCH IN GEOMORPHOLOGY**

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Citations from articles of original research in geomorphology, published over three ten year periods (1940-1949, 1950-1959 and 1960-1969), were analysed to determine title dispersion, subject scatter and national origins of cited journals. The results show that the number of cited journals has increased about two and one-half times, from 44 to 113 titles, over the past thirty years. Conforming to Bradford's law, the productivity (citation yield) of cited journals, apart from a single high producing journal, decreases in a manner such that the aggregate of references is proportional to the logarithm of the number of cited journals, arranged in order of decreasing productivity. At present, some 21 journals yield 70 per cent of the references.

More than 50 per cent of the cited journals are found in class GE, geology. But only 6 per cent of the journals come from class GB, physical geography, the parent field of geomorphology. American and foreign journals are equally represented, in terms of titles cited. Still, American journals yield 75 per cent of all the references.

Instructive to librarians, the results demonstrate that a limited number of journals can be "scientifically" selected to form a special collection in geomorphology. Finally, retrieval of the bulk of citations is possible with two or three indexing and abstracting serials. Complete access to the literature, however, requires the use of a wide range of bibliographic tools in the physical and social sciences.

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I. INTRODUCTION

Statement of Problem

Modern geomorphology is a relatively new area of study in American universities and, as such, does not have a well defined literature of its own. For the librarian and the researcher alike, this situation creates a serious problem of bibliographic control. This paper will address itself to one aspect of the problem--the identification of journals which are pertinent to the needs of researchers. Specific questions to be answered are as follows:

1. What is the title dispersion of journals used in geomorphic research?
2. Can a core or "basic" group of journals be identified?
3. To what degree does subject scatter make the researcher dependent upon journals published in related disciplines?
4. To what extent are non-American journals used?

Purpose

The purpose of this research is twofold: to provide preliminary guidelines for the evaluation and selection of journals which would enhance a subject collection in

geomorphology; and to create an awareness, on the part of geomorphologists, as to avenues of search--namely, indexing and abstracting serials--in the compilation of a working bibliography.

Hypotheses

In describing the journals used in research in geomorphology, four general assumptions pertain:

1. The title dispersion of journals is high and, at present, increasing.
2. A core or "basic" group of journals can be identified, irrespective of temporal dimensions.
3. Most of the journals are external to the subject of inquiry, that is, published in related subject fields.
4. Non-American journals, increasingly, represent an important source of references.

Review of Literature

A comprehensive review of the literature on the characteristics of subject literatures has been published by Stevens (1953). Accordingly, emphasis is given here to only those studies which closely relate to the problem under consideration.

One of the first studies on the dispersion of scientific literature among journals was completed by Gross and Gross (1927). Citation analysis, of a single volume of the Journal of the American Chemical Society, was employed to

produce a basic list of journals which would satisfy the needs of students and faculty in a college library.

Gross and Woodford (1931) did a similar study, but dealing with the serial literature of geology. Using six American geology journals as a data base for citation analysis, their research yielded a list of the most productive journals.

Singularly the most important study, in regard to research methodology, was published by S. C. Bradford (1934). In an investigation of the literature in applied geophysics and lubrication, he corroborated the general principle of decreasing productivity of journals. Further, he noted, "if scientific journals are arranged in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones containing the same number of articles as the nucleus, when the number of periodicals in the nucleus and succeeding zones will be $\log n^2$" Restated, this means, "the aggregate of references in a given subject, apart from those produced by the first group of large producers, is proportional to the logarithm of the number of sources concerned, when these are arranged in order of productivity." This relationship has since become known as Bradford's law. To ensure retrieval of the journals in the outer zones, the literature must be abstracted by source, not subject, Bradford reported.

In a more ambitious study, Fussler (1949) investigated the characteristics of research literature used by chemists

and physicists. This research was successful in describing the subject scatter, the age, the form and the title dispersion of the literature.

More recently, Goffman and Warren (1969) have studied the distribution of mast cell and schistosomiasis literatures among their respective journals. Their research demonstrated the applicability of Bradford's law to individual bibliographies as well as entire literatures. In an attempt to explain the Bradford phenomenon, the authors' postulated that the paper per author ratio may be an important factor in determining the scatter of a literature among journals. Indeed, for their study, the article per author ratio closely corresponded to the Bradford multiplier. Out of their findings, two mathematical expressions were advanced, to predict the dispersion of any medical literature.

Garfield (1972) has been one of the more ardent advocates of citation analysis as a tool in journal evaluation. After a systematic study of the journal citation patterns in the entire field of science and technology, he concluded that only a small group of journals were cited in most research. In support of this observation, some 152 journals provided about half of all citations processed for Science Citation Index in 1969. Garfield further noted, "a combination of the literature of individual disciplines and specialties produce a multidisciplinary core for all of science comprising no more than 1000 journals." In an attempt to refine the technique of citation analysis, Garfield introduced the impact factor, a parameter obtained by dividing

the number of times a journal has been cited by the number of articles it has published, as an additional criterion to assess the importance of a journal. With this method, a somewhat different ranking of the most productive journals was noted.

Methodology

Citation analysis, as proposed by earlier investigators, was adopted as an efficacious method to research the problem outlined above. Then, articles of original research, relating to the landforms of North America or its adjacent oceans, were selected from the Annals of the Association of American Geographers and the Geographical Review as a source of primary data.

The data were gathered for three time intervals, 1940-1949, 1950-1959 and 1960-1969, using the reference counting technique first used by Gross and Gross (1927) and later by others. For each period, a list of cited journals was compiled, and, at the same time, the number of times or frequency with which each journal was cited was tabulated. Repeated or duplicate references to a given citation in a single article were omitted, to eliminate any possibility of overcompensating the importance of any journal.

The term "journal" was arbitrarily defined to encompass any periodical issued by an institution or learned society which contained the results of scholarly research, including such items as journals, bulletins, proceedings, transactions and memoirs. Government publications were, however, excluded.

Once compiled, the data were quantitatively analyzed, using Bradford's law as a basic research design to show title dispersion and to identify core journals (see review of the literature on page 3 for Bradford's law).

To determine the subject classes of the various journals, the Library of Congress classification scheme was employed. A combination of the University of Missouri serials catalog and the National Union Catalog were consulted in this regard. In cases where the first two tools failed to give results, a subject class was assigned by the author, after checking the Library of Congress classification schedules. The Union List of Serials was used to verify the titles of journals and to find the national origins of foreign journals.

Limitations

Geomorphological studies are scattered among several journals; therefore, in the compilation of data for this study, a universe of references could not be examined. As noted above, only citations from two journals, which publish a "significant" number of geomorphic articles, have been analyzed. Should a larger sample be used, the statistical results of this research might differ somewhat in detail.

II. RESULTS

Title Dispersion

The dispersion of references among cited journals for three decades (1940-1949, 1950-1959 and 1960-1969) is shown in Figure 1. The cumulative number of journals is plotted, on a logarithmic scale, against the cumulative number of citations produced by these same journals. Overall, the resultant curves show title dispersion to be increasing for the period of survey; the number of titles needed to get complete coverage has increased from 44 in the period 1940-1949 to 113 in the period 1960-1969, an increment of about two and one-half times. Most pronounced, of course, has been the increase in scatter during the 1960's.

An anomalous departure from this trend is evident in the lower portion of the curve for the 1950's, for the top 20 journals show a higher output of citations than the same number of journals in the preceding decade. This can be reconciled with the observed trend, when the exceedingly high output of the top producing journal is taken into account.

When viewed in chronological sequence, 3, 4 and 7 journals yield a majority of the citations and 11, 10 and 21 journals yield over 70 percent of the citations. Thus, for all three of the decades surveyed, a small number of

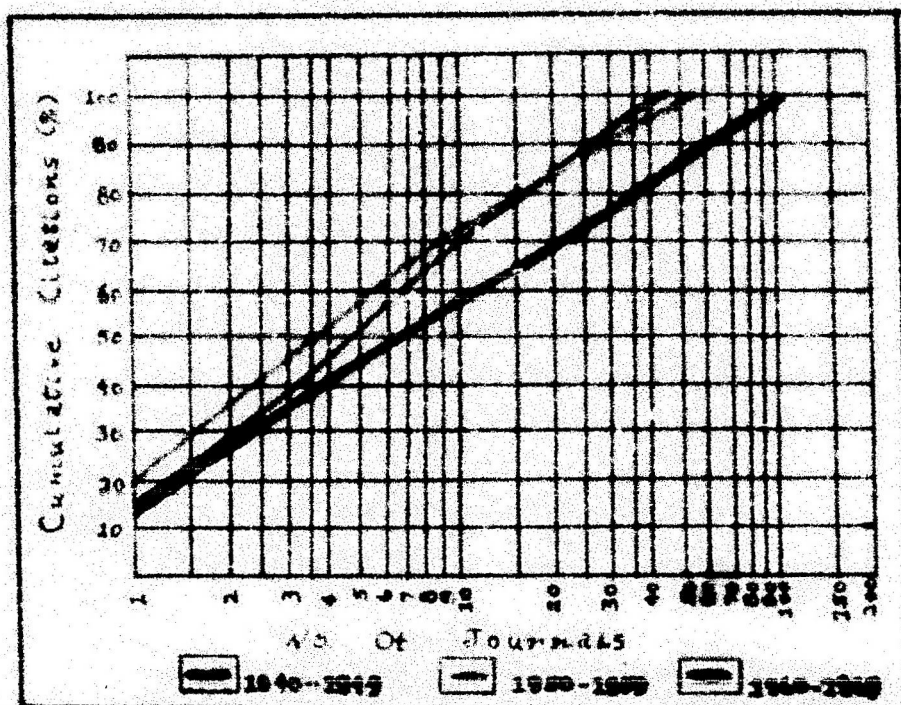


Fig. 1 Distribution of citations among journals. The pronounced shift of the curve to the right since the 1940's is clear evidence of an increase in title dispersion.

journals produce a high proportion of the citations required by researchers.

As a corollary of higher title dispersion, the productivity (citation output) of most of the journals has diminished, when measured as a proportion of the total number of references produced by all journals. This is true even though the actual output of citations has been constant or, indeed, increasing. The Geographical Review illustrates this point quite well. Its output has increased from 12 citations in the 1950's to 19 citations in the 1960's, but relative output, calculated in proportional terms, has decreased from 8.1 percent to 4.8 percent.

The Bradford Distribution

By applying Bradford's law to the data, the journals can be divided into zones in such a manner that zone 1, called the nucleus or core, and each succeeding zone produces roughly the same number of articles. Thus arranged, the journals fall into six zones for the periods 1940-1949 and 1960-1969 and five zones for the period 1950-1959 (Tables 1, 2 and 3).

In all three decades, a single journal, because of its high production, constitutes the core or zone 1. The number of journals in succeeding zones, which produce about the same number of references, increases at a geometric rate in

TABLE 1

DISPERSION OF ARTICLES AMONG JOURNALS CITED FROM 1940-1949

Zone	Articles	Journals	bm
1	25	1	-
2	20	1	1.0
3	26	2	2.0
4	24	4	2.0
5	26	9	2.5
6	25	25	2.8

TABLE 2

DISPERSION OF ARTICLES AMONG JOURNALS CITED FROM 1950-1959

Zone	Articles	Journals	bm
1	39	1	-
2	32	1	1.0
3	39	3	3.0
4	38	9	3.0
5	43	35	2.9

TABLE 3
DISPERSION OF ARTICLES AMONG JOURNALS
CITED FROM 1960-1969

Zone	Articles	Journals	bm
1	65	1	-
2	72	2	2.0
3	65	4	2.0
4	66	12	3.0
5	65	34	2.8
6	58	58	1.7

accordance with Bradford's law, as stated earlier. The bm (Bradford multiplier) represents the rate of increase from zone to zone, which, for cited journals, fluctuates between 1.0 and 3.0. The most productive journals in each decade are given in Table 4.

The Bulletin of the Geological Society of America occupies zone 1 for two of the three decades surveyed and can be considered as the core or nuclear journal. Many of the journals in zones 2, 3 and 4 repeat themselves over time as to convey their "permanence" in the citation network of geomorphology. The journals in zones 5 and 6 (not listed here) are, for the most part, low producers, giving two or fewer citations. Moreover, these peripheral journals generally produce in a single period and, therefore, are of marginal value for a special collection in geomorphology. A complete list of cited journals, along with their country of publication and subject class can be found in the appendix.

Subject Dispersion

Subject dispersion is herein defined as the degree of

TABLE 4
 MOST PRODUCTIVE JOURNALS AS
 SOURCES OF CITATIONS

Zone	1940-1949	1950-1959	1960-1969
1	J Geol	Geol Soc Am Bull	Geol Soc Am Bull
2	Geol Soc Am Bull	J Geol	J Geol Am J Sci
3	Geogr J Geogr Rev	Am J Sci Geogr Rev J Geomorphol	Geogr Rev Geogr J Assoc Am Geogr Ann
4	Zeit Gletscherd Am J Sci Assoc Am Geogr Ann	Sci Geogr J Atoll Res Bull Assoc Am Geogr Ann Sci Mon Erkd Zeit Geomorphol Geol Inst Bull Am Assoc Pet Geol Bull	Geogr Anna Am Assoc Pet Geol Bull Ar Geophys Union Trans J Sediment Pet Univ Calif Publ Geogr Nat Geogr Mag Zeit Geomorphol J Geomorphol J Glaciol Erkd Geol Mag R Soc Can Trans

Note:

For each decade, each zone yields about the same number of references, and the four zones combined produce 70 percent of the total references.

scatter of journals among related subject fields. It reflects the relationship of geomorphic literature to other fields of inquiry and, at the same time, indicates potential avenues for retrieval of the journals.

As shown in Figure 2, the journals cited in geomorphic research have come from 22 subject fields; nevertheless, a preponderance of the journals come from only 3 subject fields, namely, geology, general geography and general science. Perhaps of greater importance, in terms of citation retrieval,

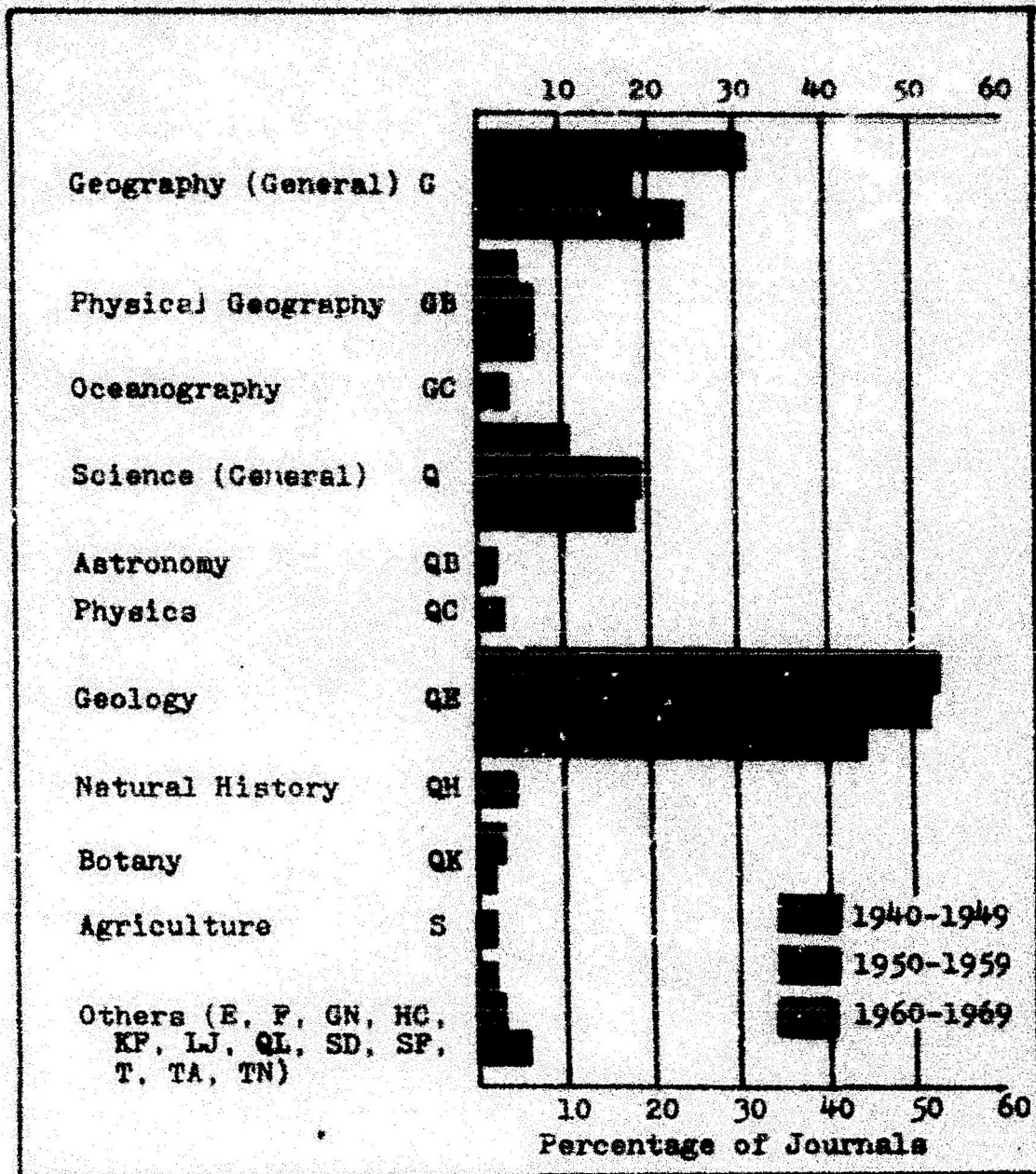


Fig. 2 Distribution of journals among Library of Congress subject classes. A majority of the journals are classified in geology, although geography (general) and science (general) are well represented. Noteworthy is the dearth of journals in class GB, physical geography, the parent subject field of geomorphology.

is the heavy concentration of the journals in the area of geology. About 50 percent of the titles are found in this subject field.

Only some 6 percent of the cited journals are classified in physical geography, the parent field of geomorphology. This figure has, however, remained relatively constant over the past thirty years. The most frequently cited journals in this subject field are the Journal of geomorphology, Erdkunde, Geografiska Annaler and Zeitschrift für Geomorphologie. An American publication, the Journal of Geomorphology has ceased publication since 1942.

A new interest in extending geomorphic research to the ocean floors is evident from the figures for the 1960's, showing 4 percent of the cited journals classified in oceanography, class GC. That oceanography is rapidly becoming a research frontier is widely acknowledged in the literature of the earth sciences (Ordway, 1972).

Figure 2 also shows that subject dispersion has increased over the past three decades. For the period 1940-1949, eight subject fields give complete coverage, but for the period 1960-1969, the journals come from twenty subject fields. When closely scrutinized, however, the data show that the number of journals in the peripheral subject fields has remained small in comparison to the number of journals in the older more productive subject fields.

Further, the data indicate that journals in the peripheral subject areas are not cited with any consistency. For example, in two of the decades studied, no journals are found in physics.

Source of Journals and Citations by Country

The world distribution of cited journals by country of publication is given in Table 5. A cursory glance at the Table shows non-American journals to be an important source of information in geomorphic research. In each decade, there is an approximate balance between the number of titles published in America and Europe, with each continent publishing about one-half of the journals.

TABLE 5

WORLD DISTRIBUTION OF CITED JOURNALS BY COUNTRY
OF PUBLICATION FOR THE YEARS 1940-1949,
1950-1959, 1960-1969

Country	1940-1949		1950-1959		1960-1969	
	#	%	#	%	#	%

<u>North America</u>							
United States	20	45	31	63	54	48	
Canada	..	..	..	..	4	4
<u>Europe</u>							
Germany	8	18	11	22	8	7	
Great Britain	6	14	5	10	12	10	
France	2	5	1	2	8	7	
Sweden	3	7	1	2	5	4	
Norway	1	2	..	..	5	4
Hungary	1	2	..	..	..	..
Poland	1	2	..	..	..	..
Soviet Union	1	2	..	..	..	..
Czechoslovakia	..	..	..	..	1	1
Ireland	..	..	..	..	1	1
Iceland	..	..	..	..	1	1
Netherlands	..	..	..	..	1	1
Switzerland	..	..	..	..	1	1
Denmark	..	..	..	..	1	1
<u>Australasia</u>							
Australia	..	..	..	..	4	4
New Zealand	..	..	..	..	4	4
<u>Others</u>							
Japan	..	..	..	..	1	1
India	..	..	..	..	1	1
Union of South Africa	..	..	..	..	1	1

When averaged for all three decades, the distribution of European journals shows Germany with 16 percent, Great Britain with 11 percent, France with 4 percent and Sweden with 3 percent. Numbering from 2 percent for the period 1950-1959 to 10 percent for the period 1960-1969, the other European journals are dispersed among several smaller countries. Titles from the Iron Curtain countries are poorly represented.

The data for the period 1960-1969 illustrates that the list of cited journals is expanding to include publications from around the world. Most notable in this regard is the recent citing of journals from Australia, New Zealand and Canada.

A comparison of the relative number of citations produced by the journals of the various countries is not shown in Table 5. When calculated as a percentage of the 731 references examined in this study, these figures are: United States, 73.1 percent; Great Britain, 9.9 percent; Germany (East and West), 7.1 percent; France, 1.3 percent; and others, 7.8 percent. Thus, while the number of American and foreign titles is about equal, the American journals, in terms of citation yield, outproduce the foreign journals at a ratio of approximately 3 to 1.

III. SUMMARY AND CONCLUSIONS

Citations from selected geomorphic articles, published in two American geography journals, have been analyzed in an effort to identify journals used in geomorphic research. In confirmation of the hypotheses set forth in the introduction to this paper, the results show that: (1) the number of journals cited in geomorphic research has increased more than twofold over the past thirty years, yet a small group of journals continue to produce the bulk of needed citations; (2) the literature is centered around a core journal--the Bulletin of the Geological Society of America--which consistently produces a high proportion of the total references; (3) the most productive journals are found in geology, general geography and general science, rather than in geomorphology or its parent subject field, physical geography; and (4) non-American journals, primarily those bearing European imprints account for about one-half of the journals cited.

For librarians and researchers, these results have some clear implications. First, an effective, specialized collection of geomorphic literature can be maintained with a limited number of journals. At present, only 21 journals (listed in Table 4) yield 70 percent of the needed citations.

Complete coverage of all potentially useful journals,

however, is not feasible, inasmuch as more than 92 journals, covering many subject fields and originating in several countries, are needed to obtain the final 30 percent of the citations. Moreover, these peripheral journals are not cited with any regularity, and, thus, are of marginal value in most geomorphic research.

For retrieval of geomorphic literature, bibliographic tools from several subject areas are required. The most useful tools are the Bibliography and Index of Geology and the Social Sciences and Humanities Index. The former is an index to all but 5 of the 21 journals indicated above. And the latter indexes the key journals in geography.

Other useful tools include Geomorphological Abstracts (title varies) and Science Citation Index. The Abstracts is an English publication which has attempted to bring together the world's geomorphic literature since 1960. SCI, published since 1961, is an important source for locating references in the general sciences.

This research has made no attempt to assess the qualitative aspect of the articles cited in the various journals. Further research is needed to determine if any of the peripheral journals (those cited infrequently) contain, or consistently publish, seminal articles important in the generation of advanced studies. Should this be the case, certain peripheral journals may be quite valuable in a special, geomorphic collection.

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APPENDIX

List of journals with research papers on geomorphology. Country of publication, LC CLASS, and subject.

<u>JOURNAL</u>	<u>COUNTRY</u>	<u>LC CLASS</u>	<u>SUBJECT</u>
American Antiquity	U.S.	E	History-American
American Association of Petroleum Geologists, Bulletin	U.S.	QE	Geology
American Geographical Society, Bulletin	U.S.	G	Geography (General)
American Geologist	U.S.	QE	Geology
American Geophysical Union, Transactions	U.S.	QE	Geology
American Journal of Science	U.S.	Q	Science (General)
American Meteorological Society, Bulletin	U.S.	QC	Physics
American Museum of Natural History, Bulletin	U.S.	QH	Natural History
American Scientist	U.S.	LJ	Student Fraternities and Their Publications
American Society of Civil Engineers, Transactions	U.S.	TA	Civil Engineering (General)
Annales de Geographie	Fr.	G	Geography (General)
Appalachia	U.S.	G	Geography (General)
Arbok	Nor.	G	Geography (General)
Arizona Academy of Science, Journal	U.S.	Q	Science (General)

<u>JOURNAL</u>	<u>COUNTRY</u>	<u>LC CLASS</u>	<u>SUBJECT</u>
Arizona Historical Review	U.S.	E	History-American
Arizona University, Geochronology- Dendrochronology	U.S.	QE	Geology
Association of American Geographers, Annals	U.S.	G	Geography (General)
Atoll Research Bulletin	U.S.	QE	Geology
Australian Journal of Science	Austl.	Q	Science (General)
Boston Journal of Natural History	U.S.	QH	Natural History
Boston Journal of Natural History, Proceedings	U.S.	QH	Natural History
British Astronomical Society, Journal	Gr. Br.	QB	Astronomy
Bulletin of Applied Botany, of Genetics, and Plant-Breeding	U.S.S.R.	QK	Botany
Cahiers Oceanographiques	Fr.	GC	Oceanography
California Academy of Science, Proceedings	U.S.	Q	Science (General)
California Geographer	U.S.	G	Geography (General)
California University, Publications in Geography	U.S.	G	Geography (General)
California University, Publications in Geological Sciences	U.S.	QE	Geology

<u>JOURNAL</u>	<u>COUNTRY</u>	<u>IC CLASS</u>	<u>SUBJECT</u>
Canadian Geographer	U.S.	G	Geography (General)
Centre d'etudes et de Documentation Paleontologique	Fr.	QE	Geology
Cracovie Academy of Science, Bulletin	Pol.	T	Science (General)
Graydon Natural History and Science Society, Proceedings	Pol.	T	Science (General)
Earthquake Notes	U.S.	QE	Geology
Ecology	U.S.	QK	Botan
Economic Geography	U.S.	HC	Economic History and Conditions
Economic Geology	U.S.	TN	Mining Engineering
Engineering News Record	U.S.	TA	Engineering-General
Erdkunde	Ger.	GB	Physical Geography
Földtani Közlemény	Hung.	QE	Geology
Geografiska Annaler	Swed.	GB	Physical Geography
Geographical Journal	Gr. Br.	G	Geography (General)
Geographical Review	U.S.	G	Geography (General)
Geographical Society of Chicago, Bulletin	U.S.	G	Geography (General)
Geographie	Fr.	G	Geography (General)

<u>JOURNAL</u>	<u>COUNTRY</u>	<u>LC CLASS</u>	<u>SUBJECT</u>
Geographische Rundschau	Ger.	G	Geography (General)
Geographische Schriften	Ger.	G	Geography (General)
Geological Magazine	Gr. Br.	QE	Geology
Geological Society of America, Bulletin	U.S.	QE	Geology
Geological Society of America, Memoirs	U.S.	QE	Geology
Geological Society of Glasgow, Transactions	Gr. Br.	QE	Geology
Geological Society of London, Quarterly Journal	Gr. Br.	QE	Geology
Geologische Rundschau	Ger.	QE	Geology
Geologische Rundschrift	Ger.	QE	Geology
Geologische und Palaeontologische Abhandlungen	Ger.	QE	Geology
Geologiska Foreningen i Stockholm Foredhandlingar	Swed.	QE	Geology
Geologists' Association, Proceedings	Gr. Br.	QE	Geology
Georgia Academy of Science, Bulletin	U.S.	Q	Science (General)
Glaciological Notes	U.S.	QE	Geology

<u>JOURNAL</u>	<u>COUNTRY</u>	<u>LC CLASS</u>	<u>SUBJECT</u>
Greenland Geologiska Undersogelse, Bulletin	Den.	QE	Geology
Harvard Museum of Comparative Zoology, Bulletin	U.S.	QL	Zoology
Himalayan Journal	India	G	Geography (General)
Indiana Academy of Science, Proceedings	U.S.	Q	Science (General)
Institute of British Geographers, Transactions and Proceedings	Gr. Br.	G	Geography (General)
Institute of Navigation Journal	Gr. Br.	QB	Astronomy
International Association of Scien- tific Hydrology, Bulletin	Bel.	GB	Physical Geography
Journal of Forestry	U.S.	SD	Forestry
Journal of Geography	U.S.	G	Geography (General)
Journal of Geology	U.S.	QE	Geology
Journal of Geomorphology	U.S.	GB	Physical Geography
Journal of Geophysical Research	U.S.	QE	Geology
Journal of Glaciology	Gr. Br.	QE	Geology
Journal of Marine Research	U.S.	QC	Oceanography
Journal of Sedimentary Petrology	U.S.	QE	Geology


<u>JOURNAL</u>	<u>COUNTRY</u>	<u>LC CLASS</u>	<u>SUBJECT</u>
Journal of Soil Science	Gr. Br.	S	Agriculture
Journal of the Franklin Institute	U.S.	Q	Science (General)
Kansas Academy of Science, Bulletin	U.S.	Q	Science (General)
Kansas University Science Bulletin	U.S.	Q	Science (General)
Leidsche Geologische Medelingen	Ger.	QE	Geology
Marine Geology	U.S.	GC	Oceanography
Mitteilungen der Pollichia	Ger.	Q	Science
Nagra Glacialmerfologiska	Swed.	QE	Geology
National Geographic Magazine	U.S.	G	Geography (General)
National Speleological Society, Bulletin	U.S.	GP	Physical Geography
Natural Resources Journal	U.S.	KF	Federal Law
Nature Magazine	U.S.	QH	Natural History
Neues Jahrbuch fur Mineralogie, Geologie und Palaeontologie	Ger.	QE	Geology
New Mexico Historical Review	U.S.	F	History-American
New Mexico University. Publications in Anthropology	U.S.	GN	Anthropology
New Zealand Institute, Transactions	N.Z.	QE	Geology

<u>JOURNAL</u>	<u>COUNTRY</u>	<u>LC CLASS</u>	<u>SUBJECT</u>
New Zealand Journal of Geology and Geophysics	N.Z.	QE	Geology
New Zealand Journal of Science and Technology	N.Z.	S	Agriculture
Norges Geologiske Undersokelse	Nor.	QE	Geology
Norsk Geografisk Tidsskrift	Nor.	G	Geography (General)
Norsk Geologisk Tidsskrift	Nor.	QE	Geology
Northwest Science	U.S.	Q	Science (General)
Oklahoma Academy of Science, Proceedings	U.S.	Q	Science (General)
Pacific Science	U.S.	Q	Science (General)
Pan-American Geologist	U.S.	QE	Geology
Peabody Museum of American Archaeology and Ethnology, Bulletin	U.S.	GN	Prehistoric Archeology
Pettermanns Geographische Mitteilungen	Ger.	G	Geography (General)
Philosophical Magazine	Gr. Br.	C	Science (General)
Professional Geographer	U.S.	G	Geography (General)
Przedglad Geograficzny	Poi.	G	Geography (General)
Records of Oceanographic Work in Japan	Jap.	GC	Oceanography

<u>JOURNAL</u>	<u>COUNTRY</u>	<u>LC CLASS</u>	<u>SUBJECT</u>
Revue de Geographie Physique et de Geologie Dynamique	Fr.	GB	Physical Geography
Revue de Geomorphologie Dynamique	Fr.	GB	Physical Geography
Revue Geographie Alpine	Fr.	G	Geography (General)
Rocks and Minerals	U.S.	QE	Geology
Royal Astronomical Society of London, Monthly Notices	Gr. Br.	QB	Astronomy
Royal Irish Academy, Proceedings	Gr. Br.	Q	Science (General)
Royal Society of Canada, Transactions	Can.	Q	Science (General)
Royal Society of London, Proceedings	Gr. Br.	Q	Science (General)
Royal Society of London, Quarterly Journal	Gr. Br.	QE	Geology
Royal Society of New South Wales, Journal and Proceedings	Austl.	Q	Science (General)
Royal Society of New Zealand, Transactions and Proceedings	N.Z.	Q	Science (General)
Royal Society of South Australia, Transactions and Proceedings	Austl.	Q	Science (General)
San Diego Natural History Society, Transactions	U.S.	Q	Science (General)
Science	U.S.	Q	Science (General)
Scientific American	U.S.	T	Technology-General

<u>JOURNAL</u>	<u>COUNTRY</u>	<u>LC CLASS</u>	<u>SUBJECT</u>
Scientific Monthly	U.S.	SF	Animal Culture
Scope	Austl.	Q	Science (General)
Scottish Geographical Magazine	Gr. Br.	G	Geography (General)
Scottish Journal of Geology	Gr. Br.	QE	Geology
Sekce Biologické kavka	Czech.	QH	Natural History
Société Géologique de France, Bulletin	Fr.	QE	Geology
Soil Conservation	U.S.	S	Agriculture
Soil Science	U.S.	S	Agriculture
Soil Science Society of America, Proceedings	U.S.	S	Agriculture
South African Geographical Journal	U.S. Afr.	G	Geography (General)
Southern California Academy of Sciences, Bulletin	U.S.	Q	Science (General)
Svergies Geologiska Undersökning	Swed.	QE	Geology
Systematic Zoology	U.S.	QL	Zoology
Tijdschrift Van Het Koninklijk Neder- landsch Aardrijkskundig Genootchap	Neth.	G	Geography (General)
Torrey Botanical Club Bulletin	U.S.	QK	Botany
Travaux de L' Institut de Recherches Sahariennes	Fr.	Q	Science (General)

<u>JOURNAL</u>	<u>COUNTRY</u>	<u>LC CLASS</u>	<u>SUBJECT</u>
Uppsala Universitat, Mineralogisk Geologiska Institutionen, Bulletin	Swed.	QE	Geology
Vestlandet Geographical Studies	Nor.	G	Geography (General)
Vísindatíðlag Ísendinga	Ice.	Q	Science (General)
Washington Academy of Sciences, Bulletin	U.S.	Q	Science (General)
Weather	Gr. Br.	QC	Physics
Weatherwise	U.S.	QC	Physics
Ymer	Swed.	GN	Anthropology
Yorkshire Geological Society, Proceedings	Gr. Br.	QE	Geology
Zeitschrift der Deutschen Geologie Gesellschaft	Ger.	QE	Geology
Zeitschrift der Gesellschaft für Erdkunde	Ger.	G	Geography (General)
Zeitschrift für Geomorphologie	Ger.	GB	Physical Geography
Zeitschrift für Gletscherkunde	Ger.	QE	Geology
Zeitschrift für Physikalische Chemie	Ger.	QD	Chemistry



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