GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES, OTTAWA

MISCELLANEOUS REPORT 16

GUIDE TO AUTHORS

Revised edition 1975

Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Miscellaneous Report 16

GUIDE TO AUTHORS - A Guide for the Preparation of Geological Maps and Reports

compiled by

R.G. BLACKADAR
H. DUMYCH
P.J. GRIFFIN

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PREFACE

The need for a guide to assist geologists of the Geological Survey of Canada in the preparation of their results for publication was recognized more than twenty years ago and the late Dr. C.E. Cairnes undertook the preparation of the forerunner of this book.

Since it first appeared, the guide has been revised several times, first by the late Dr. H.M.A. Rice and later by Dr. P. Harker. A new, revised edition prepared by Dr. R.G. Blackadar in 1968, was reprinted in 1969, and revised in 1972, to incorporate parts of an excellent publication devoted to the preparation of reports, the Canadian Government Style Manual, and also included extensively revised sections of the earlier editions that deal with the preparation of manuscript geological maps and reports. This edition, a further revision of the 1968 publication includes, a guide to the use of the SI System, standardized spellings for common geological terms and a comprehensive listing of abbreviations used in bibliographic citations.

This book is a guide designed to facilitate the preparation of manuscript maps and reports and to expedite the preparation of such material for publication. By observing the numerous details and conventions outlined, the geologist will avoid costly duplication of effort and will hasten publication of the Geological Survey's scientific contributions.

D.J. McLaren
Director,
Geological Survey of Canada

Ottawa,
February 15, 1975

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INTRODUCTION

The successful completion of field or laboratory studies is only part of the responsibility of the Geological Survey of Canada; an almost equal responsibility is the publication of the results of this research in the form of reports and maps. Like its predecessors, this most recent revision of the guide is designed to assist authors in preparing a clear, concise manuscript that will be printed and published with a minimum of delay and difficulty.

Previous editions contained lists showing approved spelling, usages and abbreviations. Much of this material has been up-dated and incorporated, however, in an attempt to indicate broad general principles rather than specific instructions, extensive extracts from the Canadian Government Style Manual (revised in places) are included wherever they have a bearing on scientific report writing.

A number of changes in spelling and usage have been adopted in keeping with accepted current practice in North American geological literature. There is also a more permissive approach to style and format of Geological Survey reports; the diversity of subject and scope of current research in the Survey requires a more flexible treatment for presentation than the more formalized memoirs of an older generation.

The guide deals in some detail with actual procedures to be followed by the staff and reflects current Survey policies, particularly in the various phases of map production. In this regard it is intended mainly for internal use. However, there seems to be a need outside the Survey for information in the broader generalities of geological writing judging from the steady demand for previous editions by geologists in industry and the universities. The revised edition of this publication, first published in 1968, was reprinted twice indicating a continuing demand.

Although basically a medium for the communication of ideas, language is something that can be enjoyed and appreciated. If this guide serves to assist in the dissemination of the results of geological research with clarity, accuracy and with some regard for literary elegance, then the efforts put into its compilation by Dr. Blackadar and his colleagues will not have been in vain.

Peter Harker,
Chief,
Geological Information Division.

GUIDE FOR THE PREPARATION OF GEOLOGICAL MAPS AND REPORTS

PUBLICATIONS ISSUED BY THE GEOLOGICAL SURVEY

MEMOIRS
Comprehensive terminal reports on the geology of specific areas.

BULLETINS
Comprehensive reports on geological or related subjects, not primarily on systematic areal mapping. May be of any length but are generally terminal reports on at least some phase of research project. May be illustrated in any manner suited to the subject.

ECONOMIC GEOLOGY REPORTS
Economic Geology reports include reports on subjects of economic interest on a broad regional basis. Examples are "Tungsten in Canada" and "Prospecting in Canada".

MISCELLANEOUS REPORTS
Include popular guides designed mainly for the use of the general public, and publications not readily assigned to other categories.

PAPERS
Produced by photo-offset printing from typescript to permit prompt publication of geological information. May be of any reasonable length and carry maps, figures, and photographs. They may range from the presentation of accumulated data to highly sophisticated and interpretive reports of progress. They include the following:

1. Progress reports on studies that have reached a point where an interim report is justified. Such reports may be complete and final so far as the status of the investigation permits.

2. Reports on projects which for economic or scientific reasons deserve immediate treatment in a preliminary manner.

3. Reports of activities. Abstract-type reports, of about 2500 words or less. May include page-size sketch maps or figures drawn by authors and half-tone illustrations. Issued annually in three parts.

4. Index of publications. Annual; includes bibliography of all outside publications.

5. Abstracts of publications. Annual; contains abstracts of papers published by staff members in outside scientific journals.

MAPS

Preliminary maps. Usually black line geology with blue drainage they may carry marginal notes and be issued separately but are generally included with a Paper series report. To elucidate complex relationships such as several generations of folding or ice movement, one or more additional colours may be permitted.

Final multicolour maps. Commonly included with a Memoir or Bulletin, but may carry marginal notes and be issued separately.

OPEN FILE

To place results in the hands of the user as quickly as possible manuscript texts and maps are made available at the principal offices of the Survey. In most cases the public may arrange to have copies made commercially. Many reports that are being prepared for publication are first placed on Open File.

HOW TO PREPARE A MANUSCRIPT GEOLOGICAL MAP

THE BASE MAP

Field information is plotted on copies of a base map supplied by the Cartography Unit on requisition through the Division Chief. The base map may take various forms and field officers should consult the drafting staff as to the most suitable type available before forwarding the requisition. The request should be made as early as possible to allow time for photography and print-making.

It is of great advantage to the Cartography Unit to have all geology submitted on the latest available topographic base and the Compilation Section will supply, if at all possible, cronoflex copies showing such information. To facilitate this procedure geologists are advised to divide their base material into two categories when requesting it from the Compilation Section.

1. Base material to be used in the field – the scale of this material is at the discretion of the field officer.

2. Base material to be used for the final compilation of the map. This material should be requested a few months prior to making the final geological compilation (only a few bases not covered by the NTS system would require more than a month for drafting). It is most important to have the geology plotted on the same base as that on which the map is to be published. If this is not done another compilation of the geology must be made thus increasing the publication time for the report and adding to the cost of production.

3. In conformity with the recommendations of the Metric Commission most maps issued by the Department of Energy, Mines and Resources now use the natural scale. The most common scales are 1: 25 000, 1: 50 000, 1: 250 000 and 1: 1 000 000.

THE FINAL MANUSCRIPT MAP

When the final manuscript map is to be submitted the following procedure should be followed.

1. One cronoflex transparency showing topographic base should be obtained from the Cartography Unit. On this all geological information is to be indicated in black ink. All relevant numbering or lettering should also appear on this copy clearly and properly identified in black ink. All symbols shown on MSS copies should conform to those specified in other sections of this manual

   Note: This copy must not be coloured.

2. A paper copy made from the cronoflex prepared following the above instructions is to be coloured by the author. Colours used must be in sharp contrast to one another to help in the identification of units. This paper copy will be made by the Cartography Unit on request.

   For those wishing to colour a transparency rather than a paper copy, the Cartography Unit will supply a duplicate cronoflex on request.

Do not submit as map manuscript a paper copy of a published or unpublished base map on which geological information has been added. Such material cannot be accepted. Such bases are not stable and in time serious distortions of scale may occur. There has been a tendency to plot geological data on copies of the NTS topographic maps and to consider these as MSS material. Such submissions are not satisfactory.

There would be considerable saving of time in drafting if the MSS material were submitted at the final publishing scale rather than at twice the scale as has been the common practice. Circumstances will determine the scale used in the preparation of the manuscript copy but the foregoing observation should be kept in mind when planning the preparation of geological maps.

The following points are mentioned specifically as, in practice, they are found to be among most persistent causes of delays:

1. Indicate clearly the various classes of geological boundaries and faults (defined, approximate, assumed).

2. Each separate area of a geological unit should be identified to conform to the legend. Do not rely on the colour. Large areas should be identified in several places.

3. Geological contacts at the margins of the map-sheet should be made to conform with those of adjacent sheets, as far as is consistent with more recent opinions.

4. All geographical names used in the text should appear on the map and those not already on should be added in red.

5. Names, other than those already adopted, must be submitted through the Superintendent of Cartography to the Canadian Permanent Committee on Geographical Names.

6. The Cartography Unit is prepared to advise and, to a limited extent, assist geologists preparing figures for reproduction in outside publications. If advice is secured at the start it will ensure the use of the simplest and most effective method for the type of reproduction anticipated.

7. Blue, violet, green and carmine inks do not give a sharp image when reproduced photographically. In addition to black the following colours are the most suitable: sepia, orange and yellow.

MAP LEGEND

A well constructed legend may indicate the broad features of the geological history of the region and also some of the major stratigraphic relations, but its prime purpose of providing a key to the geological units on the map should not be obscured by over sophistication.

The map-units may be designated by numbers or by a system of letter symbols for systems and eras with letters or numbers as subscripts indicating formations and/or gross lithologies. Lithological letters may be chosen by the author but care should be taken that they do not give rise to conflicts in the same legend with rock-unit designations. For guidance suggested abbreviations are given on p. 9 following the list of approved geological age symbols. In the text which follows on the arrangement of map-units all the examples use numbers; they could equally well use the letter system. At the end of the section a hypothetical legend shows the use of both systems.

Most maps are now being issued in one of two forms (1) with the rock-units depicted in different colours (multicoloured maps), or (2) uncoloured with the rock-units designated by symbol only (Preliminary Series maps). The two types of maps may require slightly different legends, but if the author considers how the map is to be reproduced the applicability of the proposed legend should be clear.

Arrangement of Map-Units

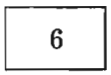
1. Colour (or symbol) blocks, each normally representing a single map-unit, are arranged in a vertical column either in order of decreasing age from bottom to top or in the case of surficial geology maps genetic groupings may replace age as the criterion for arrangement.

2. These map-unit blocks should be identified serially from bottom to top, and the same symbols used for the corresponding areas on the body of the map.

3. The map-unit blocks are bracketed together, on the left margin of the legend, according to the era or eras (PROTEROZOIC, PALEOZOIC, etc.) to which they belong.

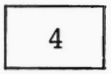
4. The map-unit blocks are also commonly grouped into systems (CAMBRIAN, CARBONIFEROUS, TRIASSIC, etc.) and series (UPPER CAMBRIAN, PENNSYLVANIAN, LOWER TRIASSIC, etc.). The system names are placed above and flush with the left margin of the uppermost block representative of that period, and the series names above, but midway of, the uppermost block that it includes and, where a period name also appears, beneath that period name.

5. Formational or group names (which have reference to lithology, and are not time terms) are shown in capitals, and are placed directly to the right of the map-unit block, and either just below the line of the top of the block (formation names) or just above the level of this line (group names) thus:



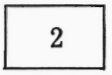
MONCTON GROUP
WELDON FORMATION: (description)

Names of groups of intrusive rocks, such as COAST INTRUSIONS, TREMBLEUR INTRUSIONS, MONTEREGIAN INTRUSIONS, etc., can probably best be treated as group names (but *see* Article 10(i), Appendix I).

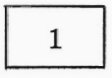


COAST INTRUSIONS

Names of complexes, that is mixtures of intrusive and intruded rocks, also constitute lithological map-units, and their names may be treated as group names, though it is improbable that any of their subdivisions can be recognized as formations (*see* Article 6(j), Appendix I). Thus we have:



WOLVERINE COMPLEX (1, 2)
Quartzite, schist; minor pegmatite



Granitic gneisses; crystalline limestone; pegmatite

In printing, a different style and weight of type is used to distinguish formational and group names, or those of equivalent ranks, a distinction that cannot be made in typescript copy. Groups, intrusions, and complexes commonly comprise more than one map-unit block, and, where any doubt may rise as to the number of blocks, the name should be followed by the numbers of the constituent map-units in parentheses thus: NICOLA GROUP (3-5).

If a formation comprises more than one map-unit the formation name should be raised above the level of the uppermost constituent map-unit block to occupy the customary position of a group name. It will, however, retain the style and weight of type used for formational names.

6. Brief lithological descriptions, should be added to the right of each colour block, and should follow immediately after any formational name applied to that block thus:

4	CADOMIN FORMATION: conglomerate

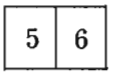
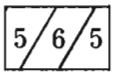
The description should be mainly lithological, and should be arranged in order of decreasing abundance of the constituent rock types, thus: 'sandstone, shale, limestone', in which it would be assumed that sandstone was the most, and limestone the least, abundant of the three principal constituents. Where one or more constituents are present in appreciably smaller amounts than the others, this may be indicated by use of such words as 'minor', 'some', or 'a little', preceded by a semicolon, as: 'sandstone, shale; minor limestone'.

7. It may be necessary to employ two or more columns of map-unit blocks in order to represent combinations of map-units that cannot be mapped separately in certain parts of the map-area. The extra columns are set up successively to the right of the descriptive matter pertaining to the preceding column. For example, a certain group of two or more formations that elsewhere in the map-area are mapped separately may be impossible to separate in the northwest corner of the area. Accordingly, a separate colour, or number, is chosen to represent the undivided group in this corner, and this colour block is placed in a second column of the legend in a position midway of and to the right of the several separate formations of the group, the later commonly being joined by a bracket to the right of the descriptive matter pertaining to them.

8. As far as possible map-units should be fitted into their appropriate chronological positions in the legend. Where there is considerable doubt as to the proper position, the doubt can be indicated by a sentence in the description. For example, map-unit 6 might carry the statement, "may be in part or entirely older than 5". There are, however, map-units composed of rocks whose age and relation to others in the map-area are unknown. These are placed at the bottom of the main column of map-unit blocks, separated from them by a short, horizontal line, and not included with them in the era bracket. Such map-units are normally lettered serially from the top down, A, B, C, etc., which serves further to distinguish them from the map-units above.

9. Subdivisions of map-units and legend blocks are commonly employed, either numbers or letters being used.

   a) Numbers are employed wherever the author wishes to show parts of a unit in different colours or patterns. These parts may be lithologically different; such as limestone in an otherwise volcanic series, metamorphosed equivalents of the main unit, minor stratigraphic members such as

basal conglomerate to which, for some reason, the author does not wish to assign a separate block, or separate bodies of similar or different composition believed to be of the same age. The block is divided by lines into sections with different number and colour pattern, thus  where the bodies are separate or consecutive, or thus  where one is included in the other.

b) Capital letters A, B, C, etc., are used, mainly on large scale compilation maps, with the block number to indicate different formations or groups that are included in a single colour. These are listed in the tabular form as in the case of numbered, subdivided blocks. If the relative ages are known, the oldest is labelled A and placed at the bottom of the column, otherwise the order is reversed.

c) Lower case letters a, b, c, etc., are used with the block number to indicate lithological or other varieties not otherwise distinguished. They may be used with a boundary, for instance separating 6a from 6b, or simply placed on the map wherever the information is available. The block is numbered thus  and if 6, the undifferentiated unit, appears on the map the description starts directly with a general account. This is terminated by a semicolon and followed directly by 6a comma and its description, and so on. If no undifferentiated 6 appears on the map the description starts with 6a.

d) Where the presence or absence of certain critical minerals is important, the initial letter or an abbreviation may be placed on the map where the mineral was observed. These letters are not attached to the block number and appear in the legend only in the descriptive matter relating to the unit in question. This system is not for general use and rarely if ever on preliminary maps; it should be resorted to only when the information cannot be presented adequately any other way.

The following is the approved method of designating map-units on Geological Survey maps. Authors may use their discretion in choosing abbreviations for group, formation and similar names and for lithologic descriptions but for guidance suggested abbreviations for the latter follow.

An author need not use all degrees of modifier, but if they are employed, the scheme must be adhered to.

GEOLOGICAL AGE SYMBOLS

EON		ERA		PERIOD		SERIES	
Phanerozoic		Cenozoic	C	Quaternary	Q	Recent	R
						Pleistocene	P
				Tertiary	T	Pliocene	P
						Miocene	M
						Oligocene	O
						Eocene	E
						Paleocene	P
				Neogene	N		
				Paleogene	P		
		Mesozoic	M	Cretaceous	K		
				Jurassic	J		
				Triassic	T		
		Paleozoic	P	Permian	P		
				Pennsylvanian	P		
				Mississippian	M		
				Carboniferous	C		
				Devonian	D		
				Silurian	S		
				Ordovician	O		
				Cambrian	C		

Precambrian

EON		ERA		SUBERA	
Proterozoic	P	Hadrynian	H		
		Helikian	H	Neohelikian	N
				Paleohelikian	P
		Aphebian	A		
Archean	A				

Modifiers as follows are to be placed on the left side of the age symbols:
EARLY-E, MIDDLE-M, LATE -L
lower-l, middle-m, upper-u
Small capital letters are to be used to designate group, formation or member and lower case letters for lithology and/or mineralogy. All are to be placed on the right side of the age symbols.

HYPOTHETICAL LEGEND

CENOZOIC

TERTIARY

MIOCENE OR EARLIER

KAMLOOPS GROUP (14, 15)

15 — Basalt, andesite, rhyolitic; associated tuffs and breccias

14 — COLDWATER FORMATION: 14a, mainly sandstone; 14b, mainly shale; 14c, conglomerate

MESOZOIC

CRETACEOUS OR TERTIARY

UPPER CRETACEOUS OR LATER

12 13 — 13. Arkose, argillite; minor lava
12. Mainly andesite and dacite; minor tuff

CRETACEOUS (?)

11 — Granodiorite; may be older than 10

JURASSIC OR CRETACEOUS

10 — Granodiorite, quartz diorite, diorite

JURASSIC

LOWER JURASSIC

9 — GUICHON BATHOLITH: granite, granodiorite, diorite

COAST INTRUSIONS

TRIASSIC

UPPER TRIASSIC

NICOLA GROUP

7 8 7 — 7. Andesite, dacite; agglomerate; minor limestone
8. Limestone

PROTEROZOIC OR PALEOZOIC PALEOZOIC

CARBONIFEROUS (?) AND PERMIAN

CACHE CREEK GROUP

4 5 6 — 6. Division C: mainly argillite
5. Division B: limestone; argillite and greywacke
4. Division A: andesite and basalt

2 — Quartzite, slate; minor andesite

1 — Andesite and rhyolitic lava; minor sedimentary rocks

3 — Biotite and amphibole schist and gneiss; probably derived from 1 and 2

HYPOTHETICAL LEGEND

CENOZOIC

TERTIARY
MIOCENE OR EARLIER
KAMLOOPS GROUP

Mk — Basalt, andesite, rhyolitic; associated tuffs and breccias

Mc — COLDWATER FORMATION: Mcs, mainly sandstone; Mcsh, mainly shale; Mcc, conglomerate

CRETACEOUS OR TERTIARY
UPPER CRETACEOUS OR LATER

KTa | KTd
KTa. Arkose, argillite; minor lava
KTd. Mainly andesite and dacite; minor tuff

MESOZOIC

CRETACEOUS (?)

Kg — Granodiorite; may be older than

JURASSIC OR CRETACEOUS

JK — Granodiorite, quartz diorite, diorite

JURASSIC
LOWER JURASSIC

Jg — GUICHON BATHOLITH: granite, granodiorite, diorite

COAST INTRUSIONS

TRIASSIC
UPPER TRIASSIC
NICOLA GROUP

TNa | TNl | TNa
TNa. Andesite, dacite; agglomerate; minor limestone
TNl. Limestone

PALEOZOIC

CARBONIFEROUS (?) AND PERMIAN
CACHE CREEK GROUP

CPc1 | CPc2 | CPc3
3. Division C: mainly argillite
2. Division B: limestone; argillite and greywacke
1. Division A: andesite and basalt

PROTEROZOIC OR PALEOZOIC

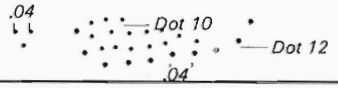
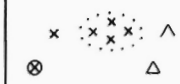
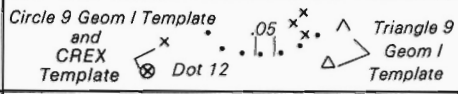
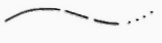
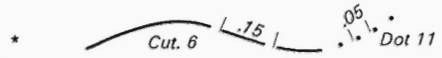
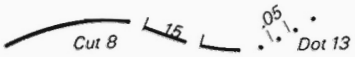
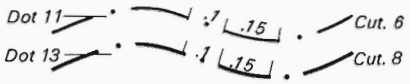
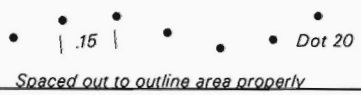
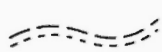
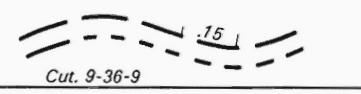
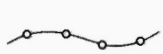
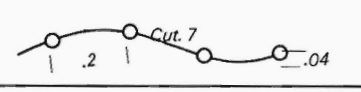
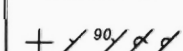
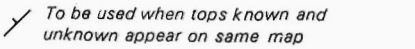
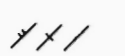
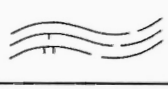
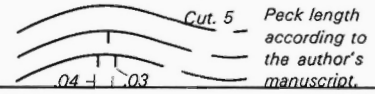
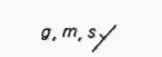
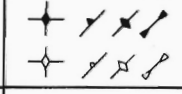
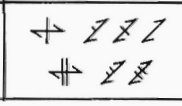
PP2 — Quartzite, slate; minor andesite

PP1 — Andesite and rhyolitic lava; minor sedimentary rocks

PP3 — Biotite and amphibole schist and gneiss; probably derived from 1 and 2

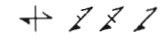
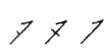
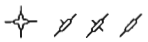
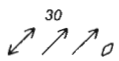
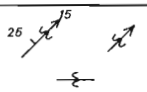
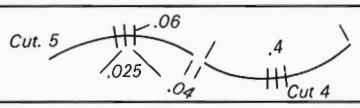
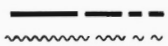
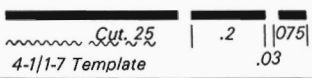
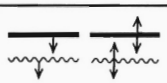
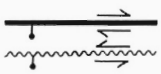
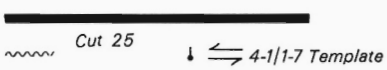
PRINCIPAL SYMBOLS FOR GEOLOGICAL MAPS AND FIGURES

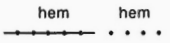
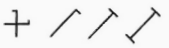
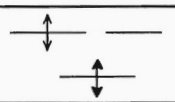
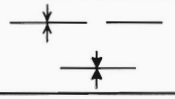
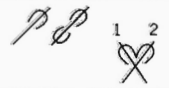
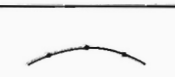
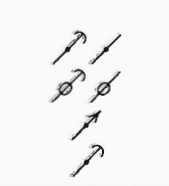
These symbols should be used on manuscript maps. Other symbols to be used only after conferring with Chief Scientific Editor, but wording below may be modified or amplified somewhat to suit special conditions. Where alternative symbols are shown, choice may depend upon final scale of map.

GEOLOGICAL FEATURES	SYMBOL	SPECIFICATIONS
Drift-covered area		
Rock outcrop, area of outcrop, probable outcrop, float, frost heaved rock		
Geological boundary (defined, approximate, assumed) *(shown in legend for final map)*		
Geological boundary (defined, approximate, assumed) *(preliminary map)*		
Geological boundary (gradational inferred or metamorphic) *(final map)* *(preliminary map)*		
Limit of geological mapping		
Limit of area surveyed with aircraft		
Flow contact		
Bedding, tops known (horizontal, inclined, vertical, overturned, dip unknown)		 2-1/1-7 Template
Bedding, tops unknown (inclined, vertical, dip unknown)		2-1/1-7 Template
Bedding, general trend (dip unknown, top unknown; dip and top known; dip known, top unknown)		
Bedding, estimated dip (gentle, moderate, steep)		2-1/1-7 Template Type 7 Pt. Helvetica Italic
Primary flow structures in igneous rock (horizontal, inclined, vertical, dip unknown) If a supplementary symbol is needed use		3-1/1-7 Template 4-1/1-7 Template
Schistosity, gneissosity, cleavage, foliation (horizontal, inclined, vertical, dip unknown) Second generation (horizontal, inclined, vertical) **		2-1/1-7 Template

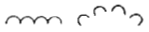
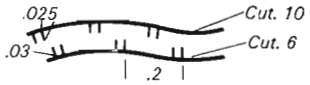
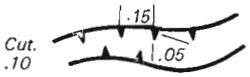
* *The minimum distance between two boundaries should be .020"*

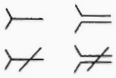
** *Number of ticks indicates generation*

Foliation (horizontal, inclined, vertical, dip unknown)		*2-1/1-7 Template*
Banding (inclined, vertical, dip unknown)		*2-1/1-7 Template*
Axial plane of minor fold (horizontal, inclined, vertical, dip unknown)		*3-1/1-7 Template*
Lineation (horizontal, inclined, inclined but plunge unknown, vertical)		*2-1/1-7 Template*
Layering (in intrusive rocks)		*4-1/1-7 Template*
Lineation, axes of minor folds (horizontal, inclined, vertical)		*2-1/1-7 Template*
Drag-fold (arrow indicates plunge) *Drag-fold in gneissosity*		*2-1/1-7 Template*
Minor fold (arrow indicates plunge)		*Circle 7, Geom I and 4-1/1-7 Templates*
Multiple fold (arrow indicates plunge, inclination of axial plane known, unknown) *Multiple fold (plunge unkown)*		*2-1/1-7 Template*
Structural trend (from air photographs)		*Follow author's design Cut 5*
Lineament (from air photographs)		
Fault (defined, approximate, assumed)		
Fault (inclined, vertical)		
Fault (solid circle indicates downthrow side, arrows indicate relative movement)		
Thrust fault (teeth in direction of dip; defined) (teeth indicate upthrust side)		*4-1/1-7 Template or TF Template (Ask supervisor)*
Thrust fault (approximate, assumed)		*4-1/1-7 Template or TF Template (Ask supervisor)*
Fault zone, shear zone; schist zone (width indicated)		*Follow author's design* 

Shearing and dip		*2-1/1-7 Template*
Vein fault (defined, assumed)		*Cut. 10* .1 *Dot 25*
Mineralized bed or seam (hematite)		hem hem hem *6 Pt. Helvetica Roman* .1 *Cut. 10* *Dot 25*
Dyke, vein, or stockwork (defined, approximate, assumed)		*Cut 20-25* .04 .12 .10 *Dot 30*
Joint (horizontal, inclined, vertical, dip unknown)		*3-1/1-7 Template*
Anticline (defined, approximate) *Antiform*		.05 .30 *Cut. 8* *2-1/1-7 Template*
Syncline (defined, approximate) *Synform*		.05 .30 *Cut. 8* *2-1/1-7 Template*
Anticline and syncline (overturned)		*Cut 8 2-1/1-7 Template*
Anticline or syncline (arrow indicates plunge)		*Cut 8 2-1/1-7 Template*
Antiform or synform		*Cut 8 3-1/1-7 Template*
Glacial striae (direction of ice movement known, unknown) *Numbers indicate relative age, 1 being the oldest*		*2-1/1-7 Template* *Type 6 pt. Trade Gothic Light*
End moraine		.2 *Cut. 10* *Dot 25*
Minor moraines, washboard moraines, "annual" moraines, till ridges transverse to ice flow (irregular, straight)		.20 *Cut. 5* .15
Drumlins, drumlinoid ridges, crag and tail, furrows, flutings, gouges, till ridges; parallel with ice flow (direction of ice movement known, unknown) *(On large scale map)* *When necessary to distinguish between drumlins and crag and tail hills use for drumlins and for crag and tails*		*2-1/1-7 Template*
Pingo or palsen		*3-1/1-7 Template*
Esker (direction of flow known, unknown)		*Stock 89, 90. or special E Template* *(Ask supervisor)*

Arrow heads should not be patched on overlay if symbol lines are scribed

Esker (continuous, discontinuous)		*Stock 89, 90. or special E Template (Ask supervisor)* 
Raised beaches		*Circle 9 Geom I Template Cut 5*
Limit of marine or lacustrine submergence (well marked, assumed)		*2-1/1-7 Template*
Dunes		*4-1/1-7 Template*
Area of sand dunes		*Stock 49*
Buried valley		
Abandoned river channel, spillway, ice-marginal channels, rill patterns etc.		
Landslide scar		*Follow author's design Cut. 5*
Escarpment		*As on author's manuscript Cut. 5*
Fossil locality	Ⓕ	*Stock 370*
Locality where age has been determined, in millions of years	Ⓐ 1400	*Stock 370* 8pt. Helvetica Roman
Location of measured section		
Gravel pit (active, abandoned)		*3-1/1-7 Template*
Rock dump or tailings		
Quarry or mine; rock trench and stripped area *Quarry or mine (abandoned)*		*3-1/1-7 Template*
Mine or mineral prospect (lead, zinc)	Pb Zn	*3-1/1-7 Template* letters 7 or 8pt. Helvetica Bold
Mineral prospect; mineral occurrence (manganese)	3 Mn	*3-1/1-7 Template* 3 8pt. Century Schoolbook Roman Mn 7 or 8pt. Helvetica Bold

Placer deposit		*3-1/1-7 Template*
Salt spring		*Circle 9 Geom I Template* *2-1/1-7 Template* *Type 7pt. Trade Gothic Light It.*
Hot spring		*Circle 9 Geom I Template* *2-1/1-7 Template* *Type 7pt. Trade Gothic Light It.*
Mineral isograd *Other alternatives when more than one*		*4-1/1-7 Template* *Circle10 and Triangle 10 Geom I Template*
Shaft, raise, winze *Shaft (abandoned)*		*3-1/1-7 and CREX Template Row B*
Trench *Open cut; axial*		*3-1/1-7 Template*
Adit or tunnel *Adit or tunnel (caved)*		*3-1/1-7 Template*
Borehole	● BH ● BH2	*Circle 2 GEOM 2 Template* *Type 7pt. Trade Gothic Light*
Diamond-drill hole *(Surface projection of geology inferred)*	● DDH 	*Cut 5*  *.10* *Circle 2 GEOM 2 Template* *Type 7pt. Trade Gothic Light*
Sinkhole	○ SH	*Circle 2 GEOM 2 Template* *Type 7pt. Trade Gothic Light*
Gossan	G G G	*Stock 102 or larger* *Craftint 261* *Geological boundary as on author's manuscript*
Trace of coal seam		*Cut. 25* *.04* *.4*
Schistosity, gneissosity, cleavage, foliation, general trend		*Cut 5* *.03* *2-1/1-7 Template*
Gneissosity, cleavage, foliation (horizontal, inclined, vertical, dip unknown)		*2-1/1-7 Template*

Show of oil and gas (abandoned)		*Stock 155 or 156*
Show of gas (abandoned)		*Stock 155 or 156*
Show of oil (abandoned)		*Stock 155 or 156*
Gas producer		*Stock 155 or 156*
Oil producer		*Stock 155 or 156*
Location of drilling		*Stock 155 or 156*
Dry (abandoned)		*Stock 155 or 156*
Water source or disposal		*Stock 155 or 156*
Status unknown or drilled for purposes other than gas or oil		*Stock 155 or 156*

The following abbreviations are approved:

Actinolite	ak	Epidote	ep	Plagioclase	pg
Aegirine	ae	Feldspar	fel	Pyrite	py
Albite	ab	Feldspathic dunite	fd	Pyrochlore	pc
Almandine	al	Fluorite	fl	Pyrolusite	pz
Alunite	at	Galena	gn	Pyroxene	pn
Amphibolite	am	Garnet	gt	Pyrrhotite	po
Anhydrite	ah	Glauconite	gk	Quartz	q
Andalusite	ad	Graphite	gf	Radioactive minerals	ra
Anthophyllite	ay	Gravel and sand	gs	Rhodochrosite	ro
Apatite	ap	Gypsum-outcrop or indication	gyp	Rutile	ru
Arsenopyrite	asp	Halite	na	Scapolite	sk
Asbestos	asb	Hematite	hem	Scorodite	so
Augite	aug	Hornblende	h	Serpentine	sup
Axinite	ax	Hypersthene	hy	Sericite	sc
Barite	ba	Illite	it	Scheelite	sh
Beryl	by	Ilmenite	il	Siderite	si
Biotite	bi	Iron-formation	i-f	Silica	sc
Bismuthinite	bs	Jarosite	jr	Sillimanite	sil
Bornite	bo	Kaolinite	kl	Spessartite	sn
Carnallite	km	Limestone	ls	Sphalerite	sp
Cassiterite	ks	Limonite	lm	Sphene	ti
Calcite	ca	Lepidolite	le	Spinel	sp
Cancrinite	cc	Leptochlorite	lc	Spodumene	spd
Cerrusite	cs	Magnetite	mag	Staurolite	st
Chalcedony	cn	Marcasite	ma	Stibnite	sb
Chalcopyrite	cp	Mica	mi	Stone (building)	B. st
Chlorite	ch	Microcline	mk	Sulphides	s
Chromite	cr	Molybdenite	mo	Sylvine	k
Cinnabar	hg	Monazite	mz	Talc	tk
Clinopyroxenite	cpy	Montmorillonite	mm	Tantalite-columbite	ta-cl
Cobaltite	cb	Muscovite	mu	Titanomagnetite	tm
Columbite	cl	Nacrite	nc	Tourmaline	tl
Cordierite	ct	Nepheline	ne	Tremolite	tr
Corundum	cor	Nontronite	nt	Topaz	to
Crocidolite	crd	Olivine	ov	Vanadinite	va
Datolite	da	Orthite	ot	Vermiculite	vm
Diallage	dl	Orthoclase	or	Vesuvianite	vs
Dickite	dt	Ozokerite	oz	Wolframite	w
Diamond	di	Pegmatite	p	Wollastonite	wo
Diopside	dp	Perovskite	pw	Zeolite	ze
Dolomite	dol	Phlogopite	pl	Zircon	zr

For elements, use chemical symbols e. g. copper . . . Cu

Symbols

The common symbols used by the Geological Survey should be employed so far as possible on any map manuscript submitted for publication. New symbols should be used only with the concurrence of the geological editor and draftsmen, and should be fully explained in the legend. It is important that symbols be as simple and conventional as possible, so that the public may become familiar with them without constant reference to the map-legend. Provincial survey departments or mining companies may employ a variety of symbols peculiar to more local conditions, but the maps of the Geological Survey cover all parts of Canada, and should be intelligible anywhere. New symbols, or variations from those illustrated, will only be used when unavoidable.

The sequence of symbols in a map-legend should in general be that listed on p. 11 f. f.

General Notes

In preparing a map-legend, such as illustrated on a preceding page, great care should be taken to adhere not only to the prescribed form and sequence, but also to details such as capitalization and punctuation. The form of the descriptive matter should also be noted, including the effective use of the colon, semicolon, and comma.

Map-legends are constructed, theoretically, from the bottom up, commencing with the oldest formations, just as, in describing these formations in a report, the geologist begins with the oldest. This sequence, from oldest to youngest, should be observed throughout. Thus, use ARCHEAN AND PROTEROZOIC, PERMIAN (?) OR TRIASSIC, and UPPER JURASSIC OR LOWER CRETACEOUS.

STRUCTURE SECTIONS

Structure sections form a valuable addition to many maps, particularly where the stratigraphic succession is economically important.

Map-units should be similarly coloured and identified on both map and section.

COLUMNAR SECTIONS

Columnar sections make a useful adjunct to geological maps in areas where the stratigraphic succession, thickness, and lithological characters of the separate formations are known with some degree of accuracy, and where the positions of key horizons or beds can be indicated. Features such as coal seams, ash beds, type fossil zones, identifiable sandstone members, etc., may be shown on these columnar sections.

Columnar sections may be constructed on any suitable vertical scale, depending on the detail required to be shown. Normally the separate formations are coloured or patterned to correspond with the scheme adopted in the map-legend; to the left of the column is printed the name of each formation, its thickness in feet, and, in some instances, its general character, such as marine, volcanic, etc.; to the right of the column are specific references to significant horizon markers such as coal seams, fossil guides, lithological units, unconformities, etc.

Where more than one section is included in a figure, care should be taken to show the orientation. In general east or north should be on the right hand side; distance between sections should be indicated.

In preparing columnar sections it is well to consult maps on which they appear as a guide to scale and proper construction.

DESCRIPTIVE NOTES

Descriptive notes, commonly referred to as marginal notes, afford the geologist an opportunity of conveying information additional to that supplied elsewhere on the map, and which he considers will be of assistance to anyone making use of the map under circumstances where no more complete account is available.

It should be clearly borne in mind that descriptive notes are a part of the map-sheet and cannot be viewed without, at the same time, seeing the map itself and the legend. They should therefore avoid duplicating any information given or implicit in the legend, or that can be seen by inspection of the map. The following is a common opening sentence, "The Aldridge (1), consisting of argillaceous quartzite and argillite, is the oldest formation known in the area and occurs as a broad band running in a northeasterly direction across the centre of the area". This sentence conveys no information not already apparent and is entirely unnecessary.

Descriptive notes should in no sense be prepared in the form of a report. They are, as their name implies, a series of disconnected data, given as tersely and concisely as possible, designed to assist in interpreting the geology as mapped. They may be applied entirely or in part to any phase or phases of the geology – lithological, structural, or economic.

Descriptive notes for preliminary maps should not exceed 1250 words. This should not, however, be considered as the most desirable length; indeed, the goal should be to give the essential information in as few words as possible. Similarly, 3000 words can be printed on a final map but fewer are preferred if they will suffice.

Current publication policy of the Geological Survey is to limit the use of marginal notes and to include most maps with a short Paper Series report.

JOINT AUTHORSHIP AND ACKNOWLEDGMENT OF CREDIT FOR CONTRIBUTIONS TO REPORTS

In recent years there has been a tendency for more than one person to be connected, in one way or another, with the preparation of a report. It is becoming increasingly important to know precisely who wrote what. Acknowledgment of scientific assistance is not merely a matter of giving due credit but is an assignment of responsibility for accuracy and veracity of statements that should not be assumed by the author.

The following points should be observed.

1. Full Joint Authorship. Each author named should have made a major and equitable contribution both to the research and to the writing of the report.

   Cited: Jones, J.G. and Smith, L.B.
   1968: Geology of Baffin Island; Geol. Surv. Can., Mem. 487.

2. Contributed Authorship. The senior author is normally the leader of a project and has had a major responsibility of assembling the text. In order cases senior authorship must be decided by mutual agreement.

   a) There are cases where there is only one senior author but where the contributions of colleagues warrants inclusion in the title. The following method of citation is suggested:

      A.W. Smith; and J.G. Jones, W.A. Black and J.M. White

   b) A second case would be research reports contributing to the major topic of the report but forming a relatively minor part of the whole. An example would be a chapter on Pleistocene Geology in a memoir. The author would be wholly responsible for the preparation of the chapter in full consultation with the author(s) of the major topic. His name would appear on the chapter or section concerned but not form part of the title of the report.

      Cited: Taylor, J.G.
      1968: Geochemistry of the Adipose batholith; in Geology of Baffin Island, by J.G. Jones and L.B. Smith; Geol. Surv. Can., Mem. 487.

3. Supporting Contributions. Provided by scientific staff to support the main research project but which may comprise data or interpreted results of usable value in a broader context. Would include age determinations, rock or mineral analyses, fossil determinations, paleomagnetic contributions etc. Where possible this information should be grouped together in tabular form or as an appendix, preferably as a separate item at the end of the report under the name of the scientist(s) responsible so that it may be cited in other publications as under (2). References in the text of the report can then be made to the appendix.

Where this is not possible and where such contributions are scattered through the text then there should be proper acknowledgment each time – e. g. "These rocks were studied by E. J. Jones of the Geological Survey who reported as follows: . . . "

Tables of analytical or other data should clearly state where the work was done, with the analyst's name (if applicable) and the method used.

4. Critical Reader. Critical reading, done conscientiously, takes time and current trends in professional appraisal demand that such service be recognized and readily identified. Depending on circumstances credit can be given as a footnote or incorporated in the acknowledgments. In letterpress publications the names of the scientific editor, editor and critical reader of the report are listed together, usually on a page preceding the inside title page.

The critical reader should be alive to the need for due and proper acknowledgment for those parts of the report that are not the work of the author; he is at the working level of the participants and is in a good position to oil the workings of co-operative research.

The following points should be considered by the critical reader:

i) Do the results presented warrant publication in the form presented or would a different mode of publication be more suitable?

ii) Does the report comprise only confirmatory data and if so is it worth publishing?

iii) Is the report too long? Is it padded? Are all the tables and figures essential? Could some be combined? Should some of the data be made available separately – e. g. as an Open File item?

iv) Does the manuscript need to be rewritten before it can be evaluated?

v) Should the manuscript be drastically condensed and published as a note in a journal or in the Geological Survey's Report of Activities series?

vi) Is the title meaningful?

vii) Does the abstract clearly present the essentials of the new information and does it meet the requirements outlined on p. 27?

viii) Are results clearly distinguishable from inferences?

ix) Does your experience allow you to judge all aspects of the study or are there sections that should be read by someone else? If so, you should suggest the name or names of alternative readers to your Division Chief.

5. General Acknowledgments. These should be made collectively at one place in the report. Assistance rendered by persons not connected with the Geological Survey should be acknowledged with suitable expressions of restrained gratitude. As a convention, members of the Survey (or Department) are not thanked but where appropriate their contribution should be recorded in such matters as photographs of some particularly useful or ingenious piece of laboratory support.

It is unnecessary to mention general assistance by other members of the Survey; every investigation or report is assumed to have had the benefit of suggestions and discussion of the author's colleagues as a part of their routine work and such contributions need not be noted unless they have been of major proportions.

METRICATION

In 1970 the Parliament of Canada unanimously endorsed a proposal to adopt the most up-to-date metric system of measurement, the Système International or SI. For some time the Geological Survey has been using a natural scale for geological maps and in 1975 began the same procedure for its aeromagnetic series. New and revised topographic maps issued by Surveys and Mapping Branch will use metric contours. There will undoubtedly be situations in which the use of feet and miles will be necessary to meet a special requirement. For example to convert the volume of borehole data now available to the metric system would be a formidable task and it may be that for some time the results of the manipulation of such data will continue to be expressed in feet etc.

Rules for Writing Symbols

One of the main advantages of SI is that there is a unique symbol for each unit. Throughout this text, the word "symbol" has been used to refer to the signs used to represent the various units, for that is what they are: symbols not abbreviations; and they remain the same in all languages. Symbols and not abbreviations should always be used. This makes for greater clarity and reduces the chance of mistakes. But there are basic rules for the use of these symbols:

1. The symbols are always printed in roman (upright) type, irrespective of the type used in the rest of the text. The only exception to this is in the use of the symbol for litre, where the use of the lower case l (ell) may be confused with the number 1 (one). In this case, "litre" should be written out in full, or the script ℓ is used. There is no problem with such symbols as cl (centilitre) or ml (millilitre).

2. Symbols are never pluralized: 1 kg, 45 kg (not 45 kgs).

3. A full stop after a symbol is not used, except when the symbol occurs at the end of a sentence.

4. When symbols consist of letters, there is always a full space between the quantity and the symbols: e. g. 45 kg (not 45kg).
   However, when the first character of a symbol is not a letter, no space is left: e. g. $32^{o}C$ (not 32 ^{o}C or 32^{o} C); or $42^{o}12'45"$ (not 42 ^{o} 12' 45").

5. All symbols are written in lower case, except when the unit is derived from a proper name. Examples: m for metre; s for second; but A for ampere, Wb for weber, N for newton, W for watt. Prefixes are printed roman (upright) type without spacing between the prefix and the unit symbol: e. g. km is the symbol for kilometre.

6. Symbols for SI units should always be used and unit names not written out (except in the case of the litre): e. g. 16 mm^2 and not 16 square millimetres.

7. A practice in some countries is to use a comma as a decimal marker, while the practice in North America, the United Kingdom and some other countries is – at this time – to use a period (or dot) as the decimal marker. Further, in some countries using the decimal comma, a dot is frequently used to divide long numbers into groups of three. Because of these differing practices, spaces must be used instead of commas to separate long lines of digits into easily-readable blocks of three digits with respect to the decimal marker: e. g. 32 453. 2460725. There is no space in a four-digit number in text, but leave the space in tables or columns of figures. e. g. The beds are from 2016 to 10 425 feet thick.

8. Where a decimal fraction of a unit is used, a zero should always be placed before the decimal marker: e. g. 0. 45 kg (not . 45 kg). This practice draws attention to the decimal marker, and helps avoid errors of scale.

9. Beware of the confusion which may arise with the word "tonne" (1000 kg). When this occurs in French text of Canadian origin, the meaning may be a "ton of 2000 pounds".

Conversion

For convenience conversion factors for some of the most common units are given. In reports published by the Geological Survey if metric measurements are used equivalents in the foot-pound-second system should be given in brackets until such time as the public becomes more familiar with the SI system. An exception would be the use of millimetres in describing gram size where continual usage has made the measurement readily understandable.

In giving equivalents the degree of precision of the original measurement should be considered. A thickness expressed as "one to two feet" should not be expressed as 0. 3048 to 0. 6096 metres but rather as 1/3 to 2/3 or 0. 3 to 0. 6 metres.

1 inch = 2. 54 cm
1 yard = 0. 914401 m
1 mile = 1. 609347 km
1 pint = 0. 473167 litre
1 quart = 0. 946332 litre
1 gallon = 3. 785329 litres
1 sq. inch = 6. 4516 cm^2
1 sq. foot = 9. 29034 dm^2
1 sq. yard = 0. 836131 m^2
1 acre = 0. 40469 ha (hectare)
1 sq. mile = 2. 59 km^2
1 cubic inch = 16. 3872 cm^3
1 cubic foot = 0. 028317 m^3
1 cubic yard = 0. 76456 m^3
1 ounce (avoir.) = 28. 350 g
1 pound (avoir.) = 453. 592 g

1 ton (short) = 0. 907 t (tonne)
1 cm = 0. 3937 inch
1 m = 3. 281 feet
1 km = 0. 6214 mile
1 litre = 0. 880 quart
1 litre = 0. 220 gallon
1 cm^2 = 0. 155 sq. inch
1 m^2 = 10. 76 sq. feet
1 ha (hectare) = 2. 471 acres
1 km^2 = 0. 386 sq. mile
1 cm^3 = 0. 061 cubic inch
1 dm^3 = 0. 035 cubic feet
1 m^3 = 1. 308 cubic yards
1 g = 0. 035 ounces (avoir.)
1 kg = 2. 205 pounds (avoir.)
1 t (tonne) = 1. 102 tons (short)

The SI Units

SI Base Units

There are seven base units in SI: length, mass, time, electric current, thermodynamic temperature, the amount of substance and luminous intensity. These are the "base units." Other units have evolved to complete the metric system.

Quantity	Name of Unit	Symbol
length	metre	m
mass	kilogram	kg
time	second	s
electric current	ampere	A
thermodynamic temperature	kelvin	K
amount of substance	mole	mol
luminous intensity	candela	cd

Some Derived Units

There are also two "supplementary" units in SI; the unit of plane angle, the *radian,* and the unit of solid angle, the *steradian,* which have the symbols rad and sr, respectively.

All of the other units used in SI are called "derived units" and are expressed algebraically in terms of base units and/or supplementary units. For some of the derived SI units, special names and symbols exist, such as:

Quantity	Name	Symbol	Equivalent to
Force	newton	N	$kg \cdot m/s^2$
Pressure	pascal	Pa	N/m^2
Work, energy, quantity of heat	joule	J	N•m
Power, heat flow rate	watt	W	J/s
Quantity of electricity	coulomb	C	A•s
Electric potential	volt	V	W/A
Electric resistance	ohm	Ω	V/A
Electric capacitance	farad	F	C/V
Magnetic flux	weber	Wb	V•s
Inductance	henry	H	Wb/A
Magnetic flux density	tesla	T	Wb/m^2

Some Units for Use With SI

Certain other units outside SI are also recognized because of their *practical importance:*

Quantity	Name	Symbol	Value in SI units
Time	minute	min	1 min = 60 s
	hour	h	1 h = 3600 s
	day	d	1 d = 86 400 s
Plane Angle	degree	—°	$1° = (\pi/180)$rad
	minute	—′	$1' = (\pi/10\,800)$rad
	second	—″	$1'' = (\pi/648\,000)$rad
Volume	litre	l or ℓ	1ℓ = 1 dm^3
Temperature	degree Celsius*	°C	An interval of 1°C = 1 K
			By definition 0°C = 273.13 K

*"Celsius" is used in SI to avoid confusion with "centigrade", sometimes associated with angular measurement. The Celsius temperature scale was named after Anders Celsius, a Swedish astronomer and Physician (1701-1744). Prior to 1948 the degree centigrade was used in the metric system to indicate a temperature interval of one kelvin or 1°C.

Some Common Prefixes

Multiples and divisions of base units, derived units and supplementary units may be expressed by adding a prefix. The prefix and the units are *always* written as one word, and are not separated by a space. The most commonly used prefixes are:

Prefix	Symbol	Means Multiply by	Or by
mega	M	1 000 000	10^6
kilo	k	1 000	10^3
hecto	h	100	10^2
deca	da	10	10
deci	d	0.1	10^{-1}
centi	c	0.01	10^{-2}
milli	m	0.001	10^{-3}
micro	μ	0.000001	10^{-6}

HOW TO WRITE A GEOLOGICAL REPORT

The author should review one or more publications most nearly analogous to the report he is about to prepare, as it is desirable for Geological Survey reports to follow more or less uniform plans. This makes it easier for the author to present his material in an orderly sequence and for the user to find particular information quickly. Any plan that diverges from custom or convention in the arrangement of the subject matter of a report should have substantial reasons in its support, and, preferably, should be discussed with the report editor before the actual writing is undertaken.

The normal sequence of subject matter in a final report (memoir or bulletin) is as follows:

1. Title page.
2. Preface.
3. Contents.
4. Abstract.
5. Successive chapters, dealing with a normal sequence of subjects related to the map-area.
6. Bibliography.
7. Appendix
8. Index.

With the development of computerized information retrieval systems based on word and subject concepts, the need for explicit titles and headings which lend themselves to cross-referencing becomes of considerable importance. The title of the report should clearly state the nature and major discipline, the location and whenever possible a meaningful NTS reference number. Chapter headings and subheadings should cover all major concepts in the report. Computer indexes are not able to analyze the report in detail and must rely on the author for an abstract and headings within the report that provide a ready access to the main topics of the subject matter of the report. When a concept authority list appropriate for Geological Survey use has been compiled the abstract will be supplemented by key words to further assist in computerized data retrieval methods.

PREFACE

A preface by the Director is included in most Geological Survey memoirs and bulletins. Although the writing of this preface is not the responsibility of the author, a rough draft should be submitted with his manuscript.

A principal purpose of the preface is to indicate how the report helps meet departmental objectives and to indicate briefly the nature of the report. It should never be more than 200 words. The preface is not an abstract. It also serves to give official approval to the report.

ABSTRACT

Abstracts should be submitted with all Geological Survey manuscripts. The abstract should be a non-critical informative condensation of the essential parts of the report and not a mere expansion of the table of contents. It should be suitable for publication apart from the paper and should refer to all information suitable for indexing. The abstract should be written in complete sentences, as simply and concisely as possible with a maximum length of 250 words. A translation into the other official language will be prepared under Departmental auspices and published with the report. Authors who are bilingual are encouraged to submit their abstract in both French and English to avoid possible misinterpretation by the translators. The following points should be observed:

1. State purpose, nature and scope of the paper. Do not repeat any information contained in the title, but amplify title if necessary.

2. Indicate treatment of the subject, i.e., brief, exhaustive, theoretical, etc.

3. State methods used (laboratory, field techniques); give basic principals of new methods or techniques, their uses and qualities, their degree of accuracy. Note new apparatus and its intended use.

4. Summarize major points and significant results of the paper, grouping facts systematically.

   Include:

   New or verified data of permanent value.
   New minerals, fossils, etc., new classification, new distribution records.
   New theories, new interpretations, evaluations, if possible; if not, reference to them.
   Locate local stratigraphic names in the general geological column.

   Omit:

   Additions, corrections, or any information not contained in original published paper.
   References, figures, tables. They are not intelligible when separated from the paper.
   Detailed descriptions.
   Long list of names.

5. Summarize conclusions and applications; show correlation with earlier work (if important).

6. Note special features (if any).

CONTENTS AND HEADINGS

The 'Contents' page (or pages) lists verbatim the principal headings and subheadings of the report and concludes with a list of illustrations. As most memoirs and bulletins carry an index, the table of contents should not be long, but should include all principal headings peculiar to each chapter, although not necessarily all the subheadings. The illustrations are listed in the following order – maps, figures and plates (if included). Lengthy captions should be precised in the contents listing.

Rarely if ever is a successful book or report written from the first chapter through to the last. Almost all professional writers organize their work thoroughly before commencing the actual task of writing. A framework is built by listing main subjects or chapter headings, and then breaking them down into subheadings; often the latter are further broken down. Under each heading or subheading a short note is made as to the material to be covered, sometimes stating the number of words that should be devoted to it depending upon its importance to the work as a whole.

The relative value of the headings, subheadings, etc., given on the Contents page is indicated by successive indentations, and all headings of like indentation will appear throughout the report in the same style and weight of type. Subheadings not listed on the table of contents will be indicated by type of successively lesser weight. These distinctions should be indicated by the author on the manuscript through the use of capitals and lower case letters, and one, two or more underlinings, as illustrated in the following sequence:

CHAPTER IV

STRUCTURE OF THE PRECAMBRIAN ROCKS

DESCRIPTION

Structural Elements

Stratiform Foliation

On the Contents page these various headings would be entered as follows:

Careful attention to the details of the Contents pages and to the representation of corresponding headings throughout the report will help to preserve order in the manuscript, will facilitate the work of editing, and will assist in preventing misrepresentation of subject headings in the published report.

Titles to illustrations as given in the table of contents are commonly briefer than those appearing with the illustrations but long enough to identify the subject clearly. The method of arranging these titles on the Contents pages is as follows:

Illustrations

In preparing such a list of illustrations it is important to follow the capitalization, punctuation, and indentations shown above in any manuscript submitted.

SUCCESSIVE CHAPTERS

The subject matter of a report is divided into chapters. These may be formally designated by chapter numbers or they may be simply major headings of the subject matter. They normally deal with a conventional sequence of subjects comprising (1) Introduction, (2) General Geology, and other chapters on subjects such as Physical Features, Stratigraphy, Metamorphism, Economic Geology. In some reports it may be appropriate to treat two or more of these headings in a single chapter. Most memoirs fall readily into such a plan. Bulletins, on the other hand, are diverse in subject, complexity, and length and may not conform to any existing plan. Logical arrangement of their subject matter demands care and thought but time spent in planning will be amply repaid in ease of writing and effectiveness of the completed report.

When ever possible authors should avoid internal cross-references by page number. For typeset reports this requires insertion of page reference at page proof, after the type is set, similarly with Geological Survey papers it requires addition after the report is finally typed. Authors should consider alternative means such as "as already stated in the section on the petrology of the batholith" as a welcome change and to ease production and publication.

(1) Introduction

The introductory chapter serves to define the position and size of the area under discussion, and means of access to it and conditions of travel in it; to indicate the significance of the area from an industrial or mining standpoint, and the scope and period of the present investigation; to acknowledge assistance received; to summarize the physical features, glaciation, and similar subjects unless any of them requires more extended treatment in a separate chapter. This

chapter is normally brief, except where special emphasis is required on one or more of such topics as means of access, drainage details, mining history, previous geological work, etc. Where a discussion of physiographic features becomes an important and lengthy contribution, it is best to reserve this for a second chapter before continuing with an account of the geology of the area.

(2) General Geology

The chapter on general geology is normally the most significant in the memoir, the one of most permanent interest and value, and the one that the accompanying geological map is designed chiefly to illustrate. Normally it is divided into three principal parts (a) General Statement, (b) Table of Formations, and (c) Description of Formations.

a) General Statement. This is normally brief, though in particular instances it may be expanded to advantage. Its principal purpose is twofold: first, to outline the regional geological setting of the map-area; second to present in summary a picture of the local geology, with special emphasis on discoveries of outstanding interest. Details should be avoided and conclusions given without supporting evidence.

The General Statement need not be indicated by a heading either in the text or the contents, as appearing under the heading General Geology, its purpose is obvious.

b) Table of Formations. Few features in the report require greater attention to detail than the Table of Formations, as few pages will be referred to more frequently for a tabular summary of the geology of the area. All rocks, whether mappable or not, should be included, and arranged in their assumed stratigraphic positions. The nature of the contacts between successive rock units should be indicated, where possible, by such terms as unconformity, disconformity, intrusive contact, gradational contact, relations unknown etc. Four columns are commonly employed: one for era, one for period or epoch, one for the name of the formation, and one for lithology. Where thicknesses are known or have been estimated, these can be shown in the column containing the formation names.

In preparing the Table of Formations the exact form, as shown in other recent memoirs, should be followed, including use of capitals, capitalization, punctuation, and indentations. The following hypothetical example may be used as an illustration.

c) Description of Formations. Formations[1] are described in order from oldest to youngest, and generally in the order appearing on the map-legend and Table of Formations. Sometimes, however, the sedimentary and volcanic rocks are described first, and the intrusive rocks are taken up in

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[1] The word 'formation' as used here and in the Table of Formations is employed in a general sense to include rocks of all types, whether sedimentary, volcanic intrusive, or metamorphic, which together or separately constitute a map-unit. As such it must be distinguished from the word 'formation' as more properly employed to designate a lithological map-unit of sedimentary or volcanic origin.

Table of Formations

Era	Period or epoch	Formation and thickness (feet)	Lithology
Mesozoic	Upper Jurassic or Lower Cretaceous	Coast intrusions	Granodiorite, quartz diorite; minor syenite and granite
		Intrusive contact	
		Eldorado Group 8 500	Mainly sandstone and shale; some conglomerate (fossiliferous)
	Unconformity		
	Upper Triassic	Tyaughton Group 6 500±	Fossiliferous dark grey limestone; quartzitic and argillaceous beds; intercalated volcanic rocks
Unconformity			
Paleozoic	Permian(?)	Fergusson Group 10 000+	Crystalline limestone, chert, slate; sheared andesitic lavas (greenstones)

order on succeeding pages. This is common practice where the positions of the intrusions cannot be allocated with confidence in the geological succession, and the same separate arrangement is used on a map-legend.

In describing the rocks of the successive units, it is considered good practice to follow the same plan with each. This has not only the advantage of simplifying the plan of this important part of the report, preventing unnecessary repetition and reminding the author of features that he might otherwise neglect to include, but serves to familiarize the reader with the sequence and contents of our memoirs. The sequence of information in the descriptive account of any 'formation' was prescribed many years ago when the series of Memoirs was initiated, and has been followed, with some variations, in most of the memoirs to date. The plan has much to recommend it, and any radical departure from the plan should be discussed with the report editor. The sequence may be outlined as follows:

(i) Origin of name of formation, and location of type section, if introduced for the first time.

(ii) Distribution of formation, thickness, etc.

(iii) Lithology, including, first, megascopic description, and second, petrographic account.

(iv) Structural relations, normally in two parts:
  (a) internal structural relations, having to do with folding and faulting within the formation, and details of any measured sections; and
  (b) external structural relations, dealing mainly with contact relations with other formations.

(v) Metamorphism, if of consequence.

(vi) Mode of origin.

(vii) Age.

(viii) Correlation.

So far as possible, this sequence of treatment should be maintained, although not all these separate headings may be required in the description of every 'formation'. Where descriptions are brief it may be convenient to combine some under single headings, as 'Structure', or 'Age and Correlation', or some may be omitted for lack of adequate information.

Bed by bed descriptions of sections form an important and necessary part of certain reports. Such described sections should be accurately and carefully prepared. Much editorial time has been wasted in the past in reorganizing rock-unit description and in eliminating errors in thickness totals. Each unit or bed should be described in a logical manner with consistent punctuation as follows: major rock type, modifying adjectives, colour, grain size; bedding, other structures; minor constituents; mineralogical, textural and other comments; weathering; relative abundance of fossils:

Unit	Description	Thickness in Feet	
		Unit	Total from base
	Medicine Formation (Silurian)		
8	Limestone, dolomitic, dark grey, medium-grained; thick-bedded to massive; scattered white chert nodules; weathers brown; abundant *Stromatopora* and occasional solitary corals. GSC loc. 27124.	22	275
	Unit 8 forms a prominent small cliff at the top of the first talus slope above treeline.		

Examples of described sections are to be found in Memoir 366 and Bulletin 219. Identified fossils should be listed by name under the description of the bed where they were found and the registered GSC locality number should be given. Consideration should be given to placing this type of data on open file if large amounts are involved. This should be discussed with the Division Chief and the Chief Scientific Editor.

All proposed new names for rock units must conform to approved principles of stratigraphic nomenclature (*see* Appendix I, and II).

BIBLIOGRAPHY

The bibliography or its equivalent is placed at the end of the report. It may carry the title 'References', 'Selected Bibliography', or 'Bibliography', depending on its nature.

The term References is used when the author restricts his list to publications referred to in the text.

The term Selected Bibliography is used when the author adds to his references the main additional publications relating to the area or problems.

The term Bibliography is used where the author has attempted to list all references bearing on the subject, in some cases even indirectly.

The accuracy of references is the responsibility of the author. He should exercise the greatest care with regard to the spelling and initials of the author's name, the title of the publication, the source of the publication, and the date of printing, as these are details that cannot ordinarily be checked by the report editors. The author should therefore remember that the reader is apt to regard an inaccurate or misquoted reference as symptomatic and dismiss an important and informative report as unreliable.

There are several methods of abbreviating titles in general use. The Geological Survey in general follows that employed by the Geological Society of America and the American Geological Institute, which is based on the U.S. Standards Institute System. A selection from this list will be found on p. 147 ff. A complete list of the 2926 titles currently abstracted by the A.G.I. is available in most earth science libraries.

1. Words are abbreviated in the same order as they appear in the original publication without omission except in the titles of government publications where names of departments or divisions may be omitted if accurate identification will still be assured.

2. Abbreviations, with the exception of J. (Journal) and Z. (Zeitschrift) should be of sufficient length to aid in the identification of the word.

3. Articles, prepositions, and conjunctions are omitted.

4. Single word titles are not abbreviated.

The following are examples of the correct form to be used in entering bibliographic references, and should be followed precisely as shown as regards capitalization, abbreviation, and punctuation. Italic type is not used in citing journal or serial titles.

Allan, J.A.
1923: Geology of Highwood-Elbow area, Alberta; Res. Counc., Alta., Rep. 49.

Allen, B.R.
1932: A primary peridotite magma; Am. J. Sci., v. 35, p. 321-344.

1946: Bird River chromite deposits, Manitoba; Can. Inst. Min. Met., Trans., v. 46, p. 154-182.

Anderson, A.L., and Jones, J.B.
1930: Endomorphism of the Idaho batholith; Bull. Geol. Soc. Am., v. 53, p. 376-400.

Berry, S.T.
1919: Upper Cretaceous floras of the Eastern Gulf Region in Tennessee; U.S. Geol. Surv., Prof. Paper 112.

Black, P.B.
1913a: Re-examination of hibschite; Am. Mineral., v. 27, p. 230.

1913b: Hydrogrossular, a new mineral of the garnet-hydro-garnet series; Roy. Soc. N. Z., Trans., v. 73, p. 99.

Brock, B.B.
1966: The Rift Valley craton; *in* the World Rift System, ed. T.N. Irvine; Geol. Surv. Can., Paper 66-14, p. 99-124.

Brown, John
1926: Revision of the Lower Cretaceous of the western Interior of Canada; Geol. Surv. Can., Paper 44-17, 14 p.

Campbell, A.
1940: Exploratory work at Stirling, Richmond County, N.S.; N.S. Dep. Mines, Ann. Rept. 1939, p. 110.

Collier, A.J., Cathcart, S.H., and Allan, A.
1922: Possibility of finding oil in laccolithic domes south of the Little Rocky Mountains, Montana; U.S. Geol. Surv., Bull. 736, pt. 2, p. 172.

Dawson, A.
1951: Contributions to the stratigraphy and paleontology of Skidegate Inlet, Queen Charlotte Islands, British Columbia; Roy. Soc. Can. Trans., ser. 3, sec. IV, v. 21, p. 157.

Dawson, G.M.
1885: Report on the region in the vicinity of the Bow and Belly Rivers; Geol. Surv. Can., Rep. Prog. 1882-83-84, pt. C.

The following method is employed in giving reference to publications throughout the text of a report. The author's name and (or) date of publication, with page reference if necessary, are placed in parentheses in the text of the report where the reference is inferred or given, as: 'it has been reported (McConnell, 1906) that these rocks...', or 'in his early report on this area, McConnell (1906, p. 27) stated that these rocks...'. The date given is, in each case, the date of publication and the title and other details of this report can be found in the bibliography under 'McConnell' for that year. It must be emphasized that the date given is the date of publication, not that in which the field work was done. For instance 1912 is the reference date for Sum. Rep. 1911. This method has the advantage that the reader learns both the name of the author referred to and the date of publication, facts that may be significant to him. Opinions of authors should always be given in the past tense; their opinion as stated at the time of writing may not be the same today. For instance, say 'McConnell believed (not believes) that these rocks...'.

The manner of referring to unpublished material depends on the type of report. The following classes are referred to in the text only:

(i) A paper not yet submitted for publication.

Smith, in an unpublished manuscript, has shown that the best results are obtained with a spacing of 6 mm.

(ii) A letter or other personal communication.

... but Jones (in a letter, June 1974) maintained that the base of the formation was the shale unit.

The following classes are normally referred to in the list of references:

(i) A typewritten paper deposited in a library or accessible file.

(ii) A manuscript that has been accepted for publication but which has not yet appeared in print.

Jones, J.A.
in press: Metamorphism along the Grenville Front; Can. J. Earth Sci.

Formal reference citations must not be made to official files or other sources to which the reader would not normally have access. Do not cite internal reports (for example paleontological reports) by internal reference numbers. The approved method for referring to such material is "Smith, in an unpublished report, states ...." or "The material was examined by Smith, who states...."

APPENDIX

An appendix is the appropriate place for detailed information that does not readily form part of the narrative sections of the report. Lengthy stratigraphic sections, locality lists, analysis reports, tables of numerical data, are examples of typical appendix material. Proper use by the author of appendices relieves the reader of much tedious detail that may only be needed for reference or as the basis for further research.

INDEX

The index is the responsibility of the author. He can be guided in his indexing by consulting indexes of published reports, especially those analogous to his own. Personal names, geographic names (where they have some special significance), names of mining companies, names of rocks and minerals, and names of geological structures and processes, are those most commonly included. Care should be taken to index a word only where the context indicates something of consequence about it. Personal names appearing in the bibliography do not, for example, need to be repeated in the index, nor would it be expected that such common words as volcanic rocks, granite, pyrite, hornblende, folds, faults, etc., should be referred to on every page where they appear. On the whole, however, it is perhaps better to err on the side of over-indexing than indexing too little.

ILLUSTRATIONS

Illustrations ordinarily comprise maps, and figures, and, as previously noted, are entered in this order on the Contents page at the beginning of the report.

Maps

It is most desirable that maps of the Preliminary Series should be distributed as soon as possible after the field work is completed. New cartographic shortcuts are being tried continually and field officers can do their part by keeping their preliminary maps as simple as possible.

Memoirs are generally accompanied by lithographed, multicoloured maps, which are placed in a pocket at the back of the report. Such maps have all the advantage that colour can give and that painstaking preparation by exceptionally skilled draughtsmen can provide. But even these great advantages can be nullified by attempts to crowd too much detail on the map. No colour band less that 1/40 inch wide can be shown, and symbols, which occupy essentially the same space on a final map as on a base map of twice the scale, must be greatly reduced in number if they are to be represented with equal clarity on the final map. If, after the geologist has prepared the manuscript, it is realized that he has included too many symbols it is customary for him to encircle with pencil those symbols that he elects to retain on the final, lithographed map.

Authors are responsible for ensuring that geographical names used in the text are shown on the manuscript map that is submitted for editing. Due to scale limitations, some base maps cannot include all approved names. If such names are essential for descriptive purposes, they will be added.

In Geological Survey reports illustrations of fossils or photomicrographs, usually composed of groups of individual photographs, are referred to as Plates. Other photographs may be referred to either as Plates or may be included with the line drawing and referred to as Figures. Do not mount figures.

Photographic Illustrations

Good photographic illustrations add to the interest of a report but with the possible exception of the frontispiece they should be included only on their geological merit. All photographs should be referred to specifically in the text and where appropriate, special features in the photographs should be designated by letter or symbol and described in the caption of the photograph. Simple designations may be made by the author by using 'letraset' symbols; more complicated annotations should be indicated on an overlay; these will be added to the print of the photograph by the Cartographic Unit after the report has been submitted.

Photographs, when submitted with a report manuscript, should be accompanied by a full title, by the negative number, and, if the photograph is not one by the author of the report, by acknowledgment to the person or organization responsible. These are best listed on a separate page and keyed to the photographs by number. Commonly, too, the date on which the picture was taken will be of interest. The same title in abbreviated form should appear in the table of contents at the beginning of the report.

The following points should be borne in mind when selecting photographic illustrations for the average report.

1. No uncatalogued photographs will be reproduced. Originals should be good photographically. Poor illustrations are no credit to a report however interesting or instructive the subject.

2. Only those illustrations should be selected that contribute materially to the subject matter of the report. All illustrations should be specifically referred to in the text and where possible geological contacts should be indicated on the actual picture.

3. Prints should be in good condition, without cracks or metal clip marks, as these are flaws that cannot be eradicated.

4. Titles, etc., should not be written on the back of an unmounted photograph, as this may result in an embossed effect on the face of the picture. The figure number or other means of identification should be lightly marked on the back with a soft pencil.

5. Fossil plates were formerly reproduced by a photogelatin or collotype process but in recent years in order to keep the costs of reports that include many plates from becoming prohibitive, the halftone process has been used. The results in most cases have been good. Dimensions are 23 cm X 18 cm.

Line Drawings

Although line drawings can be a valuable adjunct to a report, excessive drafting demands may delay publication and if a text is adequate or can be made adequate by rewriting, then duplication of the text by drawing should be avoided.

For the Report of Activities reports in the Paper series, all line drawings are required to be submitted in a form suitable for direct reproduction from the author's figures. For the Report of Activities publication all line drawings are required to be submitted in a form suitable for direct reproduction from the author's figures. The text and illustrations are sent to the printer as "camera ready" and are then reduced photographically 4: 3 to the final size for the book, $8\frac{1}{2}$" X 11". Figures, maps or line drawings should be submitted suitable for this degree of reduction. This greatly simplifies the assembly and layout process and greatly reduces the printing cost; i. e. full-page figure, with caption inside figure, should not exceed 9" X 11 5/8"; single column figures $4\frac{1}{2}$" X 11 5/8". For other Paper series reports authors are encouraged to submit neat figures that can be used without further drafting. They should be in ink and planned for spacing and size so that typewritten letters can be inserted for not more than 2: 1 reduction.

There are two general types of line drawings: (1) line-cuts and (2) lithographed figures. Line-cuts are black-line drawings useful for illustrations of page size or less, and can be printed on whatever paper is used in the report. Lithographed figures, on the other hand, can be reproduced in either black and white or in colour, but only on special paper different from that used for the text of the report. They must, therefore, either be tipped into a report, or be placed separately in a pocket at the back. Also, if they are larger than page size they must be folded to page size or less, involving extra labour costs regardless of where they are placed. Further, figures printed separately for insertion in the pocket of the report are more apt to be lost than illustrations incorporated in the body of the report. Consequently, figures should, where possible, be limited to page size or less, and simplified to the extent that they can be reproduced clearly as line-cuts. Lithographed figures should be reserved for the occasional illustration that demands considerable detail, and that, normally, cannot be reduced to page size. They are also necessary if any colour is required.

Perhaps the principal feature to bear in mind in preparing copy for figures, aside from the question of their necessity in a report, is that only the essential information should be shown. Omit all details not referred to in the text or that do not bear directly on the written account. If, for example, the author is describing the system of faults encountered at the surface and in several underground workings of a mining property, the drawing should not be cluttered with details of mine buildings, roads and trails, orebodies, or mine workings unrelated to the

fault pattern. If the vein system on this property also requires illustration, let this be done on a separate figure.

The directive arrow on a figure should be marked either true (astronomic) or magnetic north, preferably the former. In general a linear scale, such as '1 inch = 400 feet', or a natural scale, such as 1/4800, should be avoided and a bar scale used instead as it applies equally well whether the figure is enlarged or reduced from the original drawing.

Full titles should be prepared to accompany each figure. However, a separate list comprising full descriptions should always be furnished; a carbon copy of this list may be cut apart for attachment to the illustrations. Briefer titles may be used in the list of illustrations provided for the table of contents at the beginning of the report. Inasmuch as most figures are distributed through a report, the desired position for each illustration should be clearly indicated in the manuscript text.

If illustrations are reproduced without change from another publication, acknowledgment must be clearly made. The following should be noted:

after: possible redrafting but no change in information
modified: some change
adapted: radical changes

PALEONTOLOGY

Lists of fossils identified by members of the paleontological staff and outside consultants are sometimes included in Survey reports. Accuracy of these lists and any opinions on age and correlation arising out of such fossil determinations are the responsibility of the paleontologist who identified the fossils and who must be named in the text. His reports should be cited correctly and suitably acknowledged and he must be given an opportunity to check the appropriate parts of the manuscript before it is submitted to the geological editor, especially if some time has elapsed since the identifications were made.

Varying degrees of accuracy and probability of identification can be expressed in a fossil list. In order to provide some degree of uniformity the following usages should be followed where possible:

Leptaena cf. *L. rhomboidalis* (Wilckens) – Similar to *L. rhomoboidalis* and possibly conspecific with it.

Leptaena aff. *L. rhomboidalis* (Wilckens) – Closely related to *L. rhomboidalis* but possibly a different species.

Leptaena ? *concava* Hall – Genus in doubt, but identification at the species level considered certain.

Leptaena rhomboidalis ? or *L. rhomboidalis* (Wilckens) ? – Species in doubt, but generic determination believed to be correct.

? *Leptaena rhomboidalis* (Wilckens) or appropriate combination of preceding; such as ? *Leptaena* cf. *L. rhomboidalis* – Whole identification doubtful.

"Leptaena" concava, Leptaena "rhomboidalis," "Leptaena analoga" – Quoted names used in a very broad or probably incorrect sense.

Formal generic and specific names are italicized and should be underlined in typescript. Suprageneric and anglicized names are not italicized: "The genus *Spirifer* is in the family Spiriferidae which includes the true spirifers." Generic names may be species names and where such abbreviation follows a previous writing of the name in full under conditions that leave no ambiguity. Similarly, the name of the author should be stated at least once for all names cited in the text.

Systematic descriptions of new species must conform to accepted international standards and must include description, discussion, designation of a single name-bearing specimen, indication of any other material studied to establish a basis for the author's description of the species, stratigraphic and geographic distribution, and adequate illustration. Specimens should be referred to locality and specimen catalogues of the Geological Survey as: GSC locality 12345 and GSC No. 54321.

Aside from the formal requirements of systematic paleontology it is essential that full documentation be given for all fossil collections that are referred to in a geological report. Stratigraphic position as height above a known datum or recognizable contact should be given where possible, together with adequate descriptive geographic locality information, and GSC locality number when assigned. Similarly fossil material taken from boreholes should quote depths and accepted name and locality description for the hole.

A synonymy is appropriate and necessary for many systematic descriptions. A good synonymy, together with any new material described, is the basis of the immediate author's concept of the species. It should only contain citations personally verified by the author from original publications or specimens that are included within his interpretation of the species. Two forms of synonymy discussed by Schenk and McMasters[1], pp. 17-23 are recommended for use in Geological Survey publications.

Authors, critical readers and editors must all bear responsibility in ensuring that faunal and floral information is cited correctly and properly documented. Without such documentation it has little value, could be misleading and may reflect adversely on the author.

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[1]Schenk, E.T., and McMasters, J.H., 1956, Procedure in Taxonomy: Stanford Univ. Press.

SYMBOLS USED BY PROOFREADERS


Caret — left out, insert


Capital letters


Small capitals


Lower case

Italic

Bold face

Roman type


Wrong font

Period

Comma

Damaged

Space


Equal space between words


Delete


Delete space and close word


Delete letter and close up

Transposition

Run on

Extend or move over (left)


Apostrophe

Colon

Semicolon


Hyphen


Parentheses


Brackets

Dash


Insert letter

Quotations

Turn letter

Extend or move over (right)


Ligature


Leave as it is


Paragraph

Push down space


Push down lead

Insert words left out

Align letters

Question to author

CORRECTING PROOF

A copy of a report typed for offset reproduction by the Stenographic Pool is sent to the Departmental proofreading unit for checking against the original manuscript. Corrections are made where necessary. It is not usual to ask an author to check typed reports but in the case of a complicated text an author may wish to do so and copy will be provided on request.

Galley proofs of final reports are sent by printer to the Editorial Division, Department of Energy, Mines and Resources. They are checked against the author's manuscript and all typographical errors corrected. Corrected galley proofs are then sent to the author for final checking of subject matter. No textual changes may be made on the galley proof without reference to the Scientific Editor. Some minor changes may be made and it may be permissible to add a footnote in order to include reference to information not available when the report was submitted.

A second, later proof, the page proof, includes table of contents and line drawings and is sent to the author for preparation of the index. Changes should not be made in the page proofs. Any errors must be corrected without disturbing the spacing or number of letters in any given line.

Changes or alterations to printed proofs, other than printers errors, are charged to the Geological Survey and may considerably affect the estimated publication cost of a report. They also tend to reflect on the competence of the author.

AIDS IN WRITING

Previous editions of this book included a part devoted to most common errors in spelling, and use and misuse of words encountered in manuscript geological reports by the scientific editors of the Geological Survey.

Experience has shown that all too few authors have followed the suggestion made in earlier editions that they expand their knowledge of technical writing by consulting textbooks readily available in the Survey library. For this reason the 1968 revised edition contained sections on technical writing reproduced from the "Canadian Government Style Manual for Writers and Editors" which was published in 1962. The "Style Manual" was prepared by an interdepartmental committee and the resulting book was approved by the Canadian Government Specifications Board, a body consisting of the Deputy Ministers of most federal government departments.

In the interests of consistency a few alterations have been made but in general the text is reproduced directly from the original. Also included in the following section are parts on spelling and usage especially applicable to geological writing and adapted from earlier editions of this report.

Grammar

Correct grammar is essential in good writing. The reader's confidence will be quickly destroyed by grammatical errors and misspelled words. Language may move with the times but grammar is still the guide for combining words correctly to express thought. Writers should therefore always distinguish between the colloquial form and the simple grammatical sentence free from worn phrases and jargon.

These notes do not cover the comprehensive range of a complete book on grammar but are intended merely to draw attention to common pitfalls.

The Sentence

In composing a sentence, place the related parts as closely together as possible. The following examples show how poor construction can confuse the reader:

> A report of injustice to orphans in a weekly magazine was published today. (The words *in a weekly magazine* ought to follow *report* or, alternatively, *published.*)
>
> The continued construction of low-standard buildings is predicted to have a dertimental effect on a certain development by well-known architects.
>
> (The words *by well-known architects* ought to have been placed after *predicted* to make the meaning clear.)

Nouns

There are two kinds of nouns—common and proper. Common nouns may be concrete or abstract. The concrete noun refers to a tangible or physical object and is therefore the mainstay of the language; abstract nouns usually refer to a quality. Always prefer a concrete to an abstract noun. Avoid (a) nebulous abstract words such as *conditions, position* and *situation;* (b) using concrete words such as *matter* and *case* in an abstract sense; (c) using the word *thing* instead of a definite name for the subject.

The following sentence is an example of complete jargon:

> The position in regard to this whole thing is that active consideration cannot be given to it until present conditions change and the matter can be settled and the situation clarified in due course.

Contrived Words

A crop of contrived words has recently come into existence.

assessability	futurize
identicability	healthwise
performability	financialwise
substitutability	weatherwise (as an adverb)
definitize	liaise

These contrived words have little place in official writing, however common their use may be in conversation.

Collective Nouns

Collective nouns such as *cabinet, committee, board* and *commission* take their verb or pronoun in either the singular or plural, depending upon the meaning in the context. Use the plural when the action is taken by the individual members considered in their separate capacities. Use the singular when the group acts or thinks as a whole.

> The committee have discussed all aspects of the case and have not yet reached agreement.
> The committee approves unanimously and directs its subcommittee to take immediate action.

With the word *government* the singular form is usually preferred and is always correct. Remember, however, that whether singular or plural is used, the verb and pronoun must agree.

> The government takes a serious view of the strike, and will do its best to bring about a settlement.

Pronouns

Pronouns take the place of nouns. Use them freely rather than repeat the noun unnecessarily. Too often the word *such* is added to the repeated noun to stress the particular reference.

> The department has adopted an automatic computer system and has taken special precautions against its misuse. (*not* against misuse of such a system.)

Former and Latter

The words *the former* and *the latter* are used instead of a pair of names, nouns, or groups, to avoid repetition. These terms should be used sparingly. They often confuse and irritate the reader, who must look back to be sure of the reference. If three or more persons or objects are referred to, the words *first* or *last* should be used. *Latter* is frequently and unnecessarily used for another pronoun, as in the following sentence:

> During the maneuvers the Commanding Officer set the recruits aside because of the latter's inexperience (their inexperience).

Note that had there been only one recruit, the use of *latter's* instead of *his* would have been necessary to avoid the implication that the officer was inexperienced.

Pronouns Taking Singular Verbs

(a) The word *none* when its meaning is strictly confined to *not one.*

> None was injured.

When, however, the intended meaning of the word is *not any,* the plural verb is used.

> None of the enquiries were answered.

(b) Words such as *either, neither, each* and *everyone* used as pronouns.

> Neither of the clerks is eligible.
> Everyone complains that his pay is inadequate.

The words *any* and *none* replace *either* and *neither* when the reference is to more than two.

The Relative Pronouns *that* and *which*

That in a sentence restricts or defines the meaning of the word or phrase that goes before it.

> The new logistics report that I prepared is now ready.

Which neither restricts nor defines but comments on or expands the meaning of the preceding phrase, usually by adding a new thought.

> The new logistics report, which is much longer than the first, is now being distributed.

Critics differ regarding the use of the relative pronouns *which* and *that.* The author will be clear and correct if he uses *that* to introduce the restrictive clause and *which* to introduce the nonrestrictive clause.

A test of whether the clause is restrictive or nonrestrictive is to omit it. If its omission changes the meaning or results in a statement that does not make sense or is incomplete, it is restrictive. If it can be omitted without changing the meaning, it is nonrestrictive.

The restrictive clause should not be set off by commas, even if it is decided, for reasons of euphony, clearness, or emphasis, that a *which* is better than a *that* to introduce it. A nonrestrictive clause generally is set off by commas, but there are sentences in which, because of context or because of other punctuation, the nonrestrictive clause is not set off by commas.

The misuse of *that* and *which* sometimes changes the meaning of a sentence. In the one "I return the reports, *which* I have read" the borrower implies that he has read them all. If he says "I return the reports *that* I have read," it means that he is returning only those reports that he has read.

That is used after a superlative.

> The best car that his company has ever produced.

In current usage *that* replaces *who* when the preceding phrase is general in its implication and does not refer specifically to a person or persons.

> The staff that works in that office.
> The official who works in that office.

A phrase such as *and which, and who,* or *and whose* requires a preceding relative pronoun to justify the *and:*

> This district, *which is* the largest and which contains the principal mine, is in the western part of the country.

The statement applies also when the conjunction *but* is used.

Where a restrictive clause is followed by an *and which* clause, both clauses take *which:*

> The district *which* is the largest, and which contains the principal mine....
> *not* The district *that* is the largest, and which....

The Relative Pronouns *who* and *whom*

The purist is as likely to be criticized for insisting on *whom* in awkward cases as the careless writer who rarely uses it in the proper place. There are exceptions but none, however, to the following:

Who is always used as subject; *whom* as object.

They are punishing people who we know are innocent.
They are punishing people whom we know.

Whom is used after every preposition, because prepositions take the objective case.

to whom
from whom

Whom is used after than; never use *than who.*

Pronouns Used as Objects

Put pronouns in the objective case when they are the objects of verbs or prepositions.

The quarrel is between you and me.
He directed my colleague and me. (*not* my colleague and I)
He sent a directive to my colleague and me.

Possessive Pronouns

Use the possessive forms *my, his, our, their,* when the present participle form of a verb is used as a noun; that is, words ending in *-ing.*

Count on my doing all in my power. (*not* count on me)
This will not affect his going. (*not* him going)

Verbs

Verbs may be transitive, denoting action, or intransitive, describing a state of being. The verb *to be* is a typical intransitive verb because it reflects back on its subject. It is also one of the important auxiliary verbs. It combines with almost all verbs, both transitive and intransitive, in their present and past participle forms. It is in dealing with the verb *to be* that most difficulties arise. A study of this verb and the verb *to have,* which also acts as an auxiliary, is commended to all who are interested in good grammar.

Transitive verbs always take the objective case. Intransitive verbs, including the verb *to be,* do not take the objective case.

It is we	*not*	It is us
It is they	*not*	It is them

The verb always agrees in number with the subject.

The crowd was excited.

Avoid the temptation to use the plural in longer sentences.

The crowd of spectators leaving the grounds was excited.

A singular verb is necessary when the subject is singular and the complement plural.

Our only guide was the Regulations.
but The Regulations were our only guide.

The word *what* takes a singular verb even if its complement is plural.

What we need is more books.

Words joined to the subject by *with, together with, including, as well as* and similar connectives do not affect the number of the verb.

The foreman, as well as the men, was leaving

If the word *number* is used collectively, the verb is singular.

The number of clerks is larger this year than last.

If individual units are referred to, the word *number* takes the plural verb.

A number of the clerks are taking summer courses.

The Split Infinitive

Split infinitives are unpleasant to the ear and jolt the reader by interrupting the action implied by the verb.

to frankly speak
to sincerely thank you
to once again recall the incident

At times, however, it is permissible for emphasis to split an infinitive when it would be awkward to put the adverb before or after the infinitive.

Auxiliary Verbs *shall* and *will*

To express the simple future, use the auxiliary *shall* in the first person and *will* in the second and third persons. These auxiliaries are reversed to express determination or command, as *I will, you* or *they shall.* This has always been the rule but the modern trend is to neglect the *shall* and the conditional form *should* and to use instead *will* and *would* in the first person, as in "I would like to do it" rather than "I should like to do it." Colloquialism is so strong an influence in the use of these auxiliaries that it is doubtful that fixed rules would help the writer. In the book, *The King's English,* Fowler devotes twenty pages to *shall* and *will.*

The Subjunctive

The subjunctive is rapidly falling into disuse. Its few remaining regular uses include:

(a) certain common expressions

come what may if need be

(b) legal or quasi-legal language

I move that the meeting be held in Quebec.

(c) conditional sentences where the hypothesis is not a fact

If I were you, I would write to the Commission today.
If he were here, I would tell him what I think of it.

(d) the expressions *as if* and *as though,* if the hypothesis is not accepted as true

He spoke of his proposal as if it were a complete solution of the difficulty.

(e) expressions of uncertainty, doubt or supposition

He wondered if he were right.

Active and Passive Voice

The consistent use of the active voice wherever possible makes for better and clearer writing. Make the initiator of the action, not the object acted upon, the subject of the sentence.

The Deputy Minister wrote a letter expressing disapproval.
not A letter was written by the Deputy Minister expressing disapproval.

Sometimes authors lose sight of the logical subject of a sentence. They begin a sentence with a clause containing an active verb and then ineptly introduce a new subject that leads to the use of a passive verb.

These vugs carry no gold and do not affect the tenor of the vein.
not These vugs carry no gold and the tenor of the vein *has not been affected by them.*

The workings were closed and could not be *examined.*
not The workings were closed and *examination of them* could not be *made.*

This series is made up largely of shale *but includes* much sandstone and limestone.
not This series is made up largely of shale *though* much sandstone and limestone *are included.*

Gerunds

A gerund is a verbal noun. When used as a subject or object, it must take the possessive (see Possessive Pronouns).

Women's having the vote reduces men's political power.
Delegation of its authority would be contingent upon the Commission's establishing procedures to be followed.

This rule is most often ignored when words are inserted between the preposition and the gerund.

This man has been refused employment because of his membership's in a trade union being terminated.

Writers with any sense of style do not allow themselves to fall into this trap. It can be avoided by rewriting.

Adverbs

Place adverbs so that there is no doubt which word or words they modify. They are usually placed immediately before or after verbs, and before adjectives and other adverbs that they modify. Take special care with the adverbs *only, merely, just, almost, ever, hardly, scarcely* and *nearly*. Depending on the meaning write:

Only the members of the committee may receive carbon copies.
or The members of the committee may receive only carbon copies.

Resist the temptation to use *very* too frequently. Use *quite* only in its proper sense (*completely*).

Related words and phrases should be kept together. Some writers misplace adverbs and adverbial phrases, especially the adverbs *only, principally, mainly, chiefly, alone, also,* and *too.* Note the following sentences:

Their presence can be determined *only* by tests.
not Their presence can *only* be determined by tests.

The sediments were derived *principally* from quartzite.
not The sediments were *principally* derived from quartzite.

Adjectives

A sentence without adjectives and qualifying adverbs is stronger than one overflowing with them.

His speech was boring.
not His speech was exceedingly long winded and very boring.
The Board worked efficiently.
not The Board did its utmost, and worked extremely well and very efficiently.

Do not combine an abstract noun with an adjective when an adjective alone would do.

The letter was confidential.
not The letter was of a confidential nature.
The building was ornamental.
not The building was of an ornamental character.

Conjunctions

When *that* is used as a conjunction, do not use it again after an interjected clause, however long the sentence may be.

The Director knew that, however great the travel difficulties to be overcome, (that) his assistant would be there. (Omit the second *that.*)

Use *while* only in its true sense of time.

You sign the letters while I get the stamps.

Use *and* instead of *while* in the following sentence:

At the conference the Deputy Minister gave a talk on estimates and (*not* while) the Assistant Deputy Minister spoke on administration.

Use *although* instead of *while* in the following:

Although (*not* while) the estimates do not provide for such an expenditure, the commitment must be met.

Do not use *also* as a conjunction after *and.*

The word *like* can be used as a conjunction in constructions such as "He ran like a deer" but it ought not to be used in the sense of *as* or *as if*.

They played the game as if they were determined to win.
not They played the game like they were determined to win.

The Articles *a* and *an*

The article *a* is used when the word following begins with a consonant sound. This includes the aspirated *h*, and the initial *y* and *w* sounds heard in *union* and *one*.

a minister — a hope
a uniform

The article *an* is used when the following word begins with a vowel or when a consonant initial has a vowel sound.

an object — an elevator
an M.D. — an NCO

Prepositions

Preposition means pre-position and in grammar this part of speech is intended to be placed before its object. However, a preposition can end a sentence as follows:

(a) When the spontaneity of the sentence would be lost by inverting the preposition.

He is the greatest statesman you have ever heard of.
not He is the greatest statesman of whom you have ever heard.

Officials worth talking to.
not Officials to whom it is worthwhile to talk.

That depends on what you write with.
not That depends on with what you write.

They read every book they could lay their hands on.
not They read every book on which they could lay their hands.

(b) When the preposition is part of a contrived verb. There are combinations of words that appear to end with a preposition but in reality they are verbal forms. The verb *put*, for instance, can have many meanings when what seems to be a preposition is attached to it, as *put about, put away, put back, put by, put down, put forward, put in, put off, put over, put through, put up* and *put up with.*

Do not confuse these verb forms with the superfluous preposition added to such expressions as *meet up with, visit with* and *study up on,* when the meaning is the same without the preposition.

Compound Prepositions

Use the conjunction *because* rather than the compound preposition *inasmuch as*. Another compound, *as to,* can be left out of most sentences without changing the meaning. Avoid such hybrids as *herewith, thereof, thereto, thereon* or *thereunder*.

Omission of Preposition

Do not omit the preposition

(a) when a different preposition is required in a series

He had a knowledge *of* and a keen interest *in* grammar.

(b) in expressions of time

He was appointed *on* October 1, 1958.

Appropriate Prepositions with Nouns, Verbs, Adjectives and Adverbs

Idiom calls for certain nouns, verbs, adjectives and adverbs to be followed by particular prepositions. Some of the more common appear below.

Abound in (a man abounding in natural ability)
Abound with (a faithful man shall abound with blessings)
Accord with (of one's own accord)
Account for
Acquiesce in
Adhere to
Adverse to
Agree on terms
Agree to a proposal
Agree with a person
Aim at
Alien to
Averse to (preferred to *from*)
Aware of
Begin by doing something
Begin from a point
Begin with an act
Benefits of the benefactor
Benefits to the beneficiary
Capable of
Capacity for
Circumstances (in the)
Compare with (to note points of resemblance and difference)
Compare to (only when used in the sense *to liken to*)
Concur in an opinion
Concur with a person
Conditions (under the)
Conform to (adapt one's self to)
Conform with (in harmony with)
Consist in (Definition: Memory consists in a present imagination of past incidents.)
Consist of (Material: The meal consisted of fish.)
Consistent with
Content one's self with
Content others by
Contrast (When contrast is used as a verb, it is followed by *with*. Either *to* or *with* may be used when the word *contrast* is used as a noun.)
Conversant with
Correspond to (resemble)
Correspond with (communicate)
Demand for a thing
Demand a thing from or of a person
Derive from

Differ, -ent, from (preferred to *than, to*)
Differ with a person in opinion
Disagree with a person
Embark in a business
Embark on a ship
Endowed with
Find a fault in a person or thing
Find fault with a person
Forbid (one) to do
Free from
Indifferent to
Infected with disease, bad qualities
Infested with insects, wolves, vermin
Initiative in (to take) (on one's own initiative)
Insensible to
Insight into
Invest in a business
Invest with an office, a garment
Join in a game
Join with some person or thing
Labor at a task
Labor for a person, for an end
Labor in a good cause
Labor under a disadvantage
Live by labor
Live for riches
Live on an income
Look after a business
Look at a thing
Look for a missing article
Look into a matter
Look over an account
Moment (on the spur of the)
Moment's notice (at a)
Oblivious of or to
Parallel with or to
Perpendicular to
Point at a thing
Point to a fact
Possessed of wealth
Possessed with an idea
Prefer one to the other
Prefer to do one thing rather than another
Preference for
Prevent from doing something
Proceed against a person
Proceed to an act not previously started
Proceed with an act already started
Prohibit from doing something
Provide against ill luck
Provide for an emergency
Provide one's self with something
Pursuant to (in pursuance of)
Ready for a journey
Ready to do something
Ready with a reply
Reckon with a person, a contingency
Reference to (preceded by *with,* not *in*)
Regard for a person (with regard to a subject)

Regard for one's own interest
Relief to suffering (to bring)
Relieve one from a duty
Relieve with a tint
Responsibility of deciding, of a position
Responsibility to a person for an action
Result from an event
Result in a failure
Result of an investigation
Right of doing
Right to do
Satisfaction in an improvement
Satisfied of a fact
Satisfied with a thing
Secure against attack
Secure from harm
Secure in a position
Tamper with
Tinker at
Unconscious of
Variance on certain topics (at)
Variance with a person (at)
Versed in
View of circumstances (in)
View to a purpose (with a)
Wary of a danger

PARALLEL CONSTRUCTION

The same construction should be used for elements that are parallel or co-ordinate in meaning. The following sentences illustrate the clumsy or misleading combinations that result from failure to observe this rule:

The district has a moderate climate, in winter not very cold and in summer *not excessively hot.*

not The district has a moderate climate, in winter not very cold and *not excessively hot* in summer.

These leaves range in length from 6 to 9 cm and *in width* from 4 to 7 cm.

not These leaves range in length from 6 to 9 cm and from 4 to 7 cm *in width.*

The boundary between the belts is fairly distinct in *some* places and indefinite *in others.*

not The boundary between the belts is fairly distinct in places and *in places* indefinite.

Words and Expressions Commonly Misused

Achieve implies successful effort; it is more than *get* or *reach.*

Advise, offer counsel to; *not* notify, inform, announce.

Affect, to influence, produce an effect on; *effect* (verb), to bring about, accomplish; (noun), result, consequence.

Agenda is plural—the singular is *agendum*—but has been accepted as a singular word and takes a singular verb.

Aggravate, to increase or intensify, make worse, *not* to annoy.

All (of). Omit the *of.*

All ready, adjective phrase: "When the whistle blew they were *all ready"; already,* adverb, means *by this time.*

All right, idiomatic. The form *alright* should never be used.

Allude, refer indirectly (to); *elude,* escape from.

Allusion, an indirect reference; *illusion,* unreal image or false impression.

Alternate(ly), by turns; *alternative(ly),* in a way that offers a choice (originally, between two things).

Amount, total; *number* (noun) refers to collective units. *Amount of money, number of errors.*

And/or. This form has no place in literary English (although permissible in summary statements, legal documents, questionnaires and similar forms). One of the words is usually sufficient.

Anticipate, forestall by prior action, foresee, *not* expect.

Anxious, properly used only when anxiety exists, otherwise use *eager.*

Appear suggests that which is visible. A person *appears* to be young but *seems* to be intelligent.

Appreciate, to place value on, ought to be used with a noun as object, e.g., "I appreciate your kindness," and never with a *that* clause.

Apt, having a tendency (to) because of the subject's character (*apt to take offence*); *liable* expresses probabilities that the subject will suffer something undesirable; *likely,* probable.

Around means on every side, enveloping, and should not be used to mean *about.*

Background means only ground beyond the chief objects of contemplation, or in a less prominent position. Do not use in phrases such as *educational background,* or to replace *explanation, history, origins,* etc.

Begin is preferable to *commence* except in legal usage.

Biannual means *once every two years.* The term *semiannual* denotes *twice each year.* So with *bimonthly* and *semimonthly,* and other similar terms.

Biennial (Bot.), existing for two years; springs from seed one year, and flowers and dies the next.

Billion. In British usage this word signifies a million million; in United States usage it signifies a *thousand million.* The use of thousand million avoids all ambiguity.

Blocs, combinations of parties, nations, groups; *blocks,* pieces of wood.

But is unnecessary after *doubt* and *help.*

Claim means only *lay claim to.* Do not use as substitute for *declare, maintain* or *charge.*

Cohort is a band of warriors (or persons). Do not use to refer to one person.

Commence. (See *Begin.*)

Compose, make up, constitute, (most frequently used in the passive: be composed of); *comprise,* (literally *embrace*), include, consist of. Note that the preposition *of* is included in the verb *comprise* but not in *compose.* A body comprises the elements of which it is composed; the elements do not comprise the whole.

Comprise implies inclusion of all parts of a whole; *include* implies that there may be other parts not mentioned. Compare "The Dominion of Canada then (1867) comprised the provinces of Ontario, Quebec, New Brunswick and Nova Scotia" and "The Dominion of Canada, as constituted in 1867, included the provinces of Ontario and Quebec."

Consensus means shared opinion, agreement in opinion; do not say *consensus of opinion;* use one or the other.

Consist of denotes the substance of which the material is made, and is a synonym for *composed of; consist in* defines the subject ("The work *consists in* addressing envelopes") and is a synonym for *have its being in.*

Contact. Say *get in touch with,* or *look up, find, meet.*

Continual, frequently recurring; *continuous,* without intermission.

Data (plural of *datum*), things already known, hypothesis, the starting-point for investigation. Do not use for the results produced from an investigation. Note that a plural verb must be used.

Dates. Instead of such expressions as *last year, next year,* the year should be specified. Delay in publication may make the reference erroneous.

Decimate means reduce *by* one-tenth, not *to* one-tenth (originally, to take out one-tenth); hence *decimate by twenty per cent* is incorrect.

Defective (from *defect*) is appropriate to what is wanting in quality; *deficient* (from *deficit*) to what is wanting in quantity.

Definite and *definitely.* Do not use unless you are sure that you could not express your meaning properly without them. They mean exact(ly), precise(ly).

Dependant is the noun, *dependent* the adjective. Do not omit the *on* or *upon* after *depend* and *dependent.*

Deprecate, express disapproval of; *depreciate,* lower the value of.

Differ. Use *differ from* in the sense of *to be different;* use *differ from* or *with* in the sense of *to disagree.*

Different. Say *different from,* never *different than.*

Dilemma is not a synonym for *difficulty.* It means to be faced with a choice between two equally unfavorable courses of action.

Directly is an adverb meaning *instantly, immediately,* not a conjunction equivalent to *as soon as.*

Disassociate. Use *dissociate.*

Disinterested, interested in an objective, unbiased, impartial way; *uninterested,* not interested.

Donate is not the equivalent of *give;* it means *present with.*

Due to. The word *due* is an adjective, and must refer to some particular substantive in the sentence, not to the general notion expressed in the main sentence. It is incorrectly used for *through, because of* or *owing to* in adverbial phrases. "Due to the icy roadway, the automobile skidded" is not correct; but "The skidding of the automobile was due to the icy roadway" is correct. (If the reference is to the verb, *because of* or *owing to* should be used, e.g., "Because of the icy roadway, the automobile skidded.")

e.g. (exempli gratia) means *for the sake of example* and introduces an illustration; *i.e.* (id est) means *that is* and introduces a definition.

Endorse should not be used in the sense of *corroborate, subscribe to, be in agreement with.* It means *confirm, ratify.*

Enormity does not mean *bigness* but *monstrous wickedness.*

Entail, impose (labor, expense) upon, involve; is often used where no verb is necessary and often where *need, cause, impose, necessitate* or *involve* should be substituted.
See *Involve.*

Equally as. Omit *as* (not *equally as good,* but *equally good*).

Euphemism, a mild expression used in place of a stronger one; *euphuism,* high-flown style.

Except. Except that, as a conjunction introducing a clause, is better replaced by *unless* or *if not.*

Farther (comparative of *far*), to or at a greater distance; *further,* at a more advanced point in time, going beyond what exists, additional. *Farther* is a distance word; *further,* a time or quantity word.

Few, a few. *Few* emphasizes the fact that the number is small; *a few,* the fact that there is a number.

Fewer is used when referring to number; *lesser,* when referring to quantity, amount, size. But do not join *fewer* to the word *number* (fewer number).

First two should be used, not *two first.*

Firstly. First is a better form for the adverb.

Fix means *make firm, place definitely.* Avoid its use to mean *arrange, prepare, repair.*

Following should not be used as a preposition as a substitute for *after, as a result of,* but only as a participle, when it agrees with a noun or pronoun. "Such success, following the careful preparations, was to be expected."

Forecast. The past tense and past participle is *forecast,* not *forecasted.*

Fulsome, disgusting by excess, *not* full of, exceedingly.

Got. Avoid the use of *have got* where *have* alone will express your meaning. But Gowers says "It is better to say 'I have got the information you wanted' than 'I have obtained the information that you desired'." Never use *gotten.*

Hard hit, won, earned; not *hardly hit,* etc. *Hard* is the adverb of the adjective *hard. Hardly* is used only in the sense of *scarcely.*

High light(s). Reserve the use of this word for a moment or detail of vivid interest.

However. Avoid starting a sentence with *however* when the meaning is *nevertheless.*

Hung. The proper form applicable to capital punishment is *hanged.*

Ideal cannot be compared. *More ideal* is impossible.

i.e. (id est) means *that is* and introduces a definition; *e.g.* (exempli gratia) means *for the sake of example* and introduces an illustration.

If and when. One of these words is usually sufficient.

Ilk means *same, identical,* not *kind, sort, class.*

Imply and *infer* are not interchangeable. A writer or speaker implies what his reader or listener infers.

Including implies that the list that follows is not complete. Where the list is complete, use *comprising.*

Inculcate. We inculcate ideas into people, not people with ideas.

Individual is not equivalent to *person;* it refers to the single members of a group as opposed to the whole group.

Inform. Tell is preferable. *Inform* cannot be used with a verb in the infinitive.

Insanitary implies danger to health; *unsanitary,* lack of sanitary equipment or conditions.

Inside of is correct only when used adverbially to mean *in less than* (inside of a week).

Intense, existing in a high degree; *intensive,* directed to a single point or area or subject.

Involve originally meant *wrap up in anything, envelop, enfold* but is often now used in place of *include, contain* or *imply* and often superfluously. Omit where possible; otherwise use a more specific word.

Last, final; *latest,* most recent.

Least is the superlative of *little,* of which the comparative is *less.* It is incorrect to use *least* when referring to only two persons or things. (He is the less efficient of the two supervisors.)

Leave. Do not misuse for *let.*

Less should not be misused for *fewer. Less* refers to degree, quantity or extent, *fewer* to a number. *Less* takes a singular noun (less choice), *fewer* a plural noun (fewer choices).

Liable should not be used in the sense of *likely.*

Likely, probable. *Likely* does not imply any suggestion of habit or that the probability arises from the character of the subject (see *apt*).

Limited. Do not use as a substitute for *few, small, meager, inadequate, scant.*

Line. Along these lines, meaning *in this way, course of procedure,* is an overworked phrase and should be avoided.

Literally means *with words taken in their usual sense* and should not be used when you mean *figuratively, metaphorically.* Do not use *literally* in a metaphor.

Loan. Use *loan* only as a noun; the verb is *lend.*

Loaned. The better form is *lent,* past participle of *lend.*

Locate. To fix the site of; *situated,* placed. "After the institution was located in Ottawa in 1890, it remained situated there for the next half century." Avoid the use of *located* for *found.*

Major. Do not use as a substitute for *main, important, chief, principal.*

Majority; Minority. These words can be used only of *number.* In other connections write *the greater part of, the bulk; the smaller part of.* Do not use *the majority* where *most* would serve.

Masterly, very skillful, characteristic of a master; *masterful,* self-willed, imperious, arbitrary.

Media is the plural of *medium* (agency, means). Use the singular when only one agency is meant.

Meticulous means over-careful about small details and should not be used as a synonym for *scrupulous* or any other word implying commendation.

Militate (of facts), have force (*against,* rarely *in favor of*); *mitigate,* appease, reduce severity of, moderate.

Mutual means *reciprocal* (used of two individuals acting on each other). In other circumstances *common* is the appropriate word.

Next two should be used; not *two next.*

Non-. Avoid creating new words by prefixing *non-* to them when a suitable opposite already exists (*nonaudible* for *inaudible, nonurban* for *rural*).

Not to exceed. Except in specifications and similar work, *not more than* should be used.

Oldest and *eldest* are both superlatives of *old, oldest* being the most recent form. *Eldest* is now reserved to refer to the first-born in a family. So also the comparatives *older* and *elder.*

One of the most. This construction is overworked; avoid it. But if you use this expression, do not make the mistake of using a singular verb in the relative clause that follows it. "One of the most exotic sights that confront the tourist."

One of those who. Use a plural verb after *who.*

Optimistic is derived from the Latin *optimus* (best) and should not be used as a synonym for *hopeful* or *cheerful.* Reserve its use to express the habit of hoping for the best at all times.

Oral, spoken by word of mouth; *verbal,* in words, whether spoken or written.

Over. Avoid the use of *over* to mean *more than* when referring to numbers.

Overall. Often the adjective *overall* is meaningless and ought to be omitted. (What is the distinction between *overall purpose* and *purpose?*) When it is not meaningless, it is often used as a synonym for *general, average* or *total,* for *altogether* or *generally* (the *overall* yield in the 1959 crop year; the average yield).

Partly, in part, in some degree; *partially,* incompletely *but also* with partiality, in a biased manner. Prefer *partly* in the sense of *in part.*

People is best not used with words of number, when *persons* ought to be used. Strunk says: "If of six people five went away, how many people would be left? *Answer*: One people."

Per is a Latin preposition and should be confined to its own language, e.g., *per cent.* Say "Four cents a mile," not "four cents per mile."

Persuasive, able to persuade; *pervasive,* spreading through, saturating.

Phase means stage of transition or development, not *aspect.*

Phenomena is the plural of *phenomenon.*

Practicable, that can be done, feasible; *practical,* applicable in practice, the opposite of theoretical. (The opposites are *impracticable* and *unpractical.*)

Practically. Do not use for *virtually* or *almost.*

Preferable should not be compared; *more preferable* is incorrect.

Presently means *in a little while, before long, soon;* it no longer means *now, at present.*

Preventive, not *Preventative.*

Prior to (preposition). Use *before. Prior* as an adjective is correct.

Prohibit from doing but *forbid to* do.

Proportion. Use only to refer to statistics. For *a proportion of* use *some;* for *a large proportion of* use *many.*

Proposition means something put forward for discussion or as the basis of argument; it should not be used as a synonym for *plan* or *project.*

Proven. **Accepted usage only in legal sense. As participle of *prove,* the form *proved* should be employed. *Proven* may be correctly used as an adjective.**

Provided that **introduces a stipulation (on the condition that) and is preferable to *providing.***

Reaction **implies an automatic rather than an intellectual response. Reserve its use for chemical, biological and mechanical processes, and do not use in place of *opinion* or *impression.***

Relatively **should be used only when a comparison is made.**

Requisition **(verb) is transitive. One *requisitions* a thing, or *makes requisition for* it, but does not *requisition for* it.**

Resort, **that to which one has recourse for aid; *resource,* a reserve upon which one can draw when necessary. "They had resort to their resources."**

Respective(ly) **may usually be omitted.**

Responsible. **Things cannot be responsible for events; they *cause* them.**

Same **should never be used as a pronoun, as "Shops full of goods and people ready to buy *same."***

Secure, **to get possession of (something desirable) as the result of effort; originally, to make safe; *obtain,* to acquire, get.**

Strata **is the plural of *stratum.* The first *a* is pronounced as in *stray.***

Substitute, **to put a person or thing in place of another; *replace,* to take the place of another. *Substituted by* is incorrect; the correct form is *replaced by.***

Such a large, small **(etc.). *So large, small* (etc.) *a* is preferable. (Fowler and Gowers say the "such a" construction isn't too far wrong.)**

Sufficient. **Use *enough.***

Therefore, **consequently; *therefor,* for it, that, them.**

This, that, **should never be used adverbially, as *this much.***

Today **is no longer hyphened.**

Too, very. **These words do not qualify participles directly. The word *much* should be inserted, as *too much engrossed, very much pleased.***

Toward, towards. **The first form is the one now generally used as a preposition.**

Transpire, **in its nontechnical sense, means *become known,* not *happen.***

Unique **cannot be compared (rather unique, somewhat unique).**

Via **means *by way of,* not *near.***

-wards. **In words with this ending, the adverb usually retains the *s;* the adjective (and, following it, the noun) drops it.**

Weather conditions. **The word *conditions* is unnecessary.**

Abbreviations

It is best to avoid abbreviations in literary text although a few, such as *i.e., e.g., viz., A.D., B.C., a.m., p.m.,* are permissible. Abbreviations are frequently used in technical and legal publications, and are generally used in parenthetical and bracketed expressions, footnotes, sidenotes, tabular matter and bibliographies. The style of the text is followed in cut-in sideheads, legends, tables of contents and indexes. Abbreviate words only when the shortened forms are generally recognized, and then take care to follow good usage.

A general list of abbreviations is given at the end of this chapter. It is not intended to be complete. There are a number of publications on accepted standard abbreviations in use in certain fields, particularly in various branches of science.

In recent years there has been a marked trend toward the deletion of periods from abbreviations for scientific and engineering terms, particularly in tabular matter and engineering drawings.

An abbreviation is capitalized or hyphened only if the unabbreviated word would be capitalized or hyphened.

Ontario	Ont.	foot-pound	ft-lb.

The names of provinces, territories and districts may be abbreviated when they follow the name of a city, town, village or geographic feature. Otherwise the names should be spelled out.

Toronto, Ont.	Mount Robson, B.C.

The following abbreviations are used officially for the names of provinces and territories of Canada, and states of the United States:

Alberta	Alta.	Georgia	GA	New Mexico	NM
British Columbia	B. C.	Guam	GU	New York	NY
Manitoba	Man.	Hawaii	HI	North Carolina	NC
New Brunswick	N. B.	Idaho	ID	North Dakota	ND
Newfoundland	Nfld.	Illinois	IL	Ohio	OH
Northwest Territories	N. W. T.	Indiana	IN	Oklahoma	OK
Nova Scotia	N. S.	Iowa	IA	Oregon	OR
Ontario	Ont.	Kansas	KS	Pennsylvania	PA
Prince Edward Island	P. E. I.	Kentucky	KY	Puerto Rico	PR
Quebec	Que.	Louisiana	LA	Rhode Island	RI
Saskatchewan	Sask.	Maine	ME	South Carolina	SC
Yukon Territory	Y. T.	Maryland	MD	South Dakota	SD
		Massachusetts	MA	Tennessee	TN
Alabama	AL	Michigan	MI	Texas	TX
Alaska	AK	Minnesota	MN	Utah	UT
Arizona	AZ	Mississippi	MS	Vermont	VT
Arkansas	AR	Missouri	MO	Virginia	VA
California	CA	Montana	MT	Virgin Islands	VI
Colorado	CO	Nebraska	NE	Washington	WA
Connecticut	CT	Nevada	NV	West Virginia	WV
Delaware	DE	New Hampshire	NH	Wisconsin	WI
District of Columbia	DC	New Jersey	NJ	Wyoming	WY
Florida	FL				

The words *County, Fort, Mount, Point* and *Port* used as part of proper names should not be abbreviated.

Port Radium Fort McMurray

The names of countries (except U.S.S.R.) are not abbreviated in literary text.

Always spell out the names of the months in textual matter and in text footnotes, except when used in citations or references. They may be abbreviated in tabular matter and sidenotes. *May, June* and *July,* however, should not be abbreviated.

The names of the days of the week are not abbreviated, except in tabular work.

The ordinal forms *d, nd, rd, st, th* are not used after date and place numbers in literary text. When otherwise used, these forms do not require the period as they are not true abbreviations. Similarly, Roman numerals pronounced as ordinals after names do not require a period.

George V

Use the following abbreviations for titles preceding personal names:

Dr.	Mme* (Madame)
Hon.	Mmes* (Mesdames)
Mr.	Mlle* (Mademoiselle)
Mrs.	Mlles* (Mesdemoiselles)
Ms.	Md.
Messrs.	Msgr. (Monsignor)
M. (Monsieur)	Rev.
MM. (Messieurs)	St. (Saint)

Civil and military titles are abbreviated when they precede a given name or initials, unless the title is short, such as *Major.* In formal usage, such as invitations and announcements, the title is spelled out.

The titles *Honorable, Reverend* and *Monsignor* are abbreviated unless preceded by *the.* The first two titles are never used with the surname only.

Hon. Joseph Brown	the Honorable Joseph Brown
Rev. John Smith	the Reverend Mr. Smith (*but not* Reverend Smith)

The abbreviations *Esq., Jr., Sr.,* and abbreviations denoting academic degrees and honors, are used after a personal name preceded by a given name or initial. In arranging letters denoting distinctions of various kinds, those letters indicating distinctions conferred directly by the Crown should be placed first. These include V.C. (which invariably has precedence), P.C., the various orders of knighthood and their companionages in their proper order (for precedence of these orders see *Burke's Peerage* or *Whitaker's Almanack*), D.S.O., M.C., Q.C.

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*Note ommission of period. The rule followed in the French language is to omit the period when the abbreviation contains the last letter of the word abbreviated.

After these should be placed letters denoting university degrees (degrees in Arts usually first), such as M.A., D.Sc., C.M., followed by letters denoting membership in societies and other distinctions, such as F.R.S.C., F.R.G.S., M.A.I. and A.I.A.

Hon. Charles M. Jones, P.C., D.S.O., Q.C., LL.D.
Philip Spratt, Q.C., M.A., Ph.D., F.R.S.
Henry O. Lundy, M.C., B.A., B.S.
James Smithers, E.D., M.S.

The abbreviation *Esq.*, and the complimentary titles *Mr., Mrs., Dr.,* are not used with any other title or with abbreviations denoting academic degrees and honors. A comma should precede abbreviations following a proper name.

Dr. John Jones; John Jones, M.D., *not* Mr. or Dr. John Jones, M.D.
Mr. Robert Smith; Robert Smith, Esq., *not* Mr. Robert Smith, Esq.
John Jones, Jr., *not* Jones, Jr., or Mr. Jones, Jr.

The legal titles of corporate names should be preserved. Such words as *Company, Corporation, Association, Limited* should not be abbreviated unless they appear in such form in the corporate name. Similarly, the ampersand (&) should not be used unless it is part of the corporate name. It is incorrect to use the ampersand in any other connection in literary text.

Compass directions are abbreviated as follows:

N	NE
S	SW
E	NNW
W	ESE

The abbreviations *NE, NW, SE, SW,* may be used to denote town and city divisions in literary text but the words *north, south, east, west* should always be spelled out.

In designating lands covered by Canada Lands Surveys, abbreviations of the following type may be used:

NE ¼ sec.	rge. 7
tp. 22	W. 3rd mer.

The words *street, avenue, place, road, square, boulevard, terrace, drive, court* and *building* are spelled out in literary text but may be abbreviated in footnotes, sidenotes and in tabular matter. If the word *Street* or *Avenue* forms part of a name, such as *Elgin Street subway,* it is not abbreviated even in parentheses, footnotes, sidenotes and tabular matter.

Periods and spaces are omitted from the abbreviated names of radio and television stations and from certain United Nations and government agencies and corporations, and other organizations:

CBC	CPR	NATO
CBOT	CLC	RCAF
UNESCO	DVA	DND

Where there is a reference in the text to a large subdivision of a publication (Volume, Number, Part, Book, Section, Chapter), or to a smaller section that is part of a title (Figure, Table, Plate), the word is capitalized and not abbreviated. Such a word is always followed by a number.

Part 4 Table 10

Smaller subdivisions (paragraph, line, page) in the text are written in full, but are not capitalized except in main headings.

The exact location is page 247, line 13.
Notes to Pages 17-19

In a reference in some part of a work other than the text (e.g., footnotes, reference lists, tables) the words are often written without a capital and may be abbreviated as follows:

article	art.	page	p.
book	bk.	paragraph	par.
chapter	c. or chap.	plate	pl.
figure	fig.	part	pt.
line	l.	section	sec.
number	no.	volume	v.

The word *figure* in a legend or caption is not abbreviated.

Figure 2—Surveyor at work.

Do not use an apostrophe to make an abbreviation.

Dept. *not* Dep't.

Words borrowed from Latin should not be treated as abbreviations. No periods are required after the following:

via	et	finis	par	pro
ad	ex	in	per	sic

The abbreviations given below are used for units of English weight and measure, and units of time:

Length, Area and Volume

in.	inch
sq. in.	square inch
cu. in.	cubic inch
ft.	foot
cu. ft.	cubic foot
yd.	yard
mile(s)	not abbreviated

Capacity

pt.	pint
qt.	quart
pk.	peck
bu.	bushel
bbl.	barrel
tsp.	teaspoon
tbsp.	tablespoon
gill(s)	not abbreviated

Weight

gr.	grain
dr.	dram
oz.	ounce
lb.	pound
cwt.	hundredweight
dwt.	pennyweight
ton(s)	not abbreviated

Time

yr.	year
mo.	month
day	not abbreviated
hr.	hour
min.	minute
sec.	second

A General List of Abbreviations

The same abbreviation usually serves for both the singular and plural forms of a word.

abbr.	abbreviated, abbreviation
abr.	abridged
abs.	abstract
acct.	account
A.D. (anno Domini)	in the year of Our Lord
ad val. (ad valorem)	according to value
a.m. (ante meridiem)	before noon
ans.	answer
approx.	approximately
art.	article
assoc.	associate, association
asst.	assistant
av.	average
bbl.	barrel
B.C.	before Christ
bf.	boldface
B.F.	bring forward
bldg.	building
bu.	bushel
bull.	bulletin
C	Centigrade
c.	cent
c. & lc.	capitals and lower-case
c. & s.c.	capitals and small capitals
ca. (circa)	about
cf. (confer)	compare
chap.	chapter
c.o.d. or COD	cash on delivery
col.	column
comm.	committee
cont.	continued
cr.	credit, creditor
cwt.	hundredweight
d.	penny, pence
def.	definition
dep.	department
do. (ditto)	the same
doz.	dozen

dr.	debit, debtor
Dr.	Doctor, Drive
dwt.	pennyweight
e.g. (exempli gratia)	for example
et al. (et alii, -ae)	and others
etc. (et cetera)	and the rest, and so forth
et seq. (et sequens)	and the following
F	Fahrenheit
fig.	figure
fl. oz.	fluid ounce
ft.	foot
gal.	gallon
gen.	general
g.	gram
hp.	horsepower
hr.	hour
ib., ibid. (ibidem)	in the same place
id. (idem)	the same
i.e. (id est)	that is
in.	inch
I.Q.	intelligence quotient
i.q. (idem quod)	the same as
Jr.	junior
lab.	laboratory
lat.	latitude
lb. (libra)	pound (avoirdupois)
lc.	lower-case
ld.	lead (in proofreading)
lf.	lightface
loc. cit. (loco citato)	in the place cited
long.	longitude
max.	maximum
memo	memorandum
min.	minimum, minute
misc.	miscellaneous
M.P.	Member of Parliament
mph	miles per hour
MS., MSS.	manuscript, manuscripts
N.B. (nota bene)	note well
no.	number
net wt.	net weight
obs.	obsolete
o.p.	out of print, overproof
op. cit. (opere citato)	in the work cited
orig.	original
oz.	ounce
p.	page, pages
PA	public-address system
P.A.	put away
par.	paragraph
pk.	peck
pl.	plate, plural
p.m. (post meridiem)	after noon
proc.	proceedings
pro tem. (pro tempore)	temporarily, for the time being
P.S. (post scriptum)	postscript
pt.	pint
qt.	quart
ques.	question
q.v. (quod vide)	which see
ref.	reference
rev.	revise, revision

s.	shilling
s.c.	small capitals
sec.	second, section
sq.	square
Sr.	senior
St.	Saint, Street
subpar.	subparagraph
subsec.	subsection
supp.	supplement
tbsp.	tablespoonful
tp.	township
trs.	transpose
tsp.	teaspoonful
u & l	upper and lower (case)
viz. (videlicet)	namely, to wit
v.	volume
vs. (versus)	against
wf	wrong font
wt.	weight
yd.	yard
yr.	year

Capital Letters

In the English language certain words are intended to be written with capital letters for emphasis and to guide the reader in meaning and phrasing, in much the same way as punctuation. There are rules to define which words require capitals but modern usage has introduced a degree of flexibility not tolerated in earlier writing. Basic rules are given in this chapter. Allowance should be made in ambiguous cases for the intention of the writer and the interpretation of the reader.

First Word of a Sentence

Begin every sentence with a capital letter. In subdivisions of conclusions, recommendations or decisions, if the complete thought can be stated briefly, it is unnecessary to introduce the subdivisions with capitals.

> The Defence Council decided to
> (a) test guns
> (b) order equipment immediately
> (c) direct trials to be completed by October.

If the conclusion, recommendation or decision cannot be stated briefly, introduce each subdivision with a capital letter and end with a period.

Proper Nouns

Capitalize all proper nouns. Difficulty sometimes arises in making the distinction between common and proper nouns. Common nouns do not require capitals because they refer to everyday objects in a general sense (transformation from common nouns to proper nouns is dealt with on page 69). Proper nouns are so named because they belong and are proper to certain people, groups or objects set apart, or are words derived from these sources. Hence the names of months and days, derived from names of pagan gods and planets, are proper nouns whereas the seasons of the year, being common nouns, do not take capitals except when used poetically.

Proper nouns include:

(a) Names of persons and places (countries, counties, cities and other political and geographical divisions).

John Doe	Canada
the Northern Hemisphere	Carleton County
the International Boundary	Montreal
the Continental Divide	Pickle Lake
the Prairie Provinces	Elm Street West

The examples *Pickle Lake* and *Elm Street West* are made up of common nouns transformed into proper nouns because they have become parts of place names.

(b) Names of the months and days, holidays, religions, languages, races, historical periods and events, and documents.

October	French
Wednesday	Negro
Thanksgiving Day	Fall of Rome
Roman Catholic	the War of 1812
Order in Council P.C. 1354	

(c) Names of organized bodies and the distinguishing names substituted for them.

the Parliament of Canada, Parliament
the House of Commons, the House
the Civil Service Commission, the Commission
the Department of Finance, the Department

The word *Department* is capitalized. This is the basic rule but few observe it. The trend is toward a less formal and more modest attitude in self-reference, especially in correspondence with the general public.

> Thank you for your letter, which has been passed to the appropriate branch of the department for immediate attention. In this department and the Department of Agriculture the hours are staggered to fit in with those of other departments of government.

(d) Names of institutions, churches, schools, libraries, buildings, hotels, clubs, corporations, ships, etc.

Toronto General Hospital	Confederation Building
St. Andrew's Church	Chateau Laurier
Ottawa Collegiate Institute	Bell Telephone Company
Vancouver Public Library	*Empress of Canada*

(e) Names and synonyms of the Deity, and synonyms of the Bible.

the Creator	Holy Writ
the Great Architect	

(f) Titles of royalty and nobility, and of rank when used with a name.

Her Majesty	His Grace
Lieutenant Smith	

(g) Official titles of persons when used without their personal names.

the Prime Minister	the Solicitor General
the Premier	the Minister
the Secretary of State	the Commissioner

(h) Titles of courtesy to be used when addressing a person.

Sir	Father
Madam	Uncle

Filial names are not capitalized when used with possessive pronouns.

my mother

Common nouns automatically become proper nouns and are capitalized:

(a) When they refer specifically to events, institutions or similar objects and are therefore no longer used in the general sense.

declaration independence *but* Declaration of Independence
war roses *but* Wars of the Roses

Capitals are not used in any general reference to departments, branches, committees and positions, but only when naming a particular one.

There are many technical and advisory committees in this department such as the Committee on Armament Development and the Advisory Committee on Pay and Allowances.
The positions of administrative officers in the Department of External Affairs range from Administrative Officer 1 to Administrative Officer 8.

Use capitals to designate a functioning body but not when referring to the component members of that body.

All the chiefs of staff were present at the last Chiefs of Staff Committee meeting.

(b) When they become an essential part of a proper name.

Elgin Street — Brighton Pier
Royal Ottawa Golf Club

(c) When common nouns such as *north* and *east* are used to name a specific region and its inhabitants.

the West — people of the South
the Westerner

Note that the points of the compass when abbreviated take capital letters.

N — NW
E — SSW

Proper Adjectives

Capitals are used for proper adjectives because they are derived from proper names.

Franciscan friar — Douglas fir
Greek vase

A proper adjective is associated with the person or place from which the adjective is derived. When this association is remote, the adjective becomes common and no longer takes a capital.

pasteurized milk — chinaware
portland cement

Quotations

Use a capital letter for the opening word of a quotation but not of quoted phrases.

John said, "They have gone."
Their future held only "blood, toil, tears and sweat."

Titles of Books and Plays

Capitalize every important word in literary titles. Prepositions, articles and conjunctions do not take capitals unless one of them is the initial word in the title.

A Star Is Born	*An Early History of Canada*
As You Like It	*But Few Returned*

Salutation and Complimentary Closing

Use capitals in the first word and all nouns in the salutation of a letter but in the first word only in closing.

My dear Sir	Yours truly
Dear Madam	Very sincerely yours

Hyphened Compounds

A proper noun or adjective in a hyphened compound retains the capital.

anti-Communist	neo-Gothic
Greco-Roman	

Abbreviations

Abbreviations of decorations and degrees, and of countries, are capitalized and punctuated.

M.B.E.	U.K.
D.F.C.	U.S.A.
LL.D.	U.S.S.R.
Ph.D.	

Abbreviations for radio and television stations, certain United Nations and government agencies, and other organizations are capitalized but not punctuated.

CBOT	SACLANT	DND
UN	BENELUX	DVA
NATO	RCAF	CGSB

NOTE

See Appendix I: Code of Stratigraphic Nomenclature, Articles 37 and 38; and

Appendix II: Stratigraphic Commission Discussion of the Stratigraphic Code: Capitalization.

EXAMPLES OF CAPITALIZATION

Alaska Highway, Trans-Canada Highway, Mackenzie Highway, Toronto-Hamilton highway
Appendix A
arabic numerals (not Arabic numerals)
Arch, as in Boothia Arch
area, as Rouyn-Bell River area
Atlantic Provinces
Avenue, as in Carling Avenue

Basin, as in Michigan Basin

^{14}C
Canadian National Railways
Canadian Pacific railway (line), but Canadian Pacific Railway (company)
china clay
City of Ottawa
claims A61239 to A61244; Nancy claim
coast, as in Pacific coast, but the Coast (c. f. the Prairies)
Coast Mountains, but eastern Coast Mountains
County, as Pictou County
Creek, as Lost Creek

Early Precambrian (=Archean), but early Precambrian (indefinite)
Eastern Canada
Eastern Townships

Fault, as in Gloucester Fault
Figure 6 (Fig. 6)
Foothills (as analogous to Rocky Mountains)
Foothills belt
Formation, as Ottawa Formation
Forty-ninth Parallel (an International Boundary) or 49th Parallel; but fifty-first parallel or 51st parallel.
Fraser River but Fraser River valley

Geosyncline, as in Franklinian Geosyncline
government control, but the Government
Great Divide
Great Plains, the Plains (as a physiographic province)
Group, as Windsor Group
grouse; willow grouse; Franklin grouse

india ink
International Boundary; the Boundary

Lake, as Great Slave Lake
Late Precambrian (=Proterozoic), but late Precambrian (Indefinite)
Lowland, as St. Lawrence Lowland
lower Paleozoic, but Lower Ordovician

Maritime Provinces
141st Meridian (an International Boundary), but 142nd meridian
Mile 105, Alaska Highway
Mine, as McWatters Mine
mining division, as Kamloops mining division
Mount Robson, but the mountain

Ottawa and Rideau Rivers but Red and Black creeks. Relative importance of feature determines use of capital letter.

Pacific coast
paris green
Peace River Block
Plateau, as Stikine Plateau
Pole, the Pole, North Pole
portland cement
post-, as post-Triassic
post office, as Red Lake post office
Prairie Provinces, the
pre-, as pre-Ordovician
Province of Quebec; the province
Provincial Government
Province, as in Churchill Province

River, as Mackenzie River
ranges VII and VIII
Rocky Mountain Trench
roman numerals (not Roman numerals)

Street, as Sparks Street

Table No. 1
Township, as Fitzroy Township

valley (as Midge Creek valley, but Midge Valley)
Village (as Village of Rockcliffe Park)

West, the

Yukon-British Columbia boundary; the boundary

Note: When geographic names are applied to established geological or structural features the descriptive term should be in capitals e. g. Gloucester Fault. Assumed features or small-scale features should be designated informally.

Compounding of Words

Words frequently used in close association tend to become unified in form as they are in meaning, and ultimately to acquire a single accent. There are three stages in the development of compounds. At first the components of the compound expression are written separately; next they are united by a hyphen; finally, when the separate significance and accent of these components have been lost sight of, they are combined into one word. The hyphened stage may thus be considered merely preparatory to the coalescence of the various members into one word. Many such compounds have now fully coalesced and are written as one word, as *aircraft, lifetime, grindstone, byword.*

Words used in their ordinary grammatical relationship—for instance, noun and attributive adjective—ought not to be hyphened. A typical example of this rule is afforded by adverbs ending in *ly* standing before the words they modify. The relationship in this case is clear, and the hyphen is omitted. When, however, it is desired to show that the syntactical relationship between two words is closer than if they stood side by side without it, use the hyphen.

Whenever the compound expression has a meaning different from that borne by its components in their ordinary grammatical relationship, the hyphen is used, as in the expression *red-coat* (referring to a British soldier). Other instances of the same relation are to be found in the expression *toy shop* as compared with *toy-shop,* and *zinc box* as compared with *zinc-box.* A *toy shop* is a child's mock shop; a *toy-shop* is a shop where toys are sold. A *zinc box* is a box made of zinc; a *zinc-box* is a box that is used to contain zinc.

Nouns

HYPHEN

(a) nouns of equal value

man-child	city-state

(b) nouns written as two words, when they have a modifier

red color-filter	*but* color filter
public letter-writers	*but* letter writers

DO NOT HYPHEN

a compound noun that has become a single specialized word

aircraft	schoolboy
lawgiver	glassware

but if such a noun has a modifier that modifies only the first part, the compound is separated.

high-school boy	cut-glass ware

Adjectives

HYPHEN

Hyphens should be used to clarify possible ambiguities, for example:

(a) compound adjectives when they precede the noun they modify

cold-storage vaults short-term loans

(b) compound adjectives made up of an adjective and a noun to which *d* or *ed* has been added

able-bodied acute-angled
freckle-faced (*not* freckled-faced)

(c) combination colour terms are separate words, but such terms are hyphenated when they are unit modifiers.

bluish green	bluish-green feathers
dark red	iron-grey sink
orange red	silver-grey body
blue green	blue-green leaves

(d) compound adjectives made up of a noun, adjective or adverb and a *present participle* if they precede the noun they modify

fur-bearing animals far-reaching events
corn-raising area

but if the compound is preceded by an adjective modifying the first word in the compound, omit the hyphen or, if it makes it clearer, use two hyphens

sweet corn raising area *or* sweet-corn-raising area

(e) compound adjectives made up of a noun or adverb and a *past participle* when they precede the noun they modify

soft-boiled egg poverty-stricken family

(f) compound adjectives when the adverb of the combination could be misread as the modifier of the noun

more-open creek bottoms
shows much-improved growth

(g) compounds with *well* and *ill* when they precede the noun they modify.

well-fed cattle ill-gotten gains

DO NOT HYPHEN

(a) a compound adjective when it follows the noun it modifies

The eggs were soft boiled.

(b) adjectives used in the name of an institution or place

school board members grand jury room

(c) compound adjectives made up of adjective and noun when both are capitalized

Safety First rules

(d) compound adjectives used in foreign expressions

laissez faire policy
a la carte luncheon

(e) if the adverb in a compound adjective could not be misread as an adjective modifying the noun (the use of hyphens with adverbs ending in *ly* is the most frequent violation of this rule)

equally productive means
too complacent attitude

(f) if the compound adjective is preceded by an adverb modifying the first word of the compound.

a reasonably tall growing tree
but a tall-growing tree

(g) a two-word unit modifier, the first element of which is a comparative or superlative

better drained soil	larger sized grains
highest priced coal	best preserved specimen

Phrases

HYPHEN

(a) many well-known compounds

daughter-in-law	jack-o'-lantern
topsy-turvy	happy-go-lucky

(b) compound phrases used as attributive adjectives

the cost-of-living index
a long-drawn-out affair

but if there is little possibility of misreading, hyphens need not be used.

a story and a half house

Prefixes

HYPHEN

(a) when the prefix is joined to a proper noun, unless usage demands otherwise

neo-Gothic	sub-Arctic
non-Christian	trans-Siberian
pro-British	un-American
but transatlantic	

(b) when *self* forms the first element of the compound.

self-assured	self-possessed
self-control	

except selfhood, selfsame

Write as one word, except where clarity demands otherwise, compounds with *anti, bi, co, inter, intra, multi, non, post, re, semi, sub, trans, tri*

anticlimax	postdate
bimonthly	rebuild
coexist	semiannual
interdepartmental	subcommittee
intradepartmental	transcontinental
multicolored	triservice
nonactive	

but two similar vowels are separated by a hyphen.

co-operate	semi-invalid
co-ordinate	

Suffixes

HYPHEN

temporary compounds with *like.*

nut-like petal-like

DO NOT HYPHEN

certain well-known adjectives ending in *like*

childlike businesslike

except when the root word ends in two *l*'s.

bell-like

Numerals

HYPHEN

(a) compound numbers from twenty-one to ninety-nine

Twenty-two trees were cut down.

(b) an adjectival compound in which one component is a cardinal numeral and the other a noun or adjective

five-pound roast one-sided affair

Note two-rod rows (compound adjective and noun)
two rod-rows (adjective and compound noun)

(c) ordinal numerals when they precede the word they modify

fifth-story room	third-rate play
first-class coach	

(d) compounds of a numeral with *odd*

sixty-odd 140-odd

but write as one word compounds with *fold* and *score.*

fourscore sixtyfold

Fractions

HYPHEN

fractions used as modifiers unless the numerator or denominator contains a hyphen

a one-third share
twenty-fiftieths calcium

but twenty-nine fiftieths calcium.

DO NOT HYPHEN

fractions used as nouns.

Four fifths of the load was wheat and one fifth barley.

Suspended Compounds

HYPHEN

when a component common to successive compound adjectives is omitted.

first- and second-class fares
2-, 4-, and 6-inch measures

Titles and Offices

HYPHEN

(a) when a compound is a double title

secretary-treasurer treasurer-manager

(b) when the adjectives *elect* and *designate* form the last element.

president-elect minister-designate

DO NOT HYPHEN

when the compound denotes a single office.

editor in chief Governor in Council

There are many exceptions to this rule in common practice, such as vice-president, vice-chairman, and many military titles.

Compass Points

HYPHEN

after the first point when there are three points.

south-southwest

DO NOT HYPHEN

direction of two points.

southwest

Single Letters, Figures and Signs

HYPHEN

a letter, figure or sign and the word it modifies.

U-boat X-ray $-mark

DO NOT HYPHEN

a unit modifier when the second element is a letter or figure.

Class II railroad
Grade A milk

Italics

Italic type is used primarily to indicate emphasis and should therefore be employed sparingly. It is available in most fonts except small capitals.

Italics are also used for:

1. All foreign words and phrases not yet considered to be anglicized. When a foreign word or phrase becomes anglicized, the use of italics is discontinued. Most standard dictionaries indicate by prefixed parallel bars words that are to be printed in italics.

2. The titles of publications (books, pamphlets, treatises, tracts, documents), and for the names of plays, operas, long poems, newspapers, periodicals, ships and boats. Names of trains and aircraft may be either italicized or placed within quotation marks.

3. Certain Latin terms and abbreviations, as *et al., ibid., idem, infra, loc. cit., op. cit., passim,* [*sic*], *supra, vide*. Do not italicize these abbreviations: circa (ca., c.), cf., etc., e.g., vs. or v., and viz.

4. Scientific (Latin) names of genera and species in botanical, zoological and paleontological matter. Italics are not used for families or higher subdivisions.

5. Letters and words referred to as such.

> Delete the second *and* from line two.
> The word *Arabic* is spelled with a capital *a*.

6. The words *To be continued, Continued on p.—, Continued from p.—* and for the words *see* and *see also* when used in footnotes, indexes and tables of contents.

7. Letters indicating subdivisions when used at the beginning of paragraphs or for numbering verses.

8. Letter symbols used in legends to illustrations, drawings, etc., or in text as references to such material.

9. Letters designating quantities, lines, etc., in algebraical, geometrical and similar matter.

10. Greek, Latin and Arabic names of planets, satellites, constellations, individual stars, and other celestial objects, and the letters designating Fraunhofer lines. Spectral lines in general are not italicized.

11. Expression marks in music scores.

In handwritten and typewritten material, underline words intended to be printed in italics. Printers will always set in italics all underlined words.

Italicize all names of genera, species, and varieties, thus: *Posidonomya nahwisi* var. *goodrichensis,* devil's club *Fatsia horrida,* black bear *Ursus americanus*.

Numerical Expressions

Most rules for the use of numerical expressions are based on the general principle that readers find numerals easier to grasp, particularly in technical, scientific or statistical matter.

In general, write in full numbers from one to nine inclusive. Where the text is interspersed with comparatively few numerical expressions, however, they are usually written out. In special cases figures may be used throughout.

General Rules

The following general rules cover the most common instances where the writer has to choose between using a figure or writing the expression in full.

1. At the beginning of a sentence write out all numbers and all terms of measurement that would otherwise be abbreviated. When two related numbers occur at the beginning of a sentence, both are written out.

> Three hundred persons are expected.
> Nine or ten men will be needed.
> Number 6 is not to be used in the display. (*not* No. 6)

In question-and-answer material, however, numerals may be used at the beginning of a sentence to express years, sums of money of one dollar or more, decimals and cumbersome expressions.

2. To avoid confusion when one numerical expression directly follows another, the forms illustrated by the following examples may be used:

> 300 six-inch guns
> 120 eight-inch boards
> twelve 10-cent pieces

3. Do not mix in the same phrase figures and numerals written in full.

> nine out of twelve *not* nine out of 12

4. In expressing approximate numbers, words are preferred to figures.

> About a thousand men sailed for home.
> The attendance was estimated at five hundred.
> Classes are limited to approximately twenty-five children.

In expressing large numbers, write out the word *million* and similar terms.

> 20 million a billion and a half
> $285 million

When numbers larger than one thousand are written out, use these forms:

> two thousand and twenty
> one hundred and fifty-two thousand three hundred and five

5. Figures are used for serial numbers.

Publication 680
pages 99-146
serial number 1197M-2
CEntral 4-1654
number 7978

6. Numbers of dynasties, sessions of Parliament or Congress, political divisions, and numbered thoroughfares up to and including tenth, are generally written out.

Fifth Dynasty
Twenty-second Parliament
Second Ward
Fifth Avenue

7. Write out indefinite expressions.

the early seventies
the mid-thirties

8. When a number is written out, it should not be repeated in figures except in legal documents.

9. In mathematical and statistical reports, quantities and measurements are expressed in figures. For all other text matter, apply the general rule of spelling out numbers up to and including nine.

Specific Uses

Age

The number indicating a person's age is usually expressed in figures, except in literary text.

She was 9 years old on May 10.
She was 67 years, 8 months and 10 days old when she died.

Calendar or Fiscal Years

In referring to a period of two years or more, the en dash (not a hyphen) may be used.

1936-38 1946-47 1895-1913

If the word *from* precedes the year, or the word *inclusive* follows it, the second year is not shortened and the word *to* is used.

from 1933 to 1936
1935 to 1937 inclusive

The abbreviation *A.D.* precedes the year, and the abbreviation *B.C.* follows the year.

A.D. 937 245 B.C.

Date

August 1914
8 January 1942
April 25, 1955
The abbreviation for 25 June 1961 is 25/6/61.

Decimals

2.75 inches
15 ounces of silver 0.800 fine
Pi is equal to 3.1416.
It costs $0.6421 a pound.

In text, use a cipher where there is no unit. In numerical statements, ciphers may be used to indicate the number of decimal places to which the value is significant: 0.60 implies significance to two decimal places, 0.6000 to four. Ciphers may be used in tabular statements to give an equal number of digits to the right of the decimal point, provided conflict with the above usage is avoided.

Degrees

Latitude 49°21′18″, Longitude 72°13′14″
35°30′ (land distance, etc.)
45.5°F below zero (or —45.5°F)
10 degrees of frost
an angle of 45 degrees

to express a tolerance the form should be
30±2°C

Distances, Dimensions and Other Quantities

for a distance of 5 feet 6 inches
30 miles from Toronto
a 3-mile course
20/20 vision
2 500 horsepower
8 by 12 inches (or 8×12 inches)
2×4 inch boards

In text, the form *8 by 12 inches* is preferable, but if there is a large number of such expressions, the form *8×12 inches* may be used, and in tabular work, 8×12″.

Fractions

Fractions standing alone are generally written out. A fraction in figures should not be followed by *of a* or *of an.*

one-half inch
one half of a farm (see chapter on Compounding)
five one-hundredths
The insect was ¾ inch long. (*not* ¾ inches)

Market Quotations

4½ per cent bond
Preferred shares sell at 245.
wheat at 2.30
sugar, .05

Money

$100 (*not* $100. nor $100.00)
at $8 a ton
$0.752 per ounce
$285 million
two million dollars
2.5 francs *or* 2.5 fr.
£3/6/8
65 cents (*not* .65 cents)

Percentage

12 per cent (*or* 12 p.c. *or* 12%)
25.5 per cent
0.5 per cent (*or* one-half of 1 per cent)

Proportion

1 to 4
1:63 360
1:3:4

Time

Use numerals to express clock time; a period is used to separate hours from minutes.

4.30 p.m.
10 o'clock *or* 10 p.m.
4^h30^m, $4^h.5$ *or* 4.5^h, as preferred, in mathematical matter

Duration of time or time of day when given in ordinary reading matter should be written out.

They called at four o'clock.
The program starts at half-past two each afternoon.

Weights and Measures

Use figures in all enumerations of weights and measures.

3 pounds	1 hundredweight
40 bushels	15 cubic yards

Roman Numerals

Although the tendency is toward the use of Arabic rather than Roman numerals, when the latter are employed for reasons of convenience, clarity or custom, capitals and lower-case letters are generally used as follows:

Capitals for:

titles of kings and rulers
year dates in formal statements
numbering larger divisions of literary productions (such as volumes, books, chapters and appendices)
numbering tables and plates
numbers on survey posts
important documents and cornerstone legends

Lower-case for numbering:

introductory pages in books and magazines
subordinate classifications in a series
subclauses

Punctuation

"Punctuation," says Eric Partridge, one of the modern authorities on the subject, "is not something you add to writing, even the humblest: it forms an inescapable part of writing." Its function is to help the reader understand what you have written by making clear the relationship between the various parts of the sentence. Improper punctuation can and often does alter the meaning and confuse the reader. The writer ought not, however, to rely upon punctuation to improve a poorly constructed sentence; he should rewrite the sentence.

There are ten recognized punctuation marks: period, colon, semicolon, comma, dash, question mark, exclamation mark, quotation marks (see page 93), parentheses and apostrophe. Using them correctly is largely a matter of learning a few simple rules and then applying them with common sense. The modern trend is toward inserting only as much punctuation as the sense requires, not sprinkling the copy with commas and dashes in a haphazard way.

The following sections are intended to serve as a guide to logical punctuation.

The Period

The period, or full stop, is the first and most important punctuation mark.

THE PERIOD IS USED

(a) At the end of a sentence that is neither a question nor an exclamation.

When the play was finished, we went home.
Pull up your chair.

(b) After an abbreviation.

Mr. Jas. Col. Bros.

In abbreviating the names of organizations, the periods are usually omitted.

UNESCO NATO RCAF CMA

In abbreviating the names of countries, the period after each letter is retained.

U.A.R. U.K. U.S.A. U.S.S.R.

The period that marks an abbreviation is never omitted before a mark of sentence punctuation, except when the abbreviation comes at the end of a sentence.

The firm of Allan and Co., of which I am a partner, has its head office in Ottawa.
I was made a partner in the firm of Allan and Co.

(c) At the end of a chemical formula when the formula completes a sentence.

(d) In series, to mark an ellipsis: something left out of a sentence. If the ellipsis comes in the middle of the sentence, three periods are used; if it comes at the end of a sentence, four.

"Bring forth the best robe and put it on him and put . . . shoes on his feet."
"Bring forth the best robe and put it on him . . . . For this my son was dead and is alive again; he was lost and is found."

THE PERIOD IS NOT USED

(a) After display lines and titles.
How to Retire and Enjoy It

(b) After paragraph headings on separate lines.
Uses Detailed

(c) After box headings in tables.
Canadian Exports 1961

(d) After date lines and signatures.

October 10, 1910 Allan J. Moore

The Colon

The colon is a valuable punctuation mark but it is neglected today, perhaps because few people know how to use it properly. It ranks in value between a period and a semicolon: it indicates a pause, or degree of separation, longer than a semicolon but shorter than a period.

THE COLON IS USED

(a) Between two sentences that present contrasting ideas.

"These are not dark days: these are our great days—the greatest days our country has ever lived."

—WINSTON CHURCHILL

"I hate nobody: I am in charity with the world."

—JONATHAN SWIFT

(b) To introduce a formal statement, or a statement that explains, proves, or enlarges on one that precedes it. In this case, the colon acts as a substitute for a word like *for, viz.,* or a phrase like *that is to say.*

When I was a boy, my conduct was shaped by two simple principles: my father's word was law, and a child's first duty was unquestioning obedience.

(c) To introduce a formal quotation.

Mr. Carlisle listened to the address of thanks and then said: "It has been a pleasure to hold this office because I have received such generous co-operation from all of you."

(d) To introduce a series of particulars, such as a list.

The new tariff will affect a number of products of interest to Canadian exporters: newsprint, mechanical wood pulp, aluminum manufactures, plywood panels and polystyrene.

(e) After the salutation in a formal letter and also after the introduction in a written speech.

My dear Mr. Prime Minister:
Reverend Sir:
Mr. Chairman, Ladies and Gentlemen:

(f) Before a final clause that summarizes preceding matter.

"The great secret, Eliza, is not having bad manners or good manners or any other particular sort of manners, but having the same manner for all human souls: in short, behaving as if you were in Heaven, where there are no third-class carriages, and one soul is as good as another."

—GEORGE BERNARD SHAW

(g) Between chapter and verse in Scripture references, and between volume and page reference.

Matthew 6:14
National Geographic 108:321

The Semicolon

The semicolon comes third in the descending order of punctuation: period, colon, semicolon, comma. It indicates a pause or degree of separation less than a colon but more than a comma. It is also being used increasingly between clauses of a sentence when *and* or other connecting words are left out.

THE SEMICOLON IS USED

(a) To separate statements that are too closely related in meaning to be written as separate sentences.

The committee made plans for its activities in the coming year; it will carry out an extensive campaign this winter.

(b) To separate clauses of a sentence where the connecting conjunction is omitted.

In Ottawa there are a great many federal civil servants; in Woodstock only a handful.

(c) To separate principal clauses in a long sentence from phrases or subordinate clauses marked off by commas.

As John quickly discovered when he tried it, the way up the cliff was steep and slippery; when, with difficulty, he had gained the top and started down again, the descent proved just as trying.

In May the Government will take steps to restrict imports of ammunition, including lead shot and cartridges; alcoholic beverages, including those made from sugar cane; all sorts of chemicals, including raw materials for plastic products; unspecified drugs and medicines.

(d) Between the clauses of a compound sentence when there is a contrast of ideas.

"The practice of medicine is an art, not a trade; a calling, not a business; a calling in which your heart will be exercised equally with your head."

—SIR WILLIAM OSLER

The Comma

The comma is perhaps the most widely used punctuation mark. Frequently it is overworked and made to take the place of other punctuation. Modern practice favors using commas with restraint. Fowler, an authority on English usage, says: "It is a safe statement that a gathering of commas (except on certain lawful occasions, as in a list) is a suspicious circumstance."

THE COMMA IS USED

(a) To set off nouns of direct address.

It seems to me, Mr. Chairman, that the duties of this committee might well be more clearly defined.

(b) To mark off an introductory adverbial clause from the rest of the sentence.

When I cash the bonds, I shall have enough money to make the down payment on the new house.
When the bell stopped ringing, the children went in two by two.

(c) To mark off or enclose a *commenting* relative clause; a *defining* relative clause is never set off by commas. This distinction appears difficult but really is not. A *defining* relative clause contains some information that is essential to the meaning of the sentence; a *commenting* clause contains additional information that is not essential.

The man who found the missing letter has been employed as a confidential messenger for nearly thirty years. (The defining clause, "who found the missing letter," takes no commas.)

The man, who will reach the age of 65 next year, has been employed as a confidential messenger for nearly thirty years. (The commenting clause, "who will reach the age of 65 next year," contains no essential information and is set off by commas.)

(d) Between co-ordinate clauses when they are linked by simple co-ordinating conjunctions such as *for, or, nor.*

Let us make the most of today, for tomorrow may never come.

But if the clauses are long and already contain commas, a semicolon is used to separate them. (See section on the semicolon.)

(e) To separate words and phrases in a series, particularly when they have the same construction.

"The great business of life is to be, to do, to do without, and to depart."
—JOHN MORLEY

If an adjective is closely related to the noun, it should not be marked off by a comma.

The only wealthy white woman in the area was an elderly American.

(f) Generally the conjunction *and* eliminates the need for a comma, but sometimes a comma is necessary to avoid ambiguity, to give clarity, or to emphasize a point.

The Departments of External Affairs, Citizenship and Immigration, and Agriculture all have an interest in this proposal. (The comma avoids ambiguity.)
He went home, and thought long and bitterly about his problems. (The comma gives added emphasis.)

(g) To mark off nouns in apposition, provided that they are not defining.

The young lady you met, Marion Talbot, lived in India for some years.

(h) To set off parenthetical words and phrases from the other parts of the sentence, when parentheses or dashes are not used for this purpose. In such instances commas are used in pairs, just as parentheses would be.

The Indian peasant, as you no doubt know, relies on rural money-lenders to finance him until his crop comes in.
If you feel, however, that you can't wait until the storm is over, at least take my umbrella.
The length of the day varies with the distance of the sun from the earth; in midwinter, for example, the days are very short and the nights long.

But parenthetical expressions such as *also, of course, in fact, perhaps, indeed, therefore, at least, nevertheless* and *likewise* need not be enclosed within commas, nor followed by a comma when they come at the beginning of a sentence unless the comma is needed for emphasis.

Mr. Jones has had a severe attack of laryngitis. Nevertheless he will continue his speaking tour on Friday.
You, of course, will go. (Commas needed for emphasis.)

(i) To set off adverbs and adverbial phrases that modify a whole clause.

Once again, German commercial aircraft are taxiing down runways in a number of countries and passengers are booking flights with a revived Lufthansa.

(j) To indicate the omission of a word that is common to two parts of a sentence.

In 1953 there were 14 applications, in 1954, 27, and in 1955 so far, only 10.

(k) Between the day of the month and the year, but not between the month and year alone.

June 1, 1905 June 1947

(l) Between titles and degrees used with names.

John Jones, M.A., Ph.D.

(m) To separate two words or numbers that might otherwise be misunderstood.

In November 1916, 305 000 men enlisted.

The Dash

The dash is a useful punctuation mark but it is often overworked. The writer who does not or cannot choose the proper punctuation sometimes sprinkles his copy with dashes as a substitute. Excessive use of the dash marks the amateur.

THE DASH IS USED

(a) As the equivalent of, or as a substitute for, marks of parenthesis. A pair of dashes sets off material in parentheses more directly and decisively than a pair of commas, or material that is briefer or less important than that enclosed in parentheses.

I think that Miss Jones—I always call her that in office hours and Lillian when I meet her socially—would make a first-class private secretary.

(b) To mark an unexpected turn of thought, particularly one that causes an abrupt break in sentence structure.

"The Englishman must not express great joy or sorrow or even open his mouth too wide when he talks—his pipe might fall out if he did."

—E. M. FORSTER

(c) To mark the insertion of material that explains, complements, or corrects.

Deep down in the earth the miners toiled—toiled for long hours, in semidarkness, with danger always present.

(d) To mark an addition outside the regular structure of the sentence.

If only he had lived—but such speculations are always useless.

(e) To gather up the subject of the sentence when the sentence is a long one. Sir Ernest Gowers says: "After the long loose canter of the subject, you need to collect your horse for the jump to the verb."

Rich stores of minerals, good agricultural land, forests stretching over millions of acres, coastal waters teeming with fish, and energetic and enterprising people—all these assure Canada a bright future.

(f) To precede a credit line for a photograph or author.

—Photo by Smith

THE DASH IS NOT USED

Immediately after a colon, semicolon or comma.

Quotation Marks

See chapter beginning on page 93.

The Question Mark

THE QUESTION MARK IS USED

(a) At the end of any sentence that is a direct question.

How long does the new radio program take?

(b) After every direct question of a series that makes up a single sentence.

"What is your name? your place of birth? your age? your height? your weight?" barked the sergeant to the new recruit.

(c) Enclosed in parentheses, to express a doubt about the correctness of what has gone before.

Mr. Schwartz, a refugee from Nazi persecution (?), applied for the position last week.

THE QUESTION MARK IS NOT USED

(a) After indirect questions.

The policeman asked me which way he had gone.

(b) If the sentence is technically a question but actually a request.

Will you please reply by return mail.

The Exclamation Mark

THE EXCLAMATION MARK IS USED

(a) After true exclamations, which express surprise, fear or some other emotion.

"How dare you ask me that!"
"Fire is the best of servants; but what a master!"

—THOMAS CARLYLE

(b) Occasionally, enclosed in parentheses, to indicate irony.

Mr. A. asserted that never in his long and arduous (!) political career had he taken a bribe.

(c) After interjections, such as *oh, ah, ha,* etc. When these exclamations come in a series, they are separated by commas and the exclamation mark put after the last.

Several hon. members: "Hear, hear!"

The exclamation mark should always be used with restraint.

Parentheses and Brackets

Parenthesis means literally "an insertion beside": something outside the basic meaning of the sentence. The sentence is logically or grammatically complete without the material contained within the parentheses.

PARENTHESES ARE USED

(a) To set off words of explanation or comment, or an afterthought.

> When the news of Johnson's death reached Brattleboro (the farm he owned lies on the west bank of the river about three miles away), the townsfolk decided to hold a memorial service.

(b) To indicate something that is indirectly related to the thought of the sentence but not actually connected by construction with it.

> The only comfort I can give him (cold comfort, I am afraid, because the championship is lost) is to say that he put up a good fight.

(c) To enclose letters or numbers designating items in a series, either at the beginning of a paragraph or within a paragraph.

(1) (2) (a) (b)

SQUARE BRACKETS ARE USED

(a) In printed matter, to enclose material inserted into a text by an editor or critic, not the author.

> The chairman of the board recently pointed out [see speech printed in the company's annual report] that exports to Britain this year are rising.

(b) To enclose such phrases as [*to be continued*], [*continued on page 10*], [sic].

(c) To enclose translations of titles.

The Apostrophe

THE APOSTROPHE IS USED

(a) To indicate the omission of letters or numerals.

e'er	ever
doesn't	does not
'55	1955

Be careful to distinguish between *it's* as a contraction of *it is,* and *its,* the possessive pronoun. The first takes the apostrophe; the second does not.

(b) To form the plural of letters, words, numerals and symbols.

3's *x*'s three *and's*
but M.P.s

(c) To form the possessive of nouns not ending in an *s* or *z* sound.

men's children's dog's

If the noun ends in an *s* or *z* sound, the apostrophe alone is used for the possessive.

Jones' Moses' provinces' forests'

Some authorities favor the use of another *s* for proper names of one syllable.

Jones's St. James's

The apostrophe is often omitted in instances where the word is not used in a truly possessive sense.

Canadian Exporters Association
Department of Veterans Affairs
several minutes delay
seven days leave

Order of Punctuation

Double punctuation is used only with abbreviations, quotation marks, run-in side headings, parentheses and brackets. Difficulty sometimes arises over the order of the punctuation marks when double punctuation is needed. In abbreviations, the period marking the abbreviation comes first and the punctuation mark second. If the abbreviation comes at the end of the sentence, no final period is needed. In run-in side heads, the period may be followed by a dash. For the practice followed with quotation marks, see the chapter on "Quotations." In using parentheses, if the material enclosed in the parentheses makes a complete sentence, the period goes inside the closing parenthesis; if it forms only part of the sentence, the period goes outside. The same rule applies when using brackets.

Quotations

The exact words of a speaker or writer are indicated by the use of quotation marks or by a variation in type or indention. In the latter methods no quotation marks are used. Whichever method is used, the author must reproduce in every detail the spelling, punctuation and other characteristics of the original, even to the extent of reproducing errors, though he may call attention to such mistakes by writing *sic* (Latin for *so*) in brackets, thus: [*sic*] immediately after the error. Other interpolated matter must be enclosed in brackets.

1. Quotation marks are used to enclose direct quotations. They are not used with indirect quotations.

> John said, "They have gone."
> John said that they had gone.

Quotation marks are also used around interrupted or fragmentary quotations.

> "I have no idea," he said, "what you are going to do about it."
> The adjudicator commended the little pianist for her "perfect rhythm."

If the meaning so dictates, the resumed section of the quotation may be capitalized.

> "His imagination resembled the wings of an ostrich," wrote Thomas Babington Macaulay. "It enabled him to run, though not to soar."

2. When a quotation comprises several consecutive paragraphs, use quotation marks at the beginning of each paragraph and at the end of the last one. The same rule applies to consecutively quoted stanzas of poetry.

> "The paragraph is a convenient unit; it serves all forms of literary work. As long as it holds together, a paragraph may be of any length—a single, short sentence or a passage of great duration.
> "If the subject on which you are writing is of slight extent, or if you intend to treat it briefly, there may be no need of subdividing it into topics. Thus, a brief description, a brief book review, a brief account of a single incident, a narrative merely outlining an action, the setting forth of a single idea—any one of these is best written in a single paragraph. After the paragraph has been written, examine it to see whether subdivision will improve it."
>
> —STRUNK and WHITE

3. Double quotation marks are used for the main quotation, single ones for inside quotations, and double ones for a third quotation within the matter between single quotation marks. Quoted matter ought rarely to go beyond the third set of quotation marks.

> "I think that Agnes Repplier's 'But who shall say that a hundred dollars a minute is beyond the "order of reason"?' is most apt for your purposes," said the professor.

4. Titles of chapters, articles, essays, lectures and short poems are placed in quotation marks. But titles of books, plays, newspapers and magazines given in the text are usually italicized.

> I read Sam Jones' article "Modern Electronics" in the magazine *Science Wonders.*

5. Quotation marks are used to enclose technical terms in nontechnical writing, colloquial words in formal writing, nicknames, slang, coined or humorous words. If the term or word is repeated in the same writing, the quotation marks are no longer required. It is modern practice to use single quotation marks in these instances.

> The ore will have to be 'upgraded' to make mining profitable.
> Government policy in the matter has been to 'play it down.'
> Many 'experts' were called into consultation. (The word 'experts' is used here in an ironical sense.)

6. Matter following the terms *entitled, marked, specified as, endorsed, signed, indicated as, mentioned as, termed, the word, the term,* is usually either enclosed in quotations or put in italics.

> The parcel was marked "Fragile."
> He signed his name "John Jones."

7. When a footnote reference is given to the source of a quotation, the reference index number should follow immediately after the quotation marks.

> "If we open a quarrel between the past and the present, we shall find that we have lost the future."(1)
>
> —WINSTON CHURCHILL

8. Quotation marks are not used around a proper name, a firm name or a slogan.

> The man on the right is John Davidson of Ajax Steel Limited.
> The poster should illustrate the slogan Be Kind to Animals.

Quotation marks are not used to enclose familiar expressions like *a Daniel come to judgment* that have become part of the language.

9. Modern practice in the use of quotation marks with other punctuation marks tends to place the comma and the final period inside the quotation marks.

> "Study carefully," he said, "the section on 'Engineering,' which appears at the end of the book."

Other punctuation marks are placed inside the quotation marks only if they form a part of the matter quoted, as follows:

(a) Interrogation and exclamation marks are placed inside or outside the quotation marks according as those marks do or do not belong to the quoted matter.

> Is the question "What are we doing?" or "What are we going to do?"?

(b) The dash is placed inside the quotation marks when it stands for something left unsaid, and outside when it is used as an ordinary punctuation mark.

"Oh, how I wish—," he exclaimed.
"It would be better not to go ahead with it," he said—"the plan may be an utter failure."

(c) Parentheses are placed outside the quotation marks when the parenthetical clause is quoted, otherwise inside.

His very words ("I owe them nothing") indicated his feelings in the matter.
"I realize (and with shame)," he wrote, "that I have neglected them."

10. The quotation is separated from the rest of the sentence by commas unless the meaning requires other punctuation.

11. The too frequent use of quotation marks mars the appearance of a page. This may be overcome by using instead small capitals, italics, variations in indention and other changes in type style.

Spelling

Spelling depends largely on memory. Sound is no guide in recognizing single or double consonants and the rules are so irregular that it is necessary to memorize the exceptions as well as the rules. The best way to learn is to be observant when reading.

Words frequently misspelled are:

accommodate	embarrass	precede
arctic	gauge	rarefy
consensus	harass	sacrilegious
desiccate	inoculate	separate
dietitian	liquefy	supersede
diphtheria	naphtha	unparalleled
disappoint	paraffin	vilify

Some rules and exceptions are given here.

Words with *ei* and *ie*

The jingle "*I* before *e* except after *c* or when sounded as *a* as in *neighbor* and *weigh*" covers the rule.

Exceptions:

financier	height	seize
foreign	leisure	sovereign
heifer	neither	weird

Words ending in *cede* and *ceed*

Supersede is the only word ending in *sede*. *Exceed, proceed* and *succeed* are the only common verbs ending in *ceed*.

Able and *ible* endings

There is no basic rule for the *able* and *ible* endings, but if there is a corresponding word ending in *ation,* the ending is usually *able;* if ending in *sion* or *tion,* the ending is more often *ible.*

duration	durable
division	divisible

Final consonants doubled before a suffix

Double the final consonant in words of one syllable ending in a consonant preceded by a vowel.

bed	bedded
dip	dipper
fit	fitted
sit	sitting

Exception: Do not double the final consonant before a suffix beginning with a consonant.

fit	fitful
sad	sadness

The final consonant is usually doubled in words of more than one syllable ending in a consonant preceded by a vowel, if the accent is on the last syllable and the suffix begins with a vowel.

acquit	acquittal
occur	occurrence
rebel	rebellion
regret	regretted

Exceptions:

avoid	avoidable
behead	beheading
chagrin	chagrined
refer	referable

Final consonants not doubled before a suffix

For words ending in a consonant preceded by a vowel, and NOT accented on the last syllable, do not double the final consonant before a suffix beginning with a vowel.

abandon	abandoned
benefit	benefited
cater	catering
label	labeling
market	marketable
parallel	paralleled

Exceptions: certain words with equally accented syllables:

handicap	handicapped
sandbag	sandbagged

For words ending in a consonant preceded by a vowel, do not double the final consonant before a suffix beginning with a vowel if the accent is shifted to a preceding syllable.

confer	conference
prefer	preference
refer	reference

For words ending in a consonant preceded by more than one vowel, do not double the final consonant before a suffix.

breed	breeding
broil	broiled
cheap	cheapest

Words ending in two or more consonants usually remain unchanged when a suffix is added.

call	called
cost	costing

Combinations with *all*

The final *l* is usually dropped when *all* is used as a prefix.

all together	altogether
	But all right

Words ending in *e*

Words ending in a silent *e* usually drop the *e* before a suffix beginning with a vowel.

age	aging
debate	debatable
dine	dining
love	lovable
subdue	subduing

Exceptions:

courageous	peaceable
dyeing	shoeing
hoeing	singeing
mileage	toeing
noticeable	

Words ending in a silent *e* generally retain the *e* before a suffix beginning with a consonant.

complete	completeness
hope	hopeless
waste	wasteful
whole	wholesome

Exceptions:

abridgment	judgment
acknowledgment	wholly
argument	wisdom
duly	

Words ending in *c*

For words ending in *c* with the sound of *k*, add *k* before *i*, *y* or *e*.

picnic	picnicking
panic	panicky
traffic	trafficked

Verbs ending in *ie*

Verbs ending in *ie* change *ie* to *y* before *ing*.

die	dying
lie	lying
vie	vying

Words ending in *n*

When the suffix *ness* is added to a word ending in *n*, the original *n* is retained.

clean	cleanness
green	greenness
keen	keenness
sudden	suddenness

SPELLING

acknowledgment
airphoto, but air photograph
alkalis (not alkalies)
all right (not alright)
analysis (singular), analyses (plural)
analogous
analyze
Archean
asymmetrical
Athabasca (not Athabaska)
augen (plu.)
augen gneiss

'badlands' (not 'bad lands' or 'bad-lands')
base level, base-level (adj.)
base line, base metal
baymouth bars
bedrock (not bed-rock or bed rock)
bench mark (in precise levelling)
bevel, bevelling, bevelled
blueberry (not blue-berry or blue berry)
blueprint
borehole
breakup
building stone (two words)
bunkhouse
burned-over (adj.)
byproduct

^{14}C
cannot, can't (one word)
canvas (cloth); canvass (political)
carload
centre, centring
channel, channelling
characterize (not -ise)
clay belt (not clay-belt)
coalfields (not coal-fields or coal fields), coal measures
coastline
collinear (not co-linear)
colour, coloration
conspecific (not cospecific)
cookhouse
co-operate, co-ordinate, coexist
coulée
cross-cut
cross-bedded and cross-bedding

cross-fault
cross-lamination
cross-section, cross-fold
Crown-granted claims
crystallize (not -ise)
cut-throat trout

damsite
defence (but defensive)
deflection
delimit
dependent (adj.); dependant (noun)
desiccate
desirable (not desireable)
develop (not develope)
dip slope
disc (not disk)
dissect (not disect)
downstream, downdropped, downslope, downthrown
drag fold (but dragline)
draft (not draught), where referring to maps
drift-covered (adj.) but the area is drift covered
drillhole (but diamond-drill hole)
dyke (not dike)

embedded (not imbedded)
enclose (not inclose)
encrustation (not incrustation)
en route (not enroute)
eolian (not aeolian)
existence (not -ance)

fault fissure, fault scarp, fault-line scarp
feldspar (not felspar). The word comes from the German Feld field, not Fels rock.
feldspar porphyry
ferromagnesian (not ferro-magnesian)
fetid (not foetid)
field work (not field-work)
fine grained (adj.)
fireclay (but firewood)
fiords
flood plain
flow lines (not flow-lines)
fluvioglacial (not hyphenated)
foregoing and forgoing are two different words
footnote (not foot-note or foot note)
footwall
freezeup

fresh water (noun), freshwater (adj.) but brackish-water (adj.)
frost table

gastropods (not gasteropods)
gauge (not guage)
glacial-lake (adj.) as in 'glacial-lake deposits' but glacial Lake Iroquois
glaciofluvial
gold-bearing (adj.)
granite gneiss, granite porphyry, granite pegmatite
green-grey (adj.), greenish-grey (adj.)
grey (not gray); but grayling (not greyling)
greywacke (not graywacke)
ground level
groundmass (not ground-mass)
ground photo
groundwater
groundwork
gully (not -ey); gullies

halfway
halo, haloes/halos
hand specimen (no hyphen)
hanging wall
hard and fast (not hard-and-fast)
hardpan (not hard-pan
hardwood (not hard-wood or hard wood)
head frame
high-water mark
hillside (not hill-side)
hilltop (not hill-top)
hinge line
honeycomb (one word)
horsepower (not horse-power); h.p. (lower case)
Hudson Bay (but Hudson's Bay Company)
hydroelectric

ice cap, ice dam, ice field, ice sheets, ice front (but iceberg)
impassable (not -ible)
inasmuch as
incise (not encise or incize)
infrared
ingoing
inquire (not enquire)
in so far as
instalment, installed, installation
inter-Glacial or interglacial (different connotations)
interstream, not inter-stream, but inter-space
iron-formation

jack pine (two words)

kame-and-kettle (topography)
kettle hole, kettle-hole (adj.)
kyanite (not cyanite)

labour, but laborious
lakebed
landform
landlocked (not land-locked)
landmark (not land-mark or land mark); landslide, landmass
large-scale (adj.)
lens (noun) not lense; lenses (plu.)
leuco-quartz diorite (but leucodiorite)
licence (noun); license (verb)
limestone conglomerate
limy; the mineral makes limy, the fruit limey
lodgment
longshore
low-grade (adj.)

maintain (but maintenance)
map-area, map-sheet, map-legend, map-unit
maritime (not maratime)
meagre (not meager)
meantime (one word)
megafauna (not mega-fauna)
meltwaters
metadiorite, metasedimentary (adj.), metavolcanic (adj.)
metre (not meter)
microfauna (not micro-fauna)
midsummer (not mid-summer)
milepost, milestone
millsite (not mill-site)
mineable
mollusc (not mollusk)
mould (not mold)
Mount Robson (not Mt. Robson), in reports
motorboat
mountainside (one word)
mud boil
mudcracks
multicoloured (one word)

nearby (not near-by)
nearshore (not near-shore)
nonmarine
northeast (not north-east) but north-northeast

occurrence (not occurrance)
oftentimes (one word)
offshore (not off-shore)

oil sands
olive-green (but dark green)
one-half, two-thirds, three-quarters, etc. (when adj.)
onshore
opencut
orebody (not ore-body or ore body), (but ore shoot)
ordinarily (not ordinarly)
outcrop (verb) (not crop out)
outcrops are (not outcrop is)
outgoing
out-of-date (adj.)
overall (adj.)
overland (adj.), (not over-land)
override, overrun (no hyphen)
oxidized (not -ised)
overlie (verb) (not overly)

Paleozoic, also paleontology (not Palaeozoic, palaeontology)
Paleocene (not Palaeocene)
paraffin (not -ine)
parallel bedding
pay ore
pay streak (not paystreak, pay-streak)
pebble conglomerate, but quartz-pebble conglomerate
peneplain (noun), but peneplaned
Pennsylvanian (not Pennslyvanian)
per cent (not percent or per-cent), but percentage
permafrost table
persistent
pipeline (not pipe-line or pipe line)
plane table, but plane-table (adj.)
plateaus or plateaux
postglacial, post-vein fault
post office (not post-office)
pothole
powerhouse
practice (noun); practise (verb)
Precambrian (not Pre-Cambrian or pre-Cambrian)
precede (not preceed)
pre-Glacial or preglacial (different connotations)
prehistoric (not pre-historic)
preoccupy
preventive (not preventative)
proglacial
program (not programme)

quartzofeldspathic (not quartzo-feldspathic)
quartz diorite (not quartz-diorite)
quartz-pebble conglomerate

quartz porphyry
quick clay
quicksand (not quick-sand or quick sand)

radioactive (one word)
railhead (one word)
railway (not railroad)
rainwater, rainfall, but rain gauge
raise (noun) not upraise; the verb is rise
rare-earth
reagent (not re-agent)
recognize (not -ise)
re-cover (a land surface) not recover
re-enter
reflection
re-formed (crystals) not reformed
re-fused (rocks)
reinforce (not re-inforce)
relict (adj.) = residual
relic (noun) memento
relocate (not re-locate)
reopen (one word)
resistance, resistant
résumé
rhyolite-porphyry
rigour, rigorous
ripple marks, ripple bedding, ripple cross-lamination
river bed, river bank, river bottom
roadbed, roadside, roadway
road-cut
rock salt (not rock-salt)
rock-type, rock-unit
rôle (not role)
runoff

saddle-horse
salt water (noun), salt-water (adj.)
sandbank, sandbar (but sand dunes)
sawmill
seabeach, seacoast
sea level
seaplane (one word)
seashore
seaside
second-growth, second-hand
seismic wave
selvage
semianthracite
semicircular

severely (not severly)
shaly (not shaley)
shear zone (not shear-zone)
shoreline (not shore-line)
shothole
sideroad
side-scan sonar
siliceous (not -ious)
sinkhole
sizable (not sizeable)
sketch map
skis, skiing
sluice gate
small-diameter hole
snowdrift
snowfield (not snow field) (but ice field)
snowline (not snow line), snowfall
steatitized (not steatized)
stillstand
stockwork
stony (not stoney)
strandline
structure section
subaerial (not sub-aerial)
subangular (not sub-angular)
subarctic
subbituminous
subconchoidal (not sub-conchoidal)
subdivision (not sub-division)
subparallel (not sub-parallel)
subprovince
subsurface (not sub-surface)
sub-unit
sulphur, sulphide (not sulfur, sulfide)
surmise (not surmize)

tableland (not table land)
tamarack
terrain (not terrane except geologically)
textbook (not text-book)
text-figure
thick bedded (adj.)
thin section (not thin-section)
thrust fault (no hyphen)
thrust block
tidewater
timberline, treeline
today, tomorrow, tonight (no hyphen)

trimline
twofold (no hyphen)

ultraviolet
underlie (not underly)
up-to-date (adj.)
usable

valley bottom, valley fill, valley floor, valley-floor (adj.)
valleyside
varicoloured (not vari-coloured)
vein-lobe (but vein zone and vein fault)
vigour (but vigorous)

wagon (not waggon)
wall rocks, wall-rock (adj.)
warehouse
waterfall, waterfowl
water level
water-laid or water-lain (according to meaning)
waterline (one word)
water-plane (but waterpower)
water table (but water-table map), water well
watershed (not water-shed), waterway
wave-cut (adj.)
wavelength
whichever (one word)
widespread (one word)
windfall (not wind-fall) but wind gap and water gap
worldwide
worth-while

xenolith (not zenolith)

zigzag (one word)
2- to 6-inch beds of shale
1918-19, but 1918, 1919, and 1930

USAGES

Various Suggestions

About and approximately

In most instances about can take the place of the more pretentious approximately. If there is a difference it is that approximately suggests a more careful calculation.

Abstract and concrete

Try to avoid the employment of the abstract for the concrete – a common error in writing. Terms implying geological processes, as mineralization, chloritization, granitization, shearing, faulting, etc., are abstract. Faulting cannot 'strike northeasterly', though the fault, or faults, or fault zone may. Another abstract term commonly misused in a concrete sense is values. Value is an attribute, not a substance. An ore does not 'carry high gold values', though it may contain much of that valuable metal. Nor does a miner 'encounter good values' in his ore, but may encounter valuable minerals, or minerals that carry valuable metals. Also, values are not lost in sinking, but the orebody may be lost.

Accessories – see intrusives

Accuracy

Common in manuscripts are such statements as 'in thin section the rock consists of feldspar and mica' or 'quartz clearly cuts hornblende in thin sections'. The entire rock consists of feldspar and mica, but this is seen only in thin sections. Similarly hornblende was cut by quartz before the thin section was made although the author may not have been aware of it.

Achieve

Achieve implies successful effort and not the mere completion of something. You may achieve a merit increase but you get a statutory raise.

Affect

This imprecise word is all too often used in place of more definite synonyms such as hinder, delay, stop, alter, etc.

Alternately and alternatively

The first of these words means by turns and the second means in a way that offers a choice.

Altitude

The terms altitude and elevation are essentially synonymous, and in most instances imply height above sea level. However, in a narrower sense, altitude applies to the approximate heights of geographic features, whereas elevations have regard to the exact heights of such as bench marks.

Anyone and everyone

The following rules should be observed: anyone (everyone, no one, someone) is the correct form when the meaning is anybody, everybody, etc. Any one (every one, no one, some one) is the correct form when things and not persons are meant.

Apparent, evident, obvious

Obvious means easily seen, in the sense of discovered. Evident denotes the existence of visible signs, all pointing to one conclusion. Apparent goes one step beyond evident and implies visible signs and some reasoning, as in: "The absurdity of their contention is apparent to one who knows the effects produced by the same causes in the past."

Approximately – see about

As far as

Distinguish between: as far as Vancouver, which implies a fact, from so far as known, which implies doubt.

Assume and presume

The object-clause following assume expresses a theory or even an hypothesis whereas the object-clause following presume expresses what the presumer really believes until proven otherwise.

Both

Do not follow both by as well as – and is quite sufficient.

Broad and wide

That the meaning of both these words is similar is shown by their having the same opposite, narrow. Wide refers to the distance that separates the limits and broad to the amplitude of what connects them. Backs, shoulders and bosoms are broad but mouths are wide.

Carbonized, carbonated and carbonatized

It has become customary in our reports to distinguish between the terms carbonized, carbonated, and carbonatized. The first means changed to carbon; the second, charged with carbonic acid; and the last, replaced by carbonate mineral.

Case

The word case is all too commonly resorted to as a trouble-saver and results in flabby writing. The word has its use but before using case or its elegant variation instance, consider rewriting the sentence.

Characteristic, distinctive, typical

Typical, which is opposed to "individual", denotes that the thing or person markedly shows the characters peculiar to the type, class, species, or group to which it belongs. The characteristic quality of something is the one that distinguishes and identifies that thing. Distinctive denotes an individuality that sets something apart from its type or group.

Clastics – see intrusives

Compare to and compare with

Attention may be drawn to the distinction between and common misuse of the expressions compare to and compare with. If one rock specimen is compared to another, the object is to indicate their similarity; but if one is compared with another, both their differences and similarities are given equal consideration, and the conclusion may be that the specimens bear little resemblance to each other. Any poet could be compared with Shakespeare, but few could be compared to him.

Comprise

The word comprise means consists of; a formation is not comprised of sandstone and shale; it comprises, or consists of, or is composed of sandstone and shale. See also under include.

Consist

Use consists of for materials and consists in for a definition or statement of identity.

Correlate

The word correlate is correctly used to indicate formations of the same age, though they may be different in lithology. A limestone formation in England, may, for example, be correlated with a sandstone formation in Alberta. The term should not be applied to separate bodies of the same formation or group, nor to what are mapped tentatively as parts of the same lithological units. Correlations may be based on paleontological or physical evidence.

Definitive

This word goes a step farther than definite and introduces a concept of finality. A definite offer may state precise terms but a definitive offer presents final terms.

Develop

Develop should be used in the sense of a gradual process and is not a synonym for arise, come, happen, occur, take, place, etc. It is correctly applied in 'developing a mine', but a prospect is explored. Other words or expressions, as uncover, unfold, bring to light, disclose, increase, produce, expand, evolve, make, contrive, construct, build, establish, compose, achieve, enlarge, expand, extend, etc., can be substituted for greater clarity and with less monotony.

Differ

When used in the sense of being different differ is followed by from. When used in the sense of having a difference of opinion it is usually followed by with but sometimes by from.

Direction

North is to be preferred where a definite designation is intended as in north bank, north side, north corner, north boundary, or in north dip, north flowing. Northward

or northerly are to be preferred where the designation is less precise, as in northward trending, northerly ranges. Bearings may be given by azimuth or by reference to north or south. Write 'the fault strikes 135 degrees', or 'the fault strikes north 45 degrees west'. Similarly write that 'glacial striae trend at 135 degrees', or give the direction as 'south 45 degrees east'. Avoid bearings such as north-south, northwest-southeast, or east-west in such statements as 'the folds trend north-south'; it is sufficient to note that 'the folds trend north'. Abbreviations may be used: for example, strike N32°W, dip 25°NE. Do not abbreviate 'north side of the lake'. Unless stated to be magnetic all bearings are assumed to be true.

Disinterested and uninterested

Your report on a mining property should be disinterested (unbiased by personal interest) but should not suggest that you are uninterested (not interested) in the subject.

Due to

Although the OED does not equate due to and owing to, current usage indicates that due to has become a compound preposition. 'Due to the storm the trip was postponed'.

Elevation – see altitude

Emphasis

Many writers overlook the emphasis that can be gained by rearranging the order of words in a sentence. For example, in the following sentence the emphasis is on discovery: 'The discovery of gold in the Klondike was made in 1896'. If it is desired to emphasize gold, the sentence should read: 'Gold was discovered in the Klondike in 1896'. To emphasize the Klondike the sentence should read: 'The Klondike gold discoveries were made in 1896', and, to stress the date, should be reworded to: 'In 1896 gold was discovered in the Klondike'.

Encountered

Encountered is commonly used for observed. One encounters a grizzly but observes a deformation pattern.

Essentially

Essentially means necessarily or indispensably. As used in scientific writing in the sense of principally, chiefly, mainly, virtually, in effect, most of, and almost, essentially is a poor choice. "Most of the formation is limestone" is preferable to "The formation is essentially limestone".

Extend

Consider the merits of give, accord or offer when expressing thanks to your associates.

Facilitate

"The field officer was facilitated in his work by the manager of the Hudson's Bay Company store". Wrong. The work may have been facilitated but not the officer.

Fact

The tendency to use such meaningless phrases as as a matter of fact, in fact, the fact is, actually, may reflect a sense of insecurity in the writer. He attempts to assure his reader that he is dealing with facts and actualities not theories and surmises.

Factor

A factor is something that contributes to an effect but too commonly it is made to serve inappropriately for such words as circumstance, component, consideration, constituent, element, event, fact.

Farther

Use farther when implying distance; but use further when implying something additional, as 'with further regard to...'.

First person

It has become customary in scientific writing to avoid using the first person, a practice that has many advantages and avoids tedious repetition of personal pronouns. It can however result in clumsy circumlocutions and a rather lifeless style of writing using the passive voice. Effective use of the first person in technical writing is permissible but requires more than average skill.

For and of

John Smith is manager for a company and of a mine.

Frequently – see occasionally

Generally speaking

Avoid the expression generally speaking in such sentences as: 'Generally speaking, the rocks are well exposed'. No one is speaking – not even the rocks.

Hanging participle

Care should be taken to avoid the 'hanging' participle, gerundial, or infinitive phrase, that is, one for which the subject is missing. Amusing illustrations have been quoted as: (a) Having eaten our lunch, the boat sailed for Quebec; or (b) When three years old (or, at the age of three), my grandmother died. Actually however, these are no more absurd than the following: (a) 'Approaching the contact, the phenocrysts decrease in size'; (b) 'On crossing the ridge, the quartz veins appeared at closer intervals'; or (c) 'Reviewing the preceding paragraphs, the Cache Creek Group...'.

Horizon

A horizon, is, theoretically, a plane, and the word should not be used in reference to features that have implied or measured thicknesses. Alternative words are zone, band, belt, bed, seam, parting, etc. Thus we have platy zones, fossil zones, mineral belts, ironstone bands, concretionary bands, sandstone beds, seams of coal, and partings of shale, bentonite, etc.

i. e. and e. g.

The first stands for id est (that is) and introduces a definition; the second stands for exempli gratia (for the sake of example) and introduces an illustration.

Imply and infer

Do not confuse these words. 'What do you imply by that remark?' 'What am I to infer from that remark?'

Include

The verb include implies only part of a whole; the verb comprise implies all. For example, a section may include fossiliferous limestone, but it comprises this limestone as well as other rocks.

Infinitive phrase – see hanging participle

Intrusives

The words intrusives, pyroclastics, clastics, and accessories are not nouns, and when used in that sense are geological lingo. Preferably they should be used only in the adjectival sense; use intrusions or intrusive rocks, accessory minerals, etc.

-ize, -ise, verbal endings

Most verbs ending with sound iz derive from the Greek izo and hence the current North American usage, ize, is the more correct, e. g. analyze. There are some verbs however that do not trace their lineage to a Greek source and these should be spelled with ise. Some examples are advertise, advise, apprise, comprise, despise, enterprise, exercise, improvise, incise, revise, surprise, surmise, televise.

Isotopic nomenclature

^{14}C; $^{40}Ar/^{40}K$

Locate

Locate is commonly misused, as in the expressions: the Company located the mill; he was located at Toronto; or he located the ore shoot. Use other words, such as place, situate, reside, find, etc. A millsite may be located (established in a certain position), but the mill is built at a certain place. You may locate a claim, but you find the ore on it. In many instances, too, the word may be omitted to advantage, as in the sentence: 'The millsite is on (not located on) Spring Creek'.

Major and majority

These words should be restricted to senses that involve numbers and should not be carelessly substituted for the greater part of a whole that is not numerical.

Many

This phrase requires a singular verb.

Map-area

Do not confuse a map or sheet with a map-area. You set up camp, run traverses, and examine the geology in a map-area or area, not in a map, map-sheet, or sheet, which is a piece of paper.

More or less

More or less is an expression that is much overworked. 'The beds are more or less vertical' or 'The situation is more or less unique'. These are poor sentences. Nothing can be more than vertical or more than unique. Almost, approximately, virtually, are more appropriate.

More than and over – see over

Near by

Near by is an adverb, nearby an adjective.

Non-

A useful negative prefix but do not use it in preference to more colourful antonyms. Thus unessential is usually a better word than non-essential and dissent is to be preferred to non-concurrence.

Observed – see encountered

Occasionally

Occasionally, frequently, and often imply time, as 'I go there occasionally'. They are commonly misused for the words in places, in many places, here and there, rarely, and commonly, with reference to place. You may hear wolves frequently (not commonly) but see them rarely (not occasionally).

Often – see occasionally

Occur

Occur is overdone by many writers. Commonly it can be substituted for by some other word or words giving a more precise meaning as: find, happen, exist, follow, be present, be, live, stand, ensue, take place, etc.

One

Do not use one as a first-person pronoun. 'One must complete the program although I know that the season is late'. Its use as an impersonal pronoun is acceptable.

Orient and Orientate

Both forms of this verb are acceptable and both give rise to the same noun orientation.

Over and more than

Do not use over for more than; you can go over the top, but can't walk more than 5 miles in an hour. A gully is not over 200 feet deep but is more than 200 feet deep.

Owing to

Owing to is commonly followed by the fact that, a wordy phrase for which the conjunctions because, for, or as might better be substituted (see also due to).

Partially and partly

Partially is commonly misused for partly, as in the sentences: 'The area is partially drift covered'; 'the orebin is partially filled'; or 'the granodiorite is partially altered'; etc. Partially implies partiality, and should never be used without first considering the claims of partly.

Particular

Do not misuse this strong adjective. Use it for emphasis. The noun to which it is attached should be one that you wish to single out.

Plateau

Although plateaux and plateaus are acceptable plurals for this and similar words, the latter is preferable.

Portion

Portion is commonly misused for part, as in 'the northern portion of the area'. Portion refers to share as in 'your portion of the profits'.

Practically

Do not use this word as a substitute for almost or nearly. It is absurd to write that a political candidate practically won when actually he lost.

Prefixes pre and post

The prefixes pre and post are used with time verbs or their derivative nouns to mean "before (or after) in time, previous (later)". When these prefixes are affixed to nouns of adjectives they mean "before (or after), front (hind), anterior (posterior)". Thus it is correct to say:

pre-August sale
postoperative
postdepositional
pre-Fraser Valley Glaciation

Geologic time terms may be used with these prefixes, as, pre-Jurassic, Precambrian, post-Tertiary, and post-Mississippian.

Program and programme

Program, the preferred spelling, was the common form even in Britain until the nineteenth century.

Pyroclastics – see intrusives

Quantity

Avoid such expressions as the majority of, a good deal of, a lot of, and a number of, where the words most or much will serve for the first three expressions, and

one or other of a few, several, many, or numerous will convey a more definite meaning for the last.

Quite

The word quite means absolute, to the fullest extent, or without limitation. It is commonly misused to qualify rather than, properly to establish a condition or quality, as in the statement: 'the pebbles are quite round', meaning nearly round. Pebbles that are 'quite round' should be absolutely spherical.

Range

The word range implies a minimum as well as a maximum limit; it is incorrect to say 'the beds range up to 10 feet thick'.

Redundant words

Many reports are littered with the expressions, there is, there are, there were, etc., implying, in most instances, either careless writing or loose thinking. Generally such words can be avoided and the sentences rewritten in more compact form, as: 'In most specimens there is more biotite than hornblende', which can be rewritten to advantage as: 'Most specimens contain more biotite than hornblende'; or 'there are fourteen veins exposed on this property' (Fourteen veins are exposed on this property); or 'In this township there are many outcrops' (This township provides many outcrops). Use sparingly such verb forms as: meet with, dealt in, operated on, reported on, make up, divide up, split up, empty out, start up, climb up, close down, flow down, cave in, etc. Not uncommonly the extra word is redundant, or such compound expressions can be replaced by singles words, as:

carry out – perform
look after – watch
fall off – decline
prove up – test
dies out – ends

The following are other examples of unnecessary words:

He walked for a distance of 10 miles.
At the present time.
Exposed at the surface; or surface outcrops.
Mining is carried on extensively throughout the area.
In the vicinity of for near.
Covered over for covered.
Pyrite, chalcopyrite, and also free gold.
The rock is dark green in colour.
The conditions were favourable for landslides to occur.
An innumerable number of tiny veins.
Contemporaneous in age.
So far as is known.
A rough estimate of the approximate position.
Change: 'good lighting conditions were absent on many flights' to 'light conditions were poor on many flights', and 'bedded to completely unbedded' to 'bedded to massive'.

The following sentence will illustrate the use of unnecessary words (underlined), and the advantage gained by their elimination; the words in parentheses are added to complete the sentence; 'All of the wells in this township are in the glacial drift and the majority (most) of them are less than 30 feet (deep) with only a few deeper ones'.

Sediments

The term sediments may be used in the place of sedimentary rocks where more convenient.

Sharp

Sharp, not sharply is the right adverb to use in matters of time and direction. 'Turn sharp right at the station'. 'Meet me at eight o'clock sharp'.

So far as – see as far as

Somewhat

If a mineral is somewhat altered, it is altered, and somewhat is unnecessary; if some attempt is being made to indicate the degree of alteration, use more specific terms, such as slightly, partly, largely or completely. In the same class with this word are several others – perhaps, about, considerable, probably, and rather, as: 'the quartz is rather hard, and walls are very straight'; the lode is probably about 10 feet wide'; and 'the value of the gold produced was considerable'.

Tends to

Tends to – is incorrectly used in such expressions as: 'The vein tends to split...' or 'The fault tends to swing to the north'. Either the vein splits, or it doesn't; and, similarly, either the fault swings or it maintains its course. The expression is used correctly in the sentence: 'Dispositions tend to change with age'.

Terminations

Use the terminations -ic and -ical in a phonetic sense, except where custom may have dictated otherwise: e. g., avoid geologic but prefer topographic, except for Topographical Survey.

The

The article the is generally unnecessary as applied to name streams, valleys, or other topographic or physiographic features, as: (the) Mackenzie River, (the) Fraser River valley, (the) Porcupine Creek, etc., though the ruling is not empirical and, in some instances, custom prefers its retention, as the Rocky Mountains, the Coast Range, the Great Lakes, the Great Plains, etc. On the other hand, use the in such expressions as the Mackenzie, the Liard River bridge, and the Bearpaw Formation.

Thick or thickness

The expression 'the beds are 2 to 3 feet thick' is preferable to 'the beds are 2 to 3 feet in thickness', but no choice is allowed in the expression 'the beds vary in thickness from 2 to 3 feet'.

Time comparisons

The terms earlier and older (also later and younger) are commonly misused in geological maps and reports. Earlier is a time term, as in 'Upper Cretaceous or earlier'; older refers to rocks and rock formations, as in 'Blackstone Formation or older'.

Time terms

While, when, since, never, and often are essentially time terms, and should, properly, be replaced by although, where, because, as, nowhere, commonly, etc., in such sentences as: 'While others may disagree, I am prepared to defend this usage'; 'When the fault swings to the west', etc.; or 'Since the shaft is caved, no examination can be made'. They are correctly used in: 'While I am away, you...'; 'When the first assays were run...'; or 'Since the first World War, prices...'.

Titles

Titles, such as Dr., Mr., etc., should be used sparingly and if doubt arises are better omitted. Authors must be careful that names, initials and titles of persons, companies or organizations are cited correctly.

Upon and on

Most authorities agree that these words are interchangeable and the choice of one or the other depends on rhythm, emphasis, or convention.

Utilize and use

There is little difference in meaning between these words. Utilize tends to convey the meaning that good use was made of something not originally designed for the purpose and possibly under trying conditions. '...and for a bathtub they utilized an old 45-gallon drum'.

Verbal

Do not use verbal, which means 'in words', when oral, which means 'in spoken words', is meant. For example, the sentence 'The object of the provision was to apply it to all contracts whether in writing or verbal' is incorrect.

Very

Nine times out of ten the word very can be omitted without loss, and not uncommonly its use defeats its purpose, as: 'This machine makes a very perfect separation of the ore minerals from the gangue'. Nothing could be better than a perfect separation; the word very here implies 'nearly perfect'. As another example, the written statement that 'this is a very good report', is meaningless, for, depending upon how it is spoken, the report may be exceptionally good, or of normal expectancy, or distinctly disappointing to the reader. Other examples are: 'The water-bearing beds are not very widespread' (meaning of limited extent); 'The shale is very impervious'; and the expression 'very approximately' (meaning roughly).

Voice

A change of voice, from active to passive or vice versa, should not occur in a sentence, and preferably not in a paragraph. For example, the sentence: 'The

writer spent last season in the area, and it is expected that he will return next year' should read: 'The writer spent last season in the area, and expects to return next year'. It will be observed that the corrected sentence also avoids a circumlocution.

Volcanics, metamorphics, clastics and similar words are acceptable in geological writing.

Which and that

Much confusion seems to arise over the correct use of the relative pronouns which and that, and literature, in general, is plagued with ill-sounding 'whiches' that could so readily and properly have been replaced by phonetic 'thats'. The rule seems simple enough: use which when introducing a new fact about the antecedent; use that when introducing something without which the antecedent is incomplete or undefined. For example: 'The process, which is of recent invention, extracts both the gold and the silver'; 'This is the house that Jack built'. It is well to note that the second sentence could be modified to read: 'The house, which Jack built, was destroyed by fire'; but in this sentence the emphasis would be transferred from 'Jack' to the destruction of the house, and the fact that Jack had built it could be omitted without loss in the sentence structure. Consider the difference in meaning between: 'The houses that are made of brick are ugly', and 'the houses, which are made of brick, are ugly'. The effective use of the comma, in separating clauses commencing with which, leaves little doubt as to the meaning intended.

With

With is much misused, especially for "and" as in the examples below:

The vein has northeast strike and (not with) a vertical dip.
The rocks have been indurated, tilted, and slightly folded.
not The rocks have been indurated and tilted, with some slight folding.

With is used in the sense of "but" and a verb in the following sentences:

The rocks are mostly grey slate but include some greywacke.
not The rocks are mostly grey slate with some greywacke.

The water is very clear but has a faint bluish tinge.
not The water is very clear with a faint bluish tinge.

The surface of the bedrock is fairly even but contains depressions representing temporary channels of the shifting creek.
not The surface of the bedrock is fairly even with depressions representing...

With is sometimes used in place of a verb, as in the example:

The rock is even-grained, finely laminated, and well bedded and exhibits clearly defined jointing.
not The rock is even grained, finely laminated, and well bedded with clearly defined jointing.

APPENDIX I

CODE OF STRATIGRAPHIC NOMENCLATURE

AMERICAN COMMISSION ON STRATIGRAPHIC NOMENCLATURE

(reproduced by permission of the Commission
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The American Association of Petroleum Geologists, Inc., 1970)

Although the code is followed in great part,
not all recommendations of the Commission have
necessarily been adopted by the Geological Survey.

*As amended from the 1961 code, published in The American Association of Petroleum Geologists *Bulletin,* v. 45, no. 5, May 1961, p. 645-665. Amendments approved by the Commission appear in the following Notes:

Note 28–The American Association of Petroleum Geologists *Bulletin,* v. 46, no. 10, October 1962, p. 1935.

Note 30–The American Association of Petroleum Geologists *Bulletin,* v. 48, no. 5, May 1964, p. 710-711.

Note 33–The American Association of Petroleum Geologists *Bulletin*, v. 50, no. 3, March 1966, p. 560-561.

Note 35–The American Association of Petroleum Geologists *Bulletin,* v. 51, no. 9, September 1967, p. 1868-1869.

Note 36–The American Association of Petroleum Geologists *Bulletin,* v. 53, no. 9, September 1969, p. 2005-2006.

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CODE OF STRATIGRAPHIC NOMENCLATURE*

AMERICAN COMMISSION ON STRATIGRAPHIC NOMENCLATURE

Contents

COMMISSION ON NOMENCLATURE

PREAMBLE

Article 1.—The American Commission on Stratigraphic Nomenclature,[1] recognizing the desirability of uniform usage in stratigraphic classification and terminology throughout the continent of North America, proposes the following code. The prime purpose is (i) to formulate a usefully comprehensive, yet explicit statement of principles and practices for classifying and naming stratigraphic units, and (ii) to secure the greatest possible uniformity in applying these principles and practices. This code is applicable to all kinds of rocks, sedimentary, igneous, and metamorphic. The Commission has been guided by the philosophy expressed in its reports[2] on the nature, usage, and nomenclature of rock-stratigraphic, biostratigraphic, and time-stratigraphic units. The Articles of this code are recommendations that can not be generally mandatory, but geological organizations may adopt these articles as their rules of nomenclatorial procedure.

CATEGORIES OF STRATIGRAPHIC UNITS

Article 2.—Categories of stratigraphic units are multiple. According to different concepts and criteria, they comprise various mutually overlapping but distinct types of stratigraphic units. This code provides regulations and recommendations relating to (i) rock-stratigraphic units, (ii) soil-stratigraphic units, (iii) biostratigraphic units, and (iv) time-stratigraphic units. The code also treats two categories of units that are not in themselves stratigraphic units but are closely related. These are (v) geologic-time units, which are fundamentally related in concept to time-stratigraphic units, and (vi) geologic-climate units, which are based on Quaternary stratigraphic units.

Remark. (*a*) *Homotaxis.*—Rock-stratigraphic units or

[1] American Commission on Stratigraphic Nomenclature, 1947, Note 1—Organization and objectives of the Stratigraphic Commission: Am. Assoc. Petroleum Geologists Bull., v. 31, no. 3 (Mar.), p. 513–518, summarizes the history leading to its formation. In 1932 a committee of representatives from four organizations, the American Association of Petroleum Geologists, the Geological Society of America, the Association of American State Geologists, and the United States Geological Survey, formulated rules for the "Classification and nomenclature of rock units." When the committee had completed its code, which was published in 1933 (see Article 3, footnote), it disbanded. The four organizations severally continued to be concerned with the problems of stratigraphic nomenclature in the United States, and at least one such problem was referred to the Committee on Stratigraphy of the National Research Council. Note 1 of the Commission on Stratigraphic Nomenclature describes its founding, proposed in 1941 and achieved in 1946, with representatives from five organizations: Geological Survey of Canada, American Association of Petroleum Geologists, Geological Society of America, Association of American State Geologists, and United States Geological Survey. The Commission became more substantially American in 1955, when it was joined by representatives of three Mexican organizations: Asociación Mexicana de Geólogos Petroleros, Sociedad Geológica Mexicana, and Instituto de Geología de la Universidad Nacional Autónoma de México.

[2] American Commission on Stratigraphic Nomenclature, 1949, Report 1—Declaration on naming of subsurface stratigraphic units: Am. Assoc. Petroleum Geologists Bull., v. 33, no. 7 (July), p. 1280–82.

——— 1952, Report 2—Nature, usage, and nomenclature of time-stratigraphic and geologic-time units: Am. Assoc. Petroleum Geologists Bull., v. 36, no. 8 (Aug.), p. 1627–1638.

——— 1955, Report 3—Nature, usage, and nomenclature of time-stratigraphic and geologic-time units as applied to the Precambrian: Am. Assoc. Petroleum Geologists Bull., v. 39, no. 9 (Sept.), p. 1859–1861.

——— 1956, Report 4—Nature, usage, and nomenclature of rock-stratigraphic units: Am. Assoc. Petroleum Geologists Bull., v. 40, no. 8 (Aug.), p. 2003–2014.

——— 1957, Report 5—Nature, usage, and nomenclature of biostratigraphic units: Am. Assoc. Petroleum Geologists Bull., v. 41, no. 8 (Aug.), p. 1877–1889.

——— 1959, Report 6—Application of stratigraphic classification and nomenclature to the Quaternary: Am. Assoc. Petroleum Geologists Bull., v. 43, no. 3 (Mar.), p. 663–673.

biostratigraphic units that have a similar order of arrangement in different locations but are not necessarily contemporaneous are said to be homotaxial.[3]

Formal and Informal Names and Units

Article 3.—The code is a systematic collection of rules of formal stratigraphic classification and nomenclature. A stratigraphic unit of one of the categories mentioned in Article 2 and its name are classified as formal if they are proposed in publication in conformance with Article 13 and meet other requirements specified in the code. A valid name is preempted from use as the name of any other formal unit in the same category. (See also Articles 4i, 10 to 12, 14 to 18, 24, and 32 to 35.) Publication in abstracts, guidebooks, microfilms, newspapers, or in commercial or trade journals, even in regularly published series, is not valid publication. A stratigraphic unit and its name are classified as informal if they are not formally proposed. (See Articles 4fghi, 5c, 7a, 8ab, 10gh, 13cde, 20a, 23b, 24, 37ab, 38ac, and 40b.) The geologic vocabulary of North America contains a great many formal names of stratigraphic units, which have been proposed more or less in accordance with these rules and the rules of the previous code.[4] Many formal names antedate the rules. The names and nomenclatural history of formal units are recorded in compendia maintained by the Geologic Names Committee of the United States Geological Survey, Washington, D. C., by the Committee on Stratigraphic Nomenclature of the Geological Survey of Canada, Ottawa, Ontario, by the Instituto de Geología, Ciudad Universitaria, México, D. F., and by some state geological surveys. Information as to the status or availability of names can be obtained from these organizations on request.

Rock-Stratigraphic (Lithostratigraphic) Units

Nature of Rock-Stratigraphic Units

Article 4.—A rock-stratigraphic unit is a subdivision of the rocks in the earth's crust distinguished and delimited on the basis of lithologic characteristics.

Remarks. (*a*) *Recognition and definition.*—Rock-stratigraphic units are recognized and defined by observable physical features rather than by inferred geologic history; boundaries may be placed at sharp contacts or drawn arbitrarily within a zone of gradation. Rock-stratigraphic units are essentially the practical units of general geologic work that serve as a foundation for describing and studying lithology, local and regional structure, stratigraphy, economic resources, and geologic history.

(*b*) *Type section and extent.*—The definiton of a rock-stratigraphic unit should be based on as full knowledge as possible of its lateral and vertical variations, but for purposes of nomenclatural stability a type section should be designated. Extension of a defined unit to separated bodies of rock is permissible only where they are homotaxial (Article 2a).

(*c*) *Independence from inferred geologic history.*—Concepts based on inferred geologic history or biologic sequence properly play no part in the definition or differentiation of a rock-stratigraphic unit. Nevertheless, fossils may be valuable as physical criteria in defining a rock-stratigraphic unit in the same way as other physical constituents; for example, oyster-rich sandstone, coquina, algal reef.

(*d*) *Independence from time concepts.*—A rock-stratigraphic unit may possess approximately isochronous boundaries, or its boundaries may transgress time horizons. Concepts of time-spans, however measured, properly play no part in differentiating or determining the boundaries of any rock-stratigraphic unit. Either relatively short or relatively long intervals of time may be represented by a single rock unit, whether it be sedimentary, igneous, or metamorphic, but this factor is irrelevant to recognition of the unit. The accumulation of material assigned to a particular unit may have begun or ended earlier in some localities than in others; also removal of rock material by erosion, either within the time span of deposition of the unit or later, may reduce the time-span represented by the unit. The entire thickness of a body in some places may be younger than the entire thickness of the same body in other places. The definition of rock units is thus completely independent of time concepts.

(*e*) *Surface form.*—In surficial deposits, the constructional morphologic character, or primary surface form, of a rock-stratigraphic unit may be a factor in its definition, but should be subsidiary to the character of the rock itself. In any rock-stratigraphic unit, erosional morphology or secondary surface form may be a factor in the recognition of the unit but properly should play no part in the definition.

(*f*) *Aquifers, oil sands, coal beds, and quarry layers* are, in general, informal units even though named. Some such units, however, are stratigraphically significant and may be recognized formally as beds, members, or formations. The formal names should be proposed in accordance with Article 10.

(*g*) *Zone.*—As applied to the designation of rock-stratigraphic units, the term "zone" is informal. Examples are "producing zone," "mineralized zone," "metamorphic zone," and "heavy-mineral zone" (see Article 20a). A zone is set off as distinct from surrounding parts and may include all or parts of a bed, a member, a formation, or even a group.

(*h*) *Cyclothems.*—Cyclical sedimentary sequences called cyclothems have been widely recognized in the Mid-Continent and other regions. Geographic names have been given to many cyclothems. Because the criteria for the recognition of cyclothems are irrelevant to those for recognition of a formation, cyclothems can not be regarded as a part of rock-stratigraphic classification. The designation "cyclothem" should always be applied, if a geographic term is used in this way. Never-

[3] Huxley, T. H., 1862 and 1870, The anniversary address of the President: Quart. Jour. Geol. Soc. London, v. 18, p. xlii, and v. 26, p. xlii–xliv.

[4] Committee on Stratigraphic Nomenclature, 1933, Classification and nomenclature of rock units: Geol. Soc. America Bull., v. 44, pt. 2 (30 Apr.), p. 423–459; Am. Assoc. Petroleum Geologists Bull., v. 17, no. 7 (July), p. 843–863; Am. Assoc. Petroleum Geologists Bull., v. 23, no. 7 (July, 1939), p. 1068–1088.

theless, the boundaries of an individual cyclothem may actually coincide with those of a particular formation.

(*i*) *Soil* is a layer composed of products of weathering of pre-existing rocks, which may be of diverse character and geologic age. A soil differs in several respects from a rock-stratigraphic unit and should not be given formal status in the standard rock-stratigraphic classification. (See Article 18.)

Article 5.—Boundaries of rock-stratigraphic units are placed at positions of lithologic change. Boundaries are placed at sharp contacts or may be fixed arbitrarily within zones of gradation. Both vertical and lateral boundaries are based on the lithologic criteria that provide the greatest unity and practical utility.

Remarks. (*a*) *Boundary in a gradational sequence.* – A named rock-stratigraphic unit is preferably bounded by a single lower and a single upper surface so that the name does not recur in a normal stratigraphic succession. (See remark e.) Where one rock unit passes vertically or laterally into another by intergrading or interfingering of two or more kinds of rock, the boundary is necessarily arbitrary and should be selected to provide the most practical units. For example, where a shale unit overlies a unit of interbedded limestone and shale, the boundary commonly is placed at the top of the highest readily traceable limestone bed; where a sandstone unit grades upward into shale, the boundary may be so gradational as to require completely arbitrary treatment. Because of creep, it is generally best to define such arbitrary boundaries by the highest occurrence of a particular lithologic type, rather than the lowest.

(*b*) *Key beds used for boundaries.*—Key beds may be used as boundaries for formal rock-stratigraphic units over an area where the internal lithologic characteristics of the units remain relatively constant. Even though key beds may be traceable beyond the area of the diagnostic over-all lithology, an extension of the potential boundary markers does not alone justify geographic extension of a rock-stratigraphic unit. Where the rock between key beds becomes drastically different from that of the type locality, a new unit should be recognized, even though key beds are continuous. (See Article 8b.)

(*c*) *Mechanically defined boundaries.*—The continuing development and application of geophysical, geochemical, and mineralogic techniques have given rise to problems concerning both the vertical and lateral boundaries of units defined and identified by these techniques. Marker horizons based on electrical and other mechanically recorded logs may coincide with the boundaries of rock-stratigraphic units and help to delineate them (see Articles 6b and 13b). Such horizons may be discordant vertically or laterally with those of formal rock stratigraphic units. Units established by these techniques are considered informal.

(*d*) *Obscure unconformity.*—A sequence of closely similar rocks may not represent continuous deposition, but may include an obscure unconformity so that a separation into two units may be desirable. If, however, no lithologic distinction adequate to define a boundary can be made, only one unit should be recognized even though it may include rock deposited in different epochs, periods, or eras.

(*e*) *Boundaries in facies change.*–Where a unit changes laterally through abrupt gradation into or intertonguing with a markedly different kind of rock it may be desirable to propose a new unit. An arbitrary boundary, for example, a vertical cut-off, may be placed between the two units. Where the area of intergradation or intertonguing is sufficiently extensive, the rocks of mixed lithology may constitute a third independent unit. Where tongues (Article 7) of formations are mapped separately or otherwise set apart without being formally named, the unmodified formation name should not be repeated in a normal stratigraphic sequence, although the modified name may be repeated in such phrases as "the lower tongue of Mancos Shale" and "upper tongue of Mancos Shale." To show the order of superposition on maps and cross sections, the unnamed tongues may be distinguished informally by number or letters or by other means.

RANKS OF ROCK-STRATIGRAPHIC UNITS

Article 6.—The formation is the fundamental unit in rock stratigraphic classification. A formation is a body of rock characterized by lithologic homogeneity; it is prevailingly but not necessarily tabular and is mappable at the earth's surface or traceable in the subsurface.

Remarks. (*a*) *Content.*—A formation should possess some degree of internal lithologic homogeneity or distinctive lithologic features. It may contain between its upper and lower limits (i) rock of one lithologic type, (ii) repetitions of two or more lithologic types, or (iii) extreme heterogeneity of constitution which in itself may constitute a form of unity compared to the adjacent rock units.

(*b*) *Distinctive lithologic characteristics* may include chemical composition and such supplementary features as ripple marks, mud cracks, cross-bedding, the presence of fossils or unusual minerals, schistose or gneissic structure in metamorphic rocks, and texture in igneous rocks. A unit distinguishable only by its fossils is not a rock-stratigraphic unit but is properly classified as a biostratigraphic unit (see Article 4c). Lithology may be distinctively reflected by electrical, radioactive, seismic, or other properties (see Articles 5c and 13b).

(*c*) *Fundamental unit.*—Formations are the basic rock-stratigraphic units used in describing and interpreting the geology of a region. The limits of a formation normally are those boundaries of lithologic change that give it the greatest practicable unity of constitution. A formation may represent a long or short time interval, may be composed of materials from one or several sources, and may include breaks in the time-stratigraphic sequence.

(*d*) *Mappability.*—Practicability of surface or subsurface mapping is essential in establishing a formation. Mappability at the surface is considered as delineation at scales of the order of 1:25 000. In general, the definition of a new formation should be based upon tested mappability, rather than upon a type section alone, however completely exposed the type section may be.

(*e*) *Thickness* of a formation is not a determining feature in its classification. A formation has three dimensions, and its thickness may range from a featheredge at its margin to 5 000 feet or more elsewhere. Also, a formation 10 feet thick may be adjacent to another 1 000 feet thick. Exceptionally a formation may be mapped as a single line, but obviously a sequence of formations so thin becomes impractical because unmappable.

(*f*) *Sedimentary rock and extrusive igneous rock* that are intricately interbedded may be assembled into a formation under one name.

(*g*) *Volcanic rock.*—Cartographically distinguishable

sequences of volcanic rock should be treated as formations like any stratified sequence of sedimentary rocks. (See Articles 9f and 30d.)

(*h*) *Intrusive igneous rock.*—Units composed of intrusive igneous rock that are discriminated by mineralogic or textural characteristics, or chemical composition, may be classed as formations. (See Article 10i.)

(*i*) *Metamorphic rock.*—Formations composed of metamorphic rock are, like other formations, distinguished primarily by lithologic composition. The mineral facies may differ from place to place, but these variations do not necessarily require definition of a new formation. Metamorphic rocks with relict textures and structures that enable the geologist to recognize mappable units should be classified just as any normal stratigraphic sequence. Metamorphic and metasomatic rocks not classifiable by normal stratigraphic methods have to be discriminated primarily on their petrographic and structural features. (See Article 10j.)

(*j*) *Complex.*—If a mass of rock is composed of diverse types of any class or classes or is characterized by highly complicated structure, the word "complex" may be used as part of the formal name instead of a lithologic or rank term; for example, Crooks Complex.

Article 7.—A member is a part of a formation; it is not defined by specified shape or extent. A geographically restricted member that terminates on all sides within a formation may be called a lentil. A member that extends outward beyond the main body of a formation may be called a tongue.

Remarks. (*a*) *Designation of members.*—Formations may be divided into formally defined and named members. In some formations, one or more formal members are established, while the remainder of the formation is undivided or is treated as one or more unnamed members. If formations are divided into members designated solely by lithology (for example, siliceous shale member), or by letter or number, the usage is informal. Although members normally are in vertical sequence, laterally equivalent parts of a formation that differ recognizably may also be considered members; for example, the gravel member and the silt member of the Bonneville Formation.

(*b*) *Mapping of members.*—A member is established when it is advantageous to recognize a specially developed part of a varied formation. A member, whether named or unnamed, need not be mappable at the scale required for formations. Even though all members of a formation are locally mappable, it does not follow that they should be raised to formational rank, because multiplicity of formation names may obscure rather than clarify relations with other areas. A named member may extend from one formation into another.

(*c*) *Subdivision of members.*—Members may contain beds but never members of members.

Article 8.—A bed is the smallest rock-stratigraphic unit recognized in classification.

Remarks. (*a*) *Informal status of most beds.*—The designation of individual beds as formally named rock-stratigraphic units should generally be limited to certain distinctive beds which are particularly useful to recognize. Coal beds, oil sands, and other beds of economic importance are commonly named, but such units and their names are not usually a part of formal stratigraphic nomenclature. (See Article 4f and 10gh.)

(*b*) *Key or marker beds.*—Widely distributed key beds may be named, but these likewise are usually considered informal units. Individual key beds may be traced beyond the lateral limits of a particular formal unit. (See Article 5b.)

Article 9.—A group is the rock-stratigraphic unit next higher in rank than a formation; a group consists of two or more associated formations.

Remarks. (*a*) *Use and composition.*—Groups are recognized for the purpose of expressing the natural relations of associated formations having significant lithologic features in common. A group consists wholly of divisions defined as formations; in this respect, it contrasts with a formation and its members, for a formation need not be divided into members, and, even if a formation contains members, not every part of it need be assigned to any member. In some reconnaissance work, the term "group" has been applied to stratigraphic units that appear to be divisible into formations but have not yet been so divided.

(*b*) *Change in component formations.*—The component formations of a group are not necessarily everywhere the same. For example, in the upper part of Glen Canyon, Utah, the Glen Canyon Group comprises three formations, the Wingate Sandstone, the Kayenta Formation, and the Navajo Sandstone. At Serpents Trail, Colorado, it is composed of Wingate and Kayenta.

(*c*) *Change in rank.*—The wedge-out of a component formation or formations may justify the reduction of the group to formation rank, retaining the same name. When a group is extended laterally beyond where it is divided into formations, it becomes in effect a formation, even if it is still called a group. When a previously established formation is broken down into two or more component units that are formally given formation rank, the old formation, with its old geographic name, should be raised to group status. Raising the rank of the unit is preferable to restricting the old name to a part of its former limits, because a change in rank leaves the sense of the geographic part of the name unchanged. (See Article 14b.)

(*d*) *Subgroup.*—The hierarchy of rock-stratigraphic units (group, formation, member) does not always provide a sufficient number of categories for the proper relative assignment of all units. In certain areas stratigraphers have named and defined assemblages of formations within already established useful groups and called these assemblages subgroups.

(*e*) *Supergroup.*—In certain areas stratigraphers need a supergroup; that is, a formal assemblage of related groups or of formations and groups.

(*f*) *Misuse of "series" for group or supergroup.*—The term "series" has been employed for an assemblage of formations or an assemblage of formations and groups, especially in the Precambrian, but should no longer be so used. These are groups or supergroups. The term "series" has also been applied to a sequence of rocks resulting from a succession of eruptions or intrusions. In this usage "series" is usually preceded by an adjective such as eruptive, intrusive, or volcanic to indicate the origin of the rock. Here, as elsewhere in rock-stratigraphy, group should replace "series." Series is a time-stratigraphic term that should not be used in a rock-stratigraphic sense. (See Articles 6g and 30d.)

NOMENCLATURE OF ROCK-STRATIGRAPHIC UNITS

Article 10.—The formal name of a rock-stratigraphic unit of any rank is binomial, consisting of

a geographic name combined with a descriptive lithologic term or with the appropriate rank term alone. Capitalization of the initial letters of all words used in forming the names of formal rock-stratigraphic units is recommended.

Remarks. (*a*) *Source of geographic name.*—The geographic name should be the name of a natural or artificial feature at or near which the rock-stratigraphic unit is typically developed. Names derived from such changeable sources as the names of farms or ranches, churches, schools, crossroads, and small communities, are not entirely satisfactory but are acceptable if no others are available. Names for formations or other important rock units may be selected from those that can be found in an ordinary atlas, or on state or provincial, county, forest service, topographic, or similar maps. If a name that does not meet this test is used, precise description of the place from which the name is derived should be given. A subsurface unit may be given a farm name, if its type locality happens to be in some sparsely populated area with few geographic names. A unit should not be named from the source of its materials; for example, a deposit supposedly derived from the Keewatin center should not be called "Keewatin Drift."

(*b*) *Omission of part of name.*—Where frequent repetition would make a cumbersome style, and omission is compatible with clarity, the geographic name, the lithologic term, or the rank term may be used alone; as the Burlington," "the limestone," or "the formation," for the Burlington Limestone.

(*c*) *Use of simple lithologic term.*—Where a lithologic term is used in the name of a rock-stratigraphic unit, the simplest generally acceptable term is recommended (for example, limestone, sandstone, shale, tuff, granite, quartzite, serpentine). Compound terms (for example, clay shale, hornblende-microcline-oligoclase granite gneiss) and terms that are not in common usage (for example, calcirudite, orthoquartzite) should be avoided. Combined terms, such as sand and clay, should not be used for the lithologic part of the names of rock-stratigraphic units, nor should an adjective be used between the geographic and the lithologic terms, as "Chattanooga Black Shale" and "Biwabik Iron-bearing Formation."

(*d*) A *group name* customarily combines a geographic name with the term "group," and no lithologic designation is included; for example, San Rafael Group.

(*e*) A *formation name* consists of the geographic name followed by a lithologic designation or by the word "formation." Examples: Dakota Sandstone, Mitchell Mesa Rhyolite, Monmouth Formation, Fort Covington Till.

(*f*) A *member name* combines a geographic term followed by the term "member." Where a lithologic designation is useful, it should be included as part of the name (Wedington Sandstone Member of the Fayetteville Shale).

(*g*) *Capitalization.*—When geographic names (see remark h) are applied to such informal units as oil sands coal beds, mineralized zones, and informal members (see Articles 4f and 8a), the unit term should not be capitalized. A name is not necessarily formal because it is capitalized, nor does failure to capitalize a name render it informal. Geographic names should be combined with the terms "formation" or "group" only in formal nomenclature.

(*h*) *Informal usage of identical geographic names.*—The application of identical geographic names to several minor units in one vertical sequence is considered informal nomenclature (lower Mount Savage coal, Mount Savage fireclay, upper Mount Savage coal, Mount Savage rider coal, and Mount Savage sandstone). The application of identical geographic names to the several lithologic units constituting a cycle of sedimentation is likewise considered informal.

(*i*) *Intrusive igneous rock.*—In some areas formal stratigraphic terminology is needed for intrusive igneous rocks (see Article 6h). The formal name of an intrusive rock body properly consists of a geographic term and the petrographic name of the dominant rock type; for example, Goose Lake Granodiorite. "Dike," "stock," "pluton," "batholith," and other similar names, or more general terms such as "intrusion," are not stratigraphic terms; accordingly, the names of such intrusive igneous bodies as the Idaho batholith or the Loon Lake pluton are not stratigraphic names.

(*j*) *Metamorphic rock* recognized as a normal stratified sequence should be classified as named groups, formations, and members, such as the Deception Rhyolite, a formation of the Ash Creek Group. Metamorphic or metasomatic rocks, not classifiable by normal stratigraphic methods, should be given a suitable geographic name followed by the petrographic term for the dominant rock of the unit; for example, Baltimore Gneiss. (See Article 6i.)

(*k*) *Misuse of well known name.*—A name that suggests some well known locality, region, or political division should not, in general, be applied to a unit typically developed in another less well known locality of the same name. For example, it would not be advisable to use the name "Chicago Formation" for a unit in California.

Article 11.—The rule of priority should be observed in applying names to rock-stratigraphic units.

Remarks. (*a*) *Priority* is defined as priority of date of publication. Page precedence should decide, as in other sets of rules governing scientific nomenclature.

(*b*) *Preservation of well established name.*—A name that has become well established should not be displaced, merely on account of priority, by one not well known or only occasionally used. The term "well established" is difficult to define, but acceptance of a name by several authors is generally taken as establishing it.

(*c*) *Duplication of names* should be avoided throughout North America. A name previously applied to any unit should not later be applied to another, unless alternative names are lacking, and then only if geographic and stratigraphic separation preclude confusion. Furthermore, a group and a formation within it should not bear the same name (see Article 16d), nor a formation and a member within it; for example, the lower member of the Pruett Formation should not be called the "lower Pruett member."

Article 12.—The geographic component of an established rock-stratigraphic name should not be changed.

Remarks. (*a*) *Difference in spelling of geographic name.*—A stratigraphic name repeatedly published with spelling different from that of its geographic source should nevertheless be retained. For example, Bennett Shale, uniformly used for more than thirty years, should not be altered to Bennet Shale on the grounds that the town is named Bennet. Stratigraphic names that have been spelled variously should be made uniform by adopting the form accepted by a majority, whatever the local spelling or the original spelling in geological literature. This remark should not be construed to require geologists of one native tongue to continue to use names pro-

posed for their region by geologists of a different tongue if these names are absurd or in violation of good taste.

(*b*) *Change in the name of a geographic feature* does not entail change of the corresponding name of a stratigraphic unit. The original name of the unit should be maintained. For example, Mauch Chunk Shale should not be changed to Jim Thorpe Shale because the former town of Mauch Chunk is now called Jim Thorpe.

(*c*) *Disappearance of a geographic feature* does not entail the disappearance of the corresponding name of a stratigraphic unit. For example, Thurman Sandstone, named from a former village in Pittsburg County, Oklahoma, does not require renaming.

(*d*) *Names in different countries and different languages.*—Spelling of the geographic component of a rock-stratigraphic name should conform to the usage recognized in the country that contains the type locality. It should not be altered by conversion into equivalent but different words in other languages. For example, Cuchillo should not be translated to Knife, and La Peña should retain the tilde; on the other hand, Canyon should not be translated as Cañon. Moreover, a rock unit should not be named Montchauve after Bald Mountain in Wyoming; the name Bald Mountain is preoccupied, and translation is not a proper recourse. It is proper, however, to translate the lithologic term or rank term; thus, the Edwards Limestone may be called Caliza Edwards, and Formación La Casita, the La Casita Formation.

PROCEDURE IN ESTABLISHING FORMAL ROCK-STRATIGRAPHIC UNITS

Article 13.—Establishing a formal rock-stratigraphic unit requires publication in some recognized scientific medium of a definition that includes: (i) statement of intention to designate a formal unit; (ii) selection of name; (iii) definition of unit in the type area with specific location of the type section; (iv) distinguishing characteristics; (v) definition of boundaries and contact relationships; (vi) dimensions and shape; and, as far as possible, (vii) geologic age and correlation.

Remarks. (*a*) *Specific requirements.*—The proposed unit should be described and defined so clearly that any subsequent worker can, without doubt, recognize the same unit. The intent to introduce a new name and the important facts that led to the discrimination of the unit should be clearly stated. The definition should cite the geographic feature from which the name is taken. It should cite, also, the specific location of one or more representative sections near the geographic feature. One of these sections should be designated the type section, and its description should be included. Specific reference to location in section, township, and range, or other land divisions should be included. An accurate map showing the location of the type section is desirable. Where necessary, reference sections may be designated to supplement the type section, or, when the type section is no longer exposed, a principal reference section should be established. (See remark i.) The morphological expression of the unit should be described. In defining the boundaries of a unit, it is not sufficient merely to state that the top of the *X* Formation is the base of the *Y* Formation; the criteria used in drawing the boundary should be discussed explicitly, where possible with reference to specific points in the type section or in typical sections.

(*b*) *Additional requirements for subsurface units.*—Subsurface rock units are given formal names only if such names are useful in describing the geology of the region and if the subsurface section differs materially from the equivalent rocks in outcrop. In proposing a new name for a subsurface unit, the well or mine in which the type section is present becomes the type locality. Subsurface units defined on the basis of exposures in mines should be treated similarly to other subsurface units. The following additional data are desirable:

(i) Location of the type well or mine by written description and map; name of operating company or individual; name of farm or lease; date of drilling; total depth; surface elevation; and depths to top and bottom of the new unit or mine level where it is exposed. If all the data needed to establish a type section cannot be furnished from one well, two or more wells should be used.

(ii) Sample logs of the well, or wells, maps and cross-sections of the mine, in written or graphic form, or both. The boundaries and subdivisions, if any, of the new unit should be indicated clearly on logs or charts.

(iii) Electrical or other mechanically recorded logs, preferably of several wells. The boundaries and subdivisions of the new unit should be shown at a scale large enough to permit full appreciation of detail.

(iv) Location of the depository where sets of cuttings or samples and fossil material are available for study. Such depositories may be federal, provincial, or state geological surveys, universities, and museums with proper facilities.

(*c*) *Form of publication.*—The phrase "recognized scientific medium" is difficult to determine. Availability to the scientific public is the chief determining factor regardless of size of edition or form of publication, such as type printing, mimeographing, or lithography. A publication must be generally available either on request or by purchase. Any well-known, regularly issued, numbered series, meets this requirement. Many independent or irregularly issued publications also meet it, though some notice should appear in a nationally circulated scientific journal. Names proposed in informal or restricted media, such as letters, company reports unavailable to the public, or unpublished addresses, theses or dissertations, have no status in stratigraphic literature. Microfilming or publication in newspapers and commercial or trade journals is not valid publication. (See Article 3.)

(*d*) *Casual mention of name insufficient.*—Casual mention, such as "the formation at Jonesville schoolhouse," does not establish a new name, nor does mere use as in a table or columnar section or on a map. To be valid, a new name should be duly proposed as outlined in remark *a*.

(*e*) *Publication in abstracts and guidebooks.*—New stratigraphic names should not be included in an abstract published separately in advance of a more complete report, as the essential conciseness of abstracts does not permit full definitions. New stratigraphic names should not be introduced in guidebooks. (See Article 3.)

(*f*) *References for names already established.*—Authors should refer to federal and state records of stratigraphic names to determine whether a name has been previously used. (See Article 3.)

(*g*) *Surface vs. subsurface names.*—It may be possible to correlate a named subsurface unit with a named surface unit. If the characteristics of both are so similar that two names are unnecessary, priority and usage should determine which is to be applied.

(*h*) *Type section never changed.*—Type sections can not be changed. There may be more than one typical section but only one type section.

(*i*) *Reference localities* may be established to supplement the type locality. For example, in naming weakly consolidated rocks it may be necessary to designate a type area within which the diagnostic relations are widely represented, because good exposures are evanescent. Thus the type locality contains the type section, and the type area contains the type locality. Many early definitions of stratigraphic units indicate a type area or type region without specifying a type section.

REVISION OF ROCK-STRATIGRAPHIC CLASSIFICATION AND NOMENCLATURE

Article 14.—Redefining a rock-stratigraphic unit without changing its name requires as much justification as establishing a new unit.

Remarks. (*a*) *Redefinition* is justifiable where a minor change in boundary will make a unit more natural and useful. Where revision removes only a minor part of a previously established unit, the original name may be retained for the major part.

(*b*) *Undesirable restriction.*—When a unit is divided into two or more of the same rank as the original, the original name should not be employed for any of the divisions. The retention of the old name for one of the units would preclude use of the name in a term of higher rank. In order to understand an author's meaning, a later reader must know about the modification and its date, and whether the author is following the original or the modified usage. For this reason it should be normal practice to raise the rank of a unit when it becomes everywhere subdivisible into mappable units. (See Article 9c.)

Article 15.—A change in the lithologic term applied to a rock-stratigraphic unit does not require a new geographic term.

Remark. (*a*) *Change in lithologic designation.*—Priority should not prevent more exact lithologic designation if the original designation is not everywhere applicable; for example, the term "limestone" in such names as Galena Limestone and Leadville Limestone may locally be inapplicable and therefore changed to "dolomite," even though the type section may have been correctly named. If the lithologic variation warrants neither name the term "formation" may be preferable.

Article 16.—Change in rank of a rock-stratigraphic unit does not require redefinition of its boundaries or alteration of the geographic part of its name.

Remarks. (*a*) *Change in rank.*—It is possible for a member to become a formation or vice versa, and for a formation to become a group or vice versa.

(*b*) *Examples of changes from area to area.*—The Conasauga Shale is recognized as a formation in Georgia and as a group in eastern Tennessee; the Osgood Formation, Laurel Limestone, and Waldron Shale of Indiana are classed as members of the Wayne Formation in a part of Tennessee; the Virgelle Sandstone is a formation in western Montana and a member of the Eagle Sandstone in central Montana.

(*c*) *Example of change in single area.*—It often becomes desirable to change the rank of a unit without changing its content of rocks. For example, the Madison Limestone of early work in Montana became in later work the Madison Group, containing several formations.

(*d*) *Different geographic name for unit and its parts.*—In changing the rank of a unit, the same name should not continue to be applied both to the unit as a whole and to a part of it. For example, the Astoria Group should not contain an Astoria Sandstone, nor the Washington Formation, a Washington Sandstone Member. (See Article 11c.)

Article 17.—A name for a stratigraphic unit once applied and then abandoned is available for some other unit only if the name was introduced casually, or if it has been published only once in the last several decades and is not in current usage, and if its reintroduction will cause no confusion.

Remarks. (*a*) *Obsolete names.*—Authors should refer to federal and state records of stratigraphic names to determine whether a name is obsolete. (See Article 3.)

(*b*) *Reference to abandoned names.*—When it seems useful to refer to an obsolete or abandoned formal name, its status is made clear by some such term as "abandoned" or "obsolete," or by using a phrase such as "La Plata Sandstone of Cross (1898)."

SOIL-STRATIGRAPHIC UNITS

Article 18.—A soil-stratigraphic unit is a soil with physical features and stratigraphic relations that permit its consistent recognition and mapping as a stratigraphic unit. Soil-stratigraphic units are distinct from both rock-stratigraphic and pedologic units.

Remarks. (*a*) *Distinction from rock-stratigraphic units.*—A soil-stratigraphic unit differs from a rock-stratigraphic unit in that it is formed for the most part *in situ* from underlying rock-stratigraphic units, which may be of diverse composition and geologic age. (See Article 4i.) Further, the characteristic features of soil-stratigraphic units are the products of surficial weathering and of the action of organisms at a later time and under ecologic conditions independent of those that prevailed while the parent rocks were formed.

(*b*) *Distinction from pedologic units.*—Stratigraphic relations are an essential element in defining a soil-stratigraphic unit but are irrelevant in defining a pedologic unit. A soil-stratigraphic unit may comprise one or more pedologic units or parts of units.

(*c*) *Requirements for formal status.*—A soil-stratigraphic unit should be defined on the basis of observable physical features and stratigraphic relations at a type locality and may be extended as far as it can be recognized. Boundaries may be placed at sharp contacts or within zones of gradation. The definition of a soil-stratigraphic unit should be based on as full knowledge as possible of its lateral variations and should be independent of concepts based on geologic history. Soil-stratigraphic units may parallel or transgress time horizons.

(*d*) *Rank.*—The single rank of soil-stratigraphic classification is the soil.

(*e*) *Names.*—Formal names of soil-stratigraphic units should be chosen in accordance with the rules that

govern naming of rock-stratigraphic units, and should not conflict with rock-stratigraphic or pedologic names. Names based on subjacent and superjacent rock units, for example the post-Wilcox pre-Claiborne soil, are informal.

Biostratigraphic Units

Nature of biostratigraphic units

Article 19.—A biostratigraphic unit is a body of rock strata characterized by its content of fossils contemporaneous with the deposition of the strata.

Remarks. (*a*) *Fossil remains*, both plant and animal, are widespread in sedimentary rocks, and they provide several different kinds of stratigraphic information. Because of their complexity and variety, they are particularly distinctive and identifiable rock constituents. Fossils, as the remains of once-living forms, are sensitive indicators of environment of deposition. Finally, owing to the progressive and more or less orderly evolution of organisms throughout the Phanerozoic Eon, fossils are particularly valuable in time correlation of strata and are essential in placing rocks in a world-wide geologic-time scale.

(*b*) *Contemporaneity of rock and contained fossils.*—Normally, all fossils contained in a biostratigraphic unit are remains of organisms that lived when the sediment surrounding them was deposited. The organisms may have been buried *in situ* or transported to their place of burial, but in either case they are indigenous in the sense of belonging to the deposit as contemporaneous original constituents. For example, well preserved leaves of land plants are associated with nearly complete articulated crinoids and other marine invertebrates in the Keasey Formation (Oligocene?) of northwestern Oregon.

(*c*) *Reworked fossils.*—Some sedimentary strata, however, contain reworked" fossils derived from older rocks. Examples of fossils clearly not indigenous to the rock that contains them are: (i) worn silicified Ordovician fossils in Mississippian deposits of southeastern Missouri; (ii) a mixture of weathered and nearly perfect Late Cretaceous foraminifers in the Claytone Limestone (Paleocene) of southern Alabama; and (iii) abundant Cretaceous pelecypods (*Gryphaea*) mingled with Miocene vertebrates in the Oakville Sandstone (Miocene) of southwestern Texas. These adventitious fossils may be significant from certain points of view, but they are clearly distinct from indigenous remains; they may be relevant in identifying a rock-stratigraphic unit, but are not relevant in defining a biostratigraphic unit.

(*d*) *"Leaked" fossils.*—Much less commonly organic remains have "leaked" from younger sources. Such fossils are younger than the strata that contain them. Although stratigraphic leaks are usually easy to recognize, not all are obvious, and failure to recognize them may cause serious errors. Examples are: (i) shells of Cenozoic mollusks that have burrowed into Cretaceous and even into Paleozoic strata; (ii) both microfossils and macrofossils that have been carried from younger formations through crevices into solution-made cavities in older rocks, wherein they are sealed by mineral deposits or sediment.

(*e*) *Relation of biostratigraphic units to rock-stratigraphic units.*—Biostratigraphic units are fundamentally different from rock-stratigraphic units. The boundaries of the two may coincide or lie at quite different stratigraphic horizons or cross each other. Where fossil remains are so abundant that in themselves they become lithologically important, a biostratigraphic unit may also be a rock-stratigraphic unit. Moreover, the lithologic changes that bound rock-stratigraphic units may represent changes in depositional environment that are likewise reflected in changes of fossil assemblage so that the limits of both kinds of units closely correspond. Similarly, unconformities or breaks in deposition tend to concentrate range-zone (biozone) limits at horizons of lithologic change.

(*f*) *Relation of biostratigraphic units to time-stratigraphic units.*—A biostratigraphic unit is physically bounded and extends no farther than the limits of strata characterized by a certain fossil or assemblage of fossils. Commonly, biostratigraphic evidence is the most useful means for determining time-stratigraphic boundaries, but criteria for defining biostratigraphic and time-stratigraphic units differ fundamentally.

(*g*) *Ecologic and evolutionary significance.*—Because fossils reflect both irreversible evolutionary change and adaptation to environment, all biostratigraphic units are records of both time and facies.

Article 20.—A zone is the general basic unit in biostratigraphic classification. It is defined as a stratum or body of strata characterized by the occurrence of a fossil taxon or taxa from one or more of which it receives its name.

Remarks. (*a*) *Kinds of zone.*—The unmodified term "zone" does not define a formal biostratigraphic unit, because it has been used indiscriminately for several different concepts and does not distinguish between them. Moreover, the term "zone" is not confined to biostratigraphy, for it is used in other kinds of stratigraphic classification and in other branches of geology (for example, cherty zone, concretionary zone, fault zone, zone of flowage, zone of saturation; see Article 4g). Nevertheless, reference to biostratigraphic zones claims great antiquity, if not priority. More specific definition of zones is needed to express biostratigraphic concepts accurately.

(*b*) *Definition.*—A biostratigraphic zone is defined solely by the fossils it contains, without reference to lithology, inferred environment, or concepts of time.

(c) *Scope of term "zone."*—A biostratigraphic zone may be based on all its fossils, or it may be based solely on the fossils of one phylum, or one class, or one order, etc. Thus it is possible to have differing and overlapping systems of zones variously based on foraminifers, or mollusks, or diatoms, or vertebrates, or land plants, or combinations of two or more kinds of organic remains.

(*d*) *Dimensions of zone.*—The scale of zone classification is indefinite and extremely variable. At one extreme, a zone may be a single local bed with a characteristic fossil assemblage; at the other, it is even possible to consider all Cenozoic deposits as constituting a "Zone of Mammals" and all Mesozoic deposits as constituting a "Zone of Reptiles."

(*e*) *Subzone.*—In places it may be feasible and desirable to recognize and define zonal units of lower rank. These may be designated subzones, and classified as subdivisions of the zone. It is not necessary that an entire zone should be divided into subzones.

(*f*) *Zonule.*—The smallest recognized subdivision of a zone is a zonule. Generally it consists of a single stratum or small thickness of strata. Zonules need not be vertically contiguous biostratigraphic units. A zonule may be distinguished as a minor component of a zone

without dividing the zone into subzones. In this respect, classification and nomenclature of zonules correspond to the rock-stratigraphic usage in naming members or beds (see Articles 7a and 8a).

(*g*) *Peak zone.*—A peak zone is a special kind of zone, characterized by the exceptional abundance of some one taxon for which it is named. Peak zones are informal. They may represent one or more episodes of exceptional proliferation of a taxon, not only in number of individuals, but commonly in such respects as great lateral spread, or dominance in the entire organic assemblage. Various other terms, such as epibole, acme zone, and flood zone, have essentially the same meaning as peak zone.

Article 21.—An assemblage zone is a body of strata characterized by a certain assemblage of fossils without regard to their ranges; it receives its name from one or more of these fossils.

Remarks. (*a*) *Nature.*—The bases for recognizing assemblage zones include variations in the fossil taxa, in abundance of specimens, or in both. Such variations are usually in response to environment though evolutionary change may be a factor. The assemblage zone may indicate ecologic facies or age or both. It is, however, primarily a grouping of strata according to directly observable fossil content. Assemblage zones may be based on all the fossils or only on specific kinds. The assemblage on which a specific unit is based should be defined in a specified section.

(*b*) *Naming.*—The assemblage zone is usually named from one or more taxa particularly prominent or diagnostic of the assemblage, although name-givers need not be confined to the zone or found in every part of it.

(*c*) *Example.*—The *Heterostegina* Assemblage Zone of the Gulf Coast is an example.

(*d*) *History.*—The faunizone and florizone of Buckman are close in concept to the assemblage zone but these names are not generally accepted, and their correct definitions are in dispute. Some consider a faunizone (or florizone) as formed by the overlap of biozones (see Article 22h) and as having dominantly time-stratigraphic significance; others consider a faunizone (or florizone) as a body of strata characterized by a particular fauna or flora, regardless of whether it is inferred to have time or only environmental significance. Assemblage zone as here defined is used without any implications as to either time or facies. (See also Article 23.)

(*e*) *Guide fossils.*—The fossil or fossils most characteristic of an assemblage-zone, and those chosen to name it, as well as other characteristic fossils in the assemblage, are termed guide fossils. Neither the namegivers nor the other guide fossils are necessarily restricted to the zone, nor are they found in every part of it.

Article 22.—A range zone is a body of strata comprising the total horizontal and vertical range of occurrence of a specified taxon.

Remarks. (*a*) *Nature.*—Each taxon has its own individual range zone and thus there are as many range zones as there are recognized species, genera, etc.

(*b*) *Extent.*—A range zone comprises the rocks that contain the taxon whose name it bears.

(*c*) *Example.*—The *Cardioceras cordatum* Range Zone is the total body of rock bounded by the vertical (stratigraphic) and horizontal (geographic) limits of occurrence of *Cardioceras cordatum.* Range zones do not usually coincide with assemblage zones named for the same fossil.

(*d*) *Application.*—Range zones are much used in time-correlation of strata and have furnished a basis for placing rocks in the standard geologic time scale. Because the taxa on which range zones are based are arbitrarily defined, the range zones themselves are equally arbitrary and far from precise. Obviously, moreover, they do not lend themselves to systematic partitioning of a stratigraphic section into units without gaps and overlaps, because there are inevitable gaps and overlaps in ranges.

(*e*) *Time value.*—The time represented by a range zone may be referred to as its time value; for example, the time value of the *Cardioceras cordatum* Range Zone, differs from the time value of the Assemblage Zone of *Cardioceras cordatum.*

(*f*) *Scope.*—There are no units of lesser or greater rank than the range zone to form a hierarchy of terms in this kind of biostratigraphic classification, although the range zone of a genus is likely to be greater than the range zone of any of its constituent species, the range zone of a family greater than that of any of its constituent genera, and so on.

(*g*) *Local range zone.*—The range of a taxon in any local section or area is unlikely to be its maximum range. A local range zone can be referred to simply as the range zone of the taxon in a specific, geographically located section or area; for example, "Range zone of *Dorothia bulleta* in Denmark"; "*Megalodon* Range zone in the Exshaw Creek section." The use of the German term "teilzone" or other special terms for a local range zone seems unnecessary. Obviously, the summation of all the local range zones is the range zone of the taxon. There are considerable differences in the span of local range zones in different areas because of variations in facies, migration time, and other factors. Because all local range zones can never be known, the true range zone cannot be determined.

(*h*) *Synonyms.*—In 1902 Buckman coined the term "biozone" as a time term indicating the range of a particular taxon in geologic time. Arkell[5] pointed out that H. S. Williams in 1901 had already coined the term "biochron" for this meaning. Arkell preferred to use biozone for the deposits formed during the life-span of the taxon, but whether the biozone includes all deposits equivalent in age to the life-span of the taxon or only those in which the taxon is actually found is a controversial question. The term "biozone" has been used with all three meanings; hence, it is somewhat confusing, and the term "range zone" is more readily understood. The term "teilzone" proposed by Pompeckj is replaced by the term "local range zone" (see Remark g).

Article 23.—A concurrent-range zone is a zone defined by the overlapping ranges of specified taxa from one or more of which it takes its name.

Remarks. (*a*) *Nature.*—The concurrent-range zone is one of the most useful kinds of zones. It is the principal basis of time correlation of strata. The specified taxa are only those that form a distinctive association because their ranges overlap; that is, some taxa range no higher than the zone, others range no lower, and some taxa may be confined to it. To have useful significance the concurrent-range zone must be defined explicitly by naming the taxa on whose overlap the unit is based. It is helpful to cite reference localities where the unit is

[5] Arkell, W. J., 1933, The Jurassic System in Great Britain: Oxford, p. 22–23.

exposed and the chosen taxa are adequately represented.

(*b*) *History.*—The concurrent-range zone as here defined is the zone generally recognized by stratigraphers when they use fossils in attempting time-correlation of strata. Such zones are formal zones. Historically this usage is derived from Oppel[6] who described "zone" as " . . . marked in any one place by a number of species that are constant for it. . . . " (See also Article 21d.)

(*c*) *Example.*—The *Bulimina excavata* Concurrent-range Zone (Paleocene of California) contains the lowest known occurrences of *Anomalina judas, Bulimina excavata, Cibicides fortunatus,* plus 73 additional species, and the highest known occurrences of *Ammodiscus glabratus, Bulimina exigua, Gyrodina depressa,* plus 20 additional species (V. S. Mallory, 1959).

NOMENCLATURE OF BIOSTRATIGRAPHIC UNITS

Article 24.—The name of a zone, subzone, or zonule consists of the names of the characteristic fossil or fossils combined with the appropriate zone term.

Remarks. (*a*) *Ambiguity of the unmodified term "zone."*—The formal name of any biostratigraphic unit should specify the kind of zone, for the meaning of the unmodified term is indefinite. In later references in the same paper, however, it is permissible to combine the biologic name with the unmodified term "zone," if the meaning is obvious.

(*b*) *Capitalization.*—The initial letter of formal unit terms, except the names of species, used in biostratigraphic classification should be capitalized when part of a named unit, in conformity with the usage adopted for rock-stratigraphic and time-stratigraphic units. (See Articles 10g and 32.) Examples are the *Cardioceras cordatum* Concurrent-range Zone or Zone of *Cardioceras cordatum;* the *Bolivina* Range Zone or Range Zone of *Bolivina;* the *Bifericeras bifer* Subzone and *Oxynoticeras lymense* Subzone of the *Oxynoticeras oxynotum* Concurrent-range Zone, Sinemurian, Lower Jurassic of England.

(*c*) *Generic name.*—The formal name of a zone or subzone that is based upon a certain species should always include the generic name also. In later references to the zone in the same paper, however, it is permissible to use only the initial letter of the genus preceding the specific name; for example, *C. cordatum* Zone.

(*d*) *Formal and informal names.*—Biostratigraphic units, like those of other categories (rock-stratigraphic, time-stratigraphic) may be either formal or informal (see Article 3). Formally designated units should be distinguished by use of an initial capital letter for the zone term (see Remark b), whereas an informal unit should not be so capitalized; for example, *Cardioceras cordatum* zone.

(*e*) *Duplication of names.*—The name of the same fossil should not be used for both a zone and a subdivision of that zone.

Article 25.—Names of biostratigraphic units should be changed to conform with changes in names of taxa required by international rules of biologic nomenclature.

[6] Oppel, A., 1856-1858, Die Juraformation Englands, Frankreichs und des Südwestlichen Deutschlands: Stuttgart, p. 3.

Remark. (*a*) *Reason for change.*—The names of biostratigraphic units should be modified whenever the name of the taxon is changed to conform to the international rules of nomenclature; otherwise, the biologic part of the biostratigraphic name would disagree with the name recognized by paleobotanists and paleozoologists. Until the changed name of the taxon becomes well known, it is desirable to cite both old and new names; for example, *Hyracotherium* ("*Eohippus*") Concurrent-range Zone, *Merycoidodon* ("*Oreodon*") Range Zone.

TIME-STRATIGRAPHIC (CHRONOSTRATIGRAPHIC) UNITS

NATURE OF TIME-STRATIGRAPHIC UNITS

Article 26.—A time-stratigraphic unit is a subdivision of rocks considered solely as the record of a specific interval of geologic time.

Remarks. (*a*) *Definition.*—Time-stratigraphic units depend fundamentally for definition on actual sections or sequences of rock, and without these standards they are meaningless. They are material units. Each is the record of an interval of time that extended from the beginning to the ending of its deposition or intrusion. In actual practice, the scope of a time-stratigraphic unit in its type section or type area usually is made to coincide with that of some other kind of stratigraphic unit, such as a biostratigraphic or a rock-stratigraphic unit, which thus serves as an objective reference. As time-stratigraphic units depend for definition on actual sections of rock, care should be taken to define geologic-time units in terms of time-stratigraphic units and not vice versa.

(*b*) *Principal purposes.*—Two principal purposes are served by time-stratigraphic classification: (i) correlation of rocks in one section or area with those of others on the basis of age equivalence or contemporaneity of origin; and (ii) placing the rocks of the earth's crust in a systematic geochronologic sequence, so as to indicate their relative position and age with respect to earth history as a whole.

Article 27.—Boundaries of time-stratigraphic units at the type locality or area are defined by objective criteria.

Remarks. (*a*) *Definition.*—The upper and lower limits of all time-stratigraphic units should be defined in the rock succession at a type section within the type area in order to provide a standard for the unit. In the type area the boundaries may be based on any features thought to be stratigraphically useful or may be designated arbitrarily. Preferably, they should set the unit apart as representing a significant geologic episode. Preferably also, the limits should coincide with such horizons in the type section as boundaries of formations or biostratigraphic zones. The better these objective criteria can be extended laterally as guides to placement of the rocks in time, the greater is the geographic extent of the area in which the unit can be identified accurately. Boundaries of time-stratigraphic units in other than the type area may fall within rock-stratigraphic or biostratigraphic units.

(*b*) *Historic boundaries.*—Boundaries of many of the older time-stratigraphic units were selected to coincide with hiatuses in the rock succession; others were based on lithologic change. Further, Lyell used the relative

proportions of living forms among the fossil species for classifying Cenozoic rocks into time-stratigraphic units.

Article 28.—Geographic extension of a time-stratigraphic unit from its type section or area can be accomplished only as criteria of time equivalence are available, and then only within the limits of accuracy imposed by physical (including isotopic) or paleontologic criteria.

Remarks. (*a*) *Physical criteria.*—Physically based criteria are (i) generally more useful and often more precise in local time-correlation and (ii) seldom if ever surpass paleontologic criteria for world-wide correlation. Many physical criteria may be useful; for example, isotopes, products of radioactivity, lithologic similarity, paleomagnetism, thermoluminescence, relation to adjacent strata, relation to unconformities and to intrusions.

(*b*) *Paleontologic criteria.*—Paleontologic criteria may be (i) as useful and precise as physical for local time-correlation; (ii) by virtue of progressive organic evolution, they remain the most successful means of world-wide correlation of all ranks of Phanerozoic time-stratigraphic units.

(*c*) *Ideal boundaries.*—Ideally the boundaries of time-stratigraphic units, as extended geographically from the type section, are isochronous surfaces, representing everywhere the same horizon in time; thus, ideally these boundaries are independent of lithology, fossil content, or any other material bases of stratigraphic division. In actual practice, the geographic extension of a time-stratigraphic unit is influenced and generally controlled by stratigraphic features.

(*d*) *Radiometry and isotopes.*—Age determinations by means of isotopic ratios are useful in time-stratigraphic correlation. Radiometric and isotope methods are applicable to sedimentary rocks that contain a suitable authigenic mineral. The radiocarbon method is applicable to Quaternary rocks that contain suitable carbon. Isotope methods are applicable to igneous rocks that contain a suitable primary mineral in which the normal ratio of decay products has not been altered through contamination, metamorphism, or other changes. Thus some time-stratigraphic units of sedimentary or igneous rocks can be approximately extended from their type localities.

(*e*) *Indirect radiometric and isotope methods.*—Radiometry and the study of isotopes may also be used where the rock and the dated mineral are not coeval; thus, assemblages of volcanic rock and nonvolcanic sedimentary rock may be placed within maximum and minimum age limits. The maximum age and minimum age of an assemblage may be determined in relation (i) to veins, faults, intrusive rocks, and other transecting features, (ii) to overriding metamorphism, (iii) to detrital minerals within the rock, and (iv) to unconformably subjacent igneous and metamorphic rocks. Thus it may be possible to group separate bodies of rock, not necessarily of the same age, into larger time-stratigraphic units.

(*f*) *Precambrian divisions.*—Because of difficulties of interregional correlation it is not yet possible to divide the Precambrian rocks of North America into widely applicable time-stratigraphic units. Several students prefer to limit classification and nomenclature of the Precambrian to rock-stratigraphic units. Others advocate that major time-stratigraphic divisions be used in a relative sense for a particular region (Lower Precambrian, Upper Precambrian). But some have extended such terms, intended for local use, over large areas as major time-stratigraphic units (Lower, Middle, and Upper Precambrian); and still others have defined major time-stratigraphic units at a type locality and have attempted to extend them geographically, basing their correlations on lithologic similarity, structural similarity, comparison of sequences, and relations to adjacent strata, to unconformities, and to intrusions (Archaean, Proterozoic). New Precambrian time-stratigraphic units should be introduced only when they can be useful for interregional time-stratigraphy and for geochronology.

RANKS OF TIME-STRATIGRAPHIC UNITS

Article 29.—The system is the fundamental unit of world-wide time-stratigraphic classification of Phanerozoic rocks.

Remarks. (*a*) *Definition and extent.*—The bases for original definition of the generally adopted geologic systems are remarkably varied and haphazard. The definition of any time-stratigraphic unit should properly depend on a clear original designation of a type sequence of rocks. This has not been true of the original definitions of any of the recognized systems. Almost all systems began as rather local units and many of them have been extended more or less successfully throughout the world on a time-stratigraphic basis, mainly through their fossil content. They have been revised and supplemented by work in the type areas and elsewhere. As a result the rocks included in the several systems as now recognized are only partly, or even indirectly, related to the sections originally designated.

(*b*) *Precambrian systems.*—In the Precambrian, systems still have only local significance. They have not been placed in widely accepted orderly succession and do not serve as the fundamental units of time-stratigraphic classification.

(*c*) *Subsystem.*—Some systems established in Europe have been later divided elsewhere into parts for each of which the rank of system has been claimed. As a solution to some of the resulting difficulties in nomenclature, the term "subsystem" has been proposed for these parts.

(*d*) *Erathem.*—Time-stratigraphic units composed of a sequence of systems are called erathems; for example, the Mesozoic Erathem comprises the Triassic System, the Jurassic System, and the Cretaceous System.

Article 30.—Series is a time-stratigraphic unit next in rank below system.

Remarks. (*a*) *Definition.*—The basis for definition of a series should be a clearly designated stratigraphic interval in a type area, but many of these units have come to be adopted quite generally without explicit indication of their limits.

(*b*) *Extent.*—The series may constitute a major unit in time correlation, within a province, between provinces, or between continents. Some are recognized as world-wide time-stratigraphic units; others are only provincial.

(*c*) *Intrusive rock.*—The term "series" is not restricted to stratified rocks but may be applied to intrusive rocks in the same time-stratigraphic sense.

(*d*) *Misuse of term "series."*—In stratigraphic terminology "series" should not be applied to rock-stratigraphic units. (See Article 9f.)

Article 31.—Stage is a time-stratigraphic unit next in rank below series.

Remarks. (*a*) *Use of stage.*—The stage is an important working unit in time-stratigraphic correlation and classification. Commonly it is based on a succession of biostratigraphic zones; the zones may differ in different geographic areas. Stages are often employed to relate the various kinds of minor stratigraphic units in one geologic section or area to those in another with respect to time of origin.

(*b*) *Substage.*—A substage is a subdivision of a stage and is the time-stratigraphic unit next in rank below a stage. A stage may be completely divided into substages or only certain parts of it may be recognized as substages. Nomenclatural rules for substages and procedures for establishing substages are the same as for stages.

(*c*) *Misuse of term "stage."*—The 1933 Code remarked that in America "stage" is a "time term for major subdivisions of the Pleistocene epoch," that by "long-continued custom in the United States, the time covered by a Pleistocene subdivision of formational rank is called a *stage*," and that "correlation within" the Quaternary System is "based primarily upon the concept of widespread climatic changes contemporaneous with the several glaciations of the Pleistocene epoch." This usage is here excluded from formal stratigraphic nomenclature insofar as it conflicts with the definition of "stage" as a time-stratigraphic unit and with the requirement that "stages" be extended geographically on the basis of time-equivalent criteria (see Article 39a). The use of "stage" in the Quaternary should be the same as in the older parts of the geologic column.

(*d*) *Chronozone.*—The strata equivalent in time-span to a biostratigraphic zone or any other zone may often constitute a useful time-stratigraphic unit. Such a unit may carry the same fossil name as a biostratigraphic unit but should always be referred to as a chronozone (chronostratigraphic zone) to avoid confusion with the quite different concept of a biostratigraphic zone. Thus the biostratigraphic unit *Cardioceras cordatum* Range Zone is the total body of rock bounded by the vertical and horizontal limits of occurrence of *Cardioceras cordatum*, whereas the time-stratigraphic unit, *Cardioceras cordatum* Chronozone, is the total body of rock formed anywhere during the time-span of the *Cardioceras cordatum* Range Zone, regardless of whether or not *Cardioceras cordatum* is itself present.

NOMENCLATURE OF TIME-STRATIGRAPHIC UNITS

Article 32.—A formal time-stratigraphic unit is given a binomial name, and the initial letter of both terms should be capitalized.

Remarks. (*a*) *System names.*—The existing names that are generally accepted for systems have diverse origins, and they also have different sorts of endings; for example, Cambrian, Cretaceous, Jurassic, Tertiary.

(*b*) *Series names.*—Series are commonly known either by geographic names, for example, Waucoban Series, Niagaran Series, or by names of their encompassing systems modified by the capitalized adjectives Upper, Middle, Lower, for example, Lower Cretaceous Series, Middle Devonian Series. In general a geographic name is preferable because it may be tied to a type area. For names of geographic origin the adjectival endings *-an* or *-ian* have been widely used, for example, Cincinnatian Series, but it is permissible to use the geographic name without any special ending, for example, Cincinnati Series.

(*c*) *Stage names.*—The great majority of stage names already in use have been based on rock-stratigraphic units (groups, formations, members) and bear the names of these units, for example, Chemung Stage, Maestrichtian Stage, Claiborne Stage. Preferably a stage should have a geographic name not previously used in stratigraphic nomenclature, for example, Refugian Stage.

(*d*) *New names.*—Geographic names proposed for new time-stratigraphic units should not duplicate those used for rock-stratigraphic units. Moreover, two names should not be derived from the same place, for example, the stage names Bathonian and Bathian. The later variant should be regarded as a "stillborn homonym."

Article 33.—Doubt in the assignment of rocks to time-stratigraphic units should be made explicit if criteria of time equivalence are inconclusive or lacking. (See Article 28.)

Remark. (*a*) *Expression of doubt.*—Doubt can be expressed in several ways. (i) If the balance of evidence seems to favor one age assignment, the rock may be assigned to a specific time-stratigraphic unit with the doubt expressed by a question mark or by the words "probably" or "possibly." (ii) If the evidence suggests a position athwart a time-stratigraphic boundary, the doubt may be expressed (with or without question marks) by coupling the names of the two time-stratigraphic units with "or," "and," or a hyphen. (iii) If the evidence indicates only an upper or a lower limit, the assignment should be indicated by the prefix "pre-" or "post-," for example, pre-Cretaceous, post-Cambrian. (iv) It is not necessary to make formal time-stratigraphic assignments if evidence of age equivalence with established units is lacking.

PROCEDURE IN ESTABLISHING TIME-STRATIGRAPHIC UNITS

Article 34.—Requirements for establishing a time-stratigraphic unit include (i) statement of intention to designate such a unit; (ii) selection of name; (iii) definition of boundaries of the unit in the type area with specific reference to designated sections; (iv) distinguishing characteristics including fossils if present; (v) correlation and age relationships; and (vi) publication in a recognized scientific medium as specified in Article 13.

Remark. (*a*) *Invalid names.*—Naming a time-stratigraphic unit simply by adding "-an" or "-ian" to the name of a rock stratigraphic name is improper and does not constitute definition of a time-stratigraphic unit. A new name so proposed should be considered invalid.

REVISION OF TIME-STRATIGRAPHIC CLASSIFICATION AND NOMENCLATURE

Article 35.—Redefinition of a time-stratigraphic unit without changing its name is allowable but requires as much justification as the establishment of a new unit and demands con-

servatism. Redefinition of systems calls for international agreement.

Remark. (*a*) *Supplementary sections.*—If definition of a time-stratigraphic unit is inadequate, it may be redefined and revised by reference to supplementary sections. (See Article 34.)

GEOLOGIC-TIME (GEOCHRONOLOGIC) UNITS

NATURE OF GEOLOGIC-TIME UNITS

Article 36.—Geologic-time units are divisions of time distinguished on the basis of the rock record, particularly as expressed by time-stratigraphic units. They are not material units.

Remarks. (*a*) *Boundaries.*—Historically the definition of a period as a unit of geologic time depended on chosen sections in the type area of the system, which is the corresponding time-stratigraphic unit. The period comprised an interval of time defined by the beginning and ending of the deposition of the system. To define periods rigorously in this manner is to create unnamed time units between periods, in other words, gaps in formal geologic time. By later work supplementary sections largely or wholly filling the hiatuses have been found elsewhere in the world and their rocks, by common consent, have been assigned to one or another of the contiguous systems. Many of the gaps have thereby been essentially filled. Today it is probable that formal geologic time as referred to actual rocks is continuous or even (as now classified) duplicated. In practice, placement of boundaries of time units is imprecise because of imperfect correlation.

(*b*) *Validity of geologic-time units.*—The units of geologic time are no more valid than the time-stratigraphic units on which they are based. (See Articles 26, 27, and 28.)

RANKS OF GEOLOGIC-TIME UNITS

Article 37.—Ranks of geologic-time units in order of decreasing magnitude are eon, era, period, epoch, and age.

Remarks. (*a*) *Period, epoch, and age.*—A period is defined as the time during which the corresponding system was deposited. Epochs are similarly related to series, and ages (in the formal sense), to stages. Because some of these words, particularly "age," are often used informally, wherever they are used formally in conjunction with a proper name they should be capitalized as noted in Article 38a.

(*b*) *Era and eon.* An era is defined as the time during which the corresponding erathem was deposited. The Paleozoic Era, Mesozoic Era, and Cenozoic Era are combined into a geologic time unit called the Phanerozoic Eon.

NOMENCLATURE OF GEOLOGIC-TIME UNITS

Article 38.—Geographic or other names used for period, epoch, and age are identical with those of the corresponding time-stratigraphic units; the names of eras and eons are independently formed.

Remarks. (*a*) *Capitalization.*—In naming a formal unit of geologic time the initial letter of each term is capitalized, as Devonian Period. (See Article 37a.)

(*b*) *Names of epochs.*—If a series name consists of the system name preceded by Lower, Middle, or Upper, the corresponding epoch name should consist of the period name preceded by Early, Middle, or Late; for example, Early Devonian Epoch.

(*c*) *Time intervals* represented by unconformities should not receive formal names. They should, in general, be referred to preceding or succeeding stratigraphic units by the prefixes *pre-* and *post-*; for example, post-Laramie interval. Where such convenient names for time intervals as "Laramide revolution" are used, they should have no part in formal stratigraphic nomenclature. Similarly, the naming of time intervals represented by cycles of erosion that are expressed in present-day land forms, for example, "Elk Valley erosion cycle" is permissible, but such physiographic names have no part in formal stratigraphic nomenclature. It is generally undesirable to use the same geographic name for an erosion cycle or erosion surface and for a rock unit; for example, "Fremont erosion cycle" in Wyoming and "Fremont Limestone" in Colorado.

GEOLOGIC-CLIMATE UNITS (FOR USE IN THE QUATERNARY)

Article 39.—A geologic-climate unit is an inferred widespread climatic episode defined from a subdivision of Quaternary rocks.

Remarks. (*a*) *Definition.*—A geologic-climate unit is defined from its records, which are bodies of rock, soil, and organic material. At any single place the time boundaries of the geologic-climate unit are defined by the boundaries of some kind of stratigraphic unit. These local stratigraphic boundaries may be isochronous surfaces, but the different stratigraphic boundaries that define the limits of the geologic-climate unit in different latitudes are not likely to be isochronous. In this respect geologic-climate units differ from geologic-time units, which are based on time-stratigraphic units. The locality where the geologic-climate unit is first defined is its type locality.

(*b*) *Principal purposes.*—Geologic-climate units are used (i) in correlating episodes of deposition of Quaternary rocks in different areas, and (ii) in determining the historical sequence of events in the Quaternary Period.

(*c*) *Extent.*—Geologic-climate units may be extended geographically as far as the record of the geologic climate can be identified, regardless of changes of facies of the rocks, soils, or other materials that constitute the record.

Article 40.—Glaciation and interglaciation are fundamental units of geologic-climate classification; stade and interstade are subdivisions of a glaciation.

Remarks. (*a*) *Definitions.*—(i) A glaciation was a climatic episode during which extensive glaciers developed, attained a maximum extent, and receded. (ii) An interglaciation was an episode during which the climate was incompatible with the wide extent of glaciers that characterized a glaciation. (iii) A stade was a climatic episode within a glaciation during which a secondary advance of glaciers took place. (iv) An interstade was a

climatic episode within a glaciation during which a secondary recession or a stillstand of glaciers took place.

(*b*) *Nomenclature.*—Formal names of geologic-climate units should be chosen in accordance with the rules (see Article 13) that govern the naming of rock-stratigraphic units. A geologic-climate unit may be named after a rock-stratigraphic unit, a soil-stratigraphic unit, or some other geographically named stratigraphic unit. In the type locality of the geologic-climate unit the record of its major climatic characteristics should be plain, and the evidence of climatic change at the lower and upper limits should be manifest.

Procedure for Amendment

Article 41.—Additions or amendments to this code may be proposed to the Commission by any geologist in writing at any time. If accepted for consideration by a majority vote of the Commission, they may be adopted by a two-thirds vote of the Commission at an annual meeting not less than a year after publication of the proposal.

COMMISSION ON NOMENCLATURE

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Roman numbers refer to Articles; lower case letters in italics refer to Remarks. Thus 13 *e* refers to Article 13, Remark *e*. *fn* refers to footnote.

COMMISSION ON NOMENCLATURE

APPENDIX II

STRATIGRAPHIC COMMISSION DISCUSSION

OF THE STRATIGRAPHIC CODE: CAPITALIZATION

(reproduced by permission of the Commission from the
Bulletin of the American Association of Petroleum Geologists
v. 47, no. 5 (May, 1963) p. 852-853)

STRATIGRAPHIC COMMISSION

DISCUSSION OF THE STRATIGRAPHIC CODE:[1] CAPITALIZATION

Prepared for the Commission
BY GEORGE V. COHEE[2] AND JOHN B. PATTON[3]

The new stratigraphic code prepared by the American Commission on Stratigraphic Nomenclature recommends capitalization of the initial letters of all words used in forming the names of formal rock-stratigraphic units (Article 10, Remark g); capitalization of the initial letter of each term in a formal unit of geologic time (Article 38, Remark a); capitalization of the initial letter of each term in a formal time-stratigraphic unit (Article 32); and capitalization of the initial letter of formal terms of a biostratigraphic unit, except the names of species (Article 24, Remark b).

The wording of the code intended to make it clear that informal usage of uncapitalized lithologic, time, time-stratigraphic, climate stratigraphic and soil names was permissible at the discretion of the author where such informal usage was appropriate. Shades of distinction in meaning can thus be attained under the new code that were not previously possible. Discussion of capitalization at the Cincinnati and Houston meetings of the Commission arrived at a consensus that accuracy in these distinctions was necessarily the responsibility of the author rather than the editor and that where an author had given conscientious attention to observing the intent of the code and had so stated in transmitting a manuscript, editors should suggest changes in author's capitalization only with caution and with reference to the author for final decision.

For the guidance of authors and editors an illustrative list showing appropriate capitalization or non-capitalization of geologic terms is appended.

Geologic Time and Time-Stratigraphic Units

Paleozoic Era (time unit)
Paleozoic time
Paleozoic age (informal usage of age)

Devonian System (time-stratigraphic unit)
Devonian Period (time unit)
Devonian time
Devonian age (informal usage of age)

Pleistocene Series (time-stratigraphic unit)
Pleistocene Epoch (time unit)
Pleistocene time
Pleistocene age (informal usage of age)
Pleistocene and Recent Series, Epochs

Formal series subdivision of a system:
Lower, Middle and Upper Ordovician; Early, Middle and Late are corresponding formal time terms.

Provincial series subdivisions:
Cincinnatian Series—lower, middle and upper; early, middle and late are corresponding informal time terms.

Cenomanian Stage (time-stratigraphic unit)
Cenomanian Age (age is capitalized only when it is used formally as a specific geologic-time unit with the stage name)
Cenomanian time
fossils of the Cenomanian Age
fossils of Cenomanian age (informal usage of age)
the Cenomanian and Turonian Stages, Ages
fossils of Cenomanian and Turonian age (informal usage of age)
Cenomanian and Turonian time
of Midway and Wilcox age (informal usage of age)
Lake Bonneville stage (informal usage of stage)
of Lake Bonneville age (informal usage of age)

Des Moines Series (time-stratigraphic unit)

Rock-Stratigraphic Units

Ash Creek Group
Ash Creek and Alder Groups
Chinle Formation
Church Rock Member
Church Rock and Owl Rock Members
Petrified Forest Member

Sonsela Sandstone Bed
Chinle and Moenkopi Formations
Ojo Alamo Sandstone
Kirtland Shale
Ojo Alamo and Kirtland Formations

Biostratigraphic Units

Examples of capitalization of biostratigraphic terms are adequately covered in Article 24, Remark b.

Informal Rock-Stratigraphic Terms

Chinle sandstone (informal reference to sandstone within the Chinle Formation; reference could also be made to sandstone of the Chinle Formation)
New Albany sandstone (informal reference to a sandstone unit within the New Albany Shale)
Borden siltstone (informal reference to beds of siltstone within the Borden Group)
Catskill facies

Informal Time Terms

Time is always considered informal. Period is capitalized only with the formal time unit correlative in

[1] Discussions are freely contributed comments on Reports and Notes of the Commission. Additional comments or discussion are welcome.—Thomas E. Bolton, Chairman, American Commission.

[2] Chairman, Geologic Names Committee, U. S. Geological Survey.

[3] State Geologist, Indiana Geological Survey.

rank with system. Epoch is capitalized only with the formal time unit correlative in rank with series. Age is capitalized only with the formal time unit correlative in rank with stage.

GEOLOGIC-CLIMATE UNITS

Wisconsin Glaciation
Tazewell Stade
Two Creeks Interstade
Sangamon Interglaciation

SOIL-STRATIGRAPHIC UNITS

Brady Soil

QUOTED MATERIAL

Geologic names should be capitalized in material that is quoted indirectly from publications in which the names were not capitalized by the author, but the names should not be capitalized in material quoted directly. Geologic names should not be capitalized in correlation tables, columnar sections and maps taken directly from publications in which the names were not capitalized by the author, but if the correlation tables, columnar sections and maps are modified after the original material by more recent or additional data the names should be capitalized.

APPENDIX III

ABBREVIATIONS USED IN THE GEOLOGICAL SOCIETY OF AMERICA'S "BIBLIOGRAPHY AND INDEX OF GEOLOGY"

SOURCE LIST

Abidjan, Univ., Dep. Geol., Ser. Doc.	Abidjan, Universite, Departement de Geologie, Serie Documentation. Abidjan.
Acad. Bras. Cienc., An.	Academia Brasileira de Ciencias, Anais. Rio de Janeiro.
Acad. Cienc. Artes Barc., Mem.	Real Academia de Ciencias y Artes de Barcelona, Memorias.
Acad. Cienc. Cuba, Inst. Geol., Ser. Geol.	Academia de Ciencias de Cuba, Instituto de Geologia, Serie Geologica. Havana.
Acad. Cienc. Cuba, Ser. Espeleologica Carsologica	Academia de Ciencias de Cuba, Serie Espeleologica y Carsologica. Havana.
Acad. Cienc. Cuba, Ser. Oriente	Academia de Ciencias de Cuba, Serie Oriente. Havana.
Acad. Cienc. Exactas, Fis. Natur. Madrid, Rev.	Real Academia de Ciencias Exactas, Fisicas y Naturales de Madrid, Revista.
Acad. Colomb. Cienc. Exactas, Fis. Natur., Rev.	Academia Colombiana de Ciencias Exactas, Fisicas y Naturales, Revista. Bogota.
Acad. Malgache, Bull.	Academie Malgache, Bulletin. Tananarive.
Acad. Nac. Cienc. (Cordoba), Misc.	Academia Nacional de Ciencias, Miscelanea. Cordoba, Argentina.
Acad. Pol. Sci., Bull., Ser. Sci. Biol.	Academie Polonaise des Science, Bulletin. Serie de Sciences Biologiques. Warsaw.
Acad. Pol. Sci., Bull., Ser. Sci. Terre	Academie Polonaise des Sciences, Bulletin, Serie des Sciences de la Terre (*continuation of* Academie Polonaise des Sciences, Bulletin, Serie des Sciences Geologiques et Geographiques). Warsaw.
Acad. R. Belg., Cl. Sci., Bull.	Academie Royale de Belgique, Classe des Sciences, Bulletin (Koninklijke Academie van Belgie, Klasse der Wetenschappen, Mededelingen). Brussels.
Acad. R. Sci. Outre-Mer, Bull.	Academie Royale des Sciences d'Outre-Mer, Bulletin des Seances—Koninklijke Academie voor Overzeese Wetenschappen, Mededelingen der Zittingen. Brussels.
Acad. R. Sci., Outre-Mer, Cl. Sci. Nat. Med., N.S., [Mem.]	Academie Royale des Sciences d'Outre-Mer, Classe des Sciences Naturelles et Medicales, N.S., [Memoires] (Koninklijke Academie voor Overzeese Wetenschappen, [Verhandelingen]). Brussels.
Acad. Sci., C. R., Ser. A	Academie des Sciences, Comptes Rendus Hebdomaires des Seances, Serie A, Sciences Mathematiques. Paris.
Acad. Sci., C. R., Ser. B	Academie des Sciences, Comptes Rendus Hebdomadaires des Seances, Serie B, Sciences Physiques. Paris.
Acad. Sci., C. R., Ser. C	Academie des Sciences, Comptes Rendus Hebdomadaires des Seances, Serie C, Sciences Chimiques. Paris.
Acad. Sci., C. R., Ser. D	Academie des Sciences, Comptes Rendus Hebdomadaires des Seances, Serie D, Sciences Naturelles. Paris.
Acad. Sci. Toulouse, Mem.	Academie des Sciences, Inscriptions et Belles-Lettres de Toulouse, Memoires.
Acad. Sci. USSR, Dokl., Earth Sci. Sect.	Academy of Sciences of the USSR, Doklady, Earth Sciences Sections (*English translation of* Akademiya Nauk SSSR, Doklady). American Geological Institute, Washington, D.C.

SOURCE LIST, continued

Acad. Soc. Lorraines Sci., Bull.	Academie et Societe Lorraines des Sciences, Bulletin. Nancy.
Acc. Chem. Res.	Accounts of Chemical Research (American Chemical Society). Washington, D.C.
Accad. Naz. Lincei, Atti, Cl. Sci. Fis., Mat. Nat., Mem.	Accademia Nazionale dei Lincei, Atti, Classe di Scienze Fisiche, Matematiche e Naturali, Memorie. Rome.
Accad. Naz. Lincei, Atti, Cl. Sci. Fis., Mat. Nat., Rend.	Accademia Nazionale dei Lincei, Atti, Classe di Scienze Fisiche, Matematiche e Naturali, Rendiconti. Rome.
Accad. Patavina Sci. Lett. Arti, Atti Mem.	Accademia Patavina di Scienze, Lettere ed Arti, Atti e Memorie. Padua.
Accad. Sci. Fis. Mat. (Naples), Rend.	Accademia delle Scienze Fisiche e Matematiche, Rendiconto (Societa Nazionale di Scienze, Lettere ed Arti in Napoli). Naples.
Acta Crystallogr.	Acta Crystallographica (International Union of Crystallography). Copenhagen.
Acta Geogr. (Soc. Geogr. Fenn.)	Acta Geographica (Societas Geographica Fenniae). Helsinki.
Acta Geol. (Acad. Sci. Hung.)	Acta Geologica (Academia Scientiarum Hungaricae). Budapest.
Acta Geol. Geogr. Univ. Comenianae, Geol.	Acta Geologica et Geographica Universitatis Comenianae, Geologica. Bratislava.
Acta Geol. Hisp.	Acta Geologica Hispanica (Instituto Nacional de Geologia). Barcelona.
Acta Geol. Pol.	Acta Geologica Polonica (Polska Akademia Nauk, Komitet Geologiczny). Warsaw.
Acta Geol. Taiwan.	Acta Geologica Taiwanica (National Taiwan University). Taipei.
Acta Geophys. Pol.	Acta Geophysica Polonica (Polska Akademia Nauk, Komitet Geofizyki). Warsaw.
Acta Hydrophy. (Berl.)	Acta Hydrophysica (Deutsche Akademie der Wissenschaften zu Berlin, Zentralinstitut Physik der Erde, Selbstaendige Abteilung Physikalische Hydrographie).
Acta Palaeobot. (Pol. Akad. Nauk)	Acta Palaeobotanica (Polska Akademia Nauk, Instytut Botaniki). Krakow.
Acta Palaeontol. Pol.	Acta Palaeontologica Polonica (Polska Akademia Nauk). Warsaw.
Acta Univ. Carol., Geol.	Acta Universitatis Carolinae, Geologica. Prague.
Acta Univ. Ouluensis, Ser. A, Sci. Rerum Nat.	Acta Universitatis Ouluensis, Series A, Scientiae Rerum Naturalium. Oulu.
Acta Univ. Ups.	Acta Universitatis Upsaliensis (Abstracts of Uppsala Dissertations from the Faculty of Science).
Acta Univ. Wratislav., Stud. Geogr.	Acta Universitatis Wratislaviensis, Studia Geograficzne. Wroclaw.
Adelaide, Univ., Cent. Precambrian Res., Spec. Pap.	Adelaide, University, Centre for Precambrian Research, Special Paper. Adelaide, South Australia.
Adv. X-Ray Anal.	Advances in X-Ray Analysis. New York.
Advan. Hydrosci.	Advances in Hydroscience. Academic Press, New York–London.
Afr. Soils—Sols Afr.	African Soils—Sols Africains (Bureau Interafricain des Sols—Inter-African Bureau for Soils). Niamey (Niger)–Bangui (Central African Republic).
Akad. Gorn.-Hutn. (Krakow), Zesz. Nauk.	Akademia Gornicza-Hutnicza, Krakow, Zeszyty Naukowe.
Akad. Nauk Arm. SSR, Biol. Zh.	Akademiya Nauk Armyanskoy SSR, Biologicheskiy Zhurnal. Brevan.
Akad. Nauk Arm. SSR, Dokl.	Akademiya Nauk Armyanskoy SSR, Doklady. Erevan.
Akad. Nauk Azerb. SSR, Dokl.	Akademiya Nauk Azerbaydzhanskoy SSR, Doklady. Baku.

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Akad. Nauk Azerb. SSR, Izv., Ser. Nauk Zemle	Akademiya Nauk Azerbaydzhanskoy SSR, Izvestiya, Seriya Nauk o Zemle. Baku.
Akad. Nauk BSSR, Dokl.	Akademiya Nauk BSSR, Doklady. Minsk.
Akad. Nauk Gruz. SSR, Geol. Inst., Tr.	Akademiya Nauk Gruzinskoy SSR, Geologicheskiy Institut, Trudy. Tiflis.
Akad. Nauk Gruz. SSR, Soobshch.	Akademiya Nauk Gruzinskoy SSR, Soobshcheniya. Tiflis.
Akad. Nauk Kaz. SSR, Inst. Gidrogeol. Gidrofiz., Tr.	Akademiya Nauk Kazakhskoy SSR, Institut Gidrogeologii i Gidrofiziki, Trudy. Alma-Ata.
Akad. Nauk Kaz. SSR, Izv., Ser. Geol.	Akademiya Nauk Kazakhskoy SSR, Izvestiya, Seriya Geologicheskaya. Alma-Ata.
Akad. Nauk SSSR, Dokl.	Akademiya Nauk SSSR, Doklady. Moscow-Leningrad.
Akad. Nauk SSSR, Geol. Inst., Tr.	Akademiya Nauk SSSR, Geologicheskiy Institut, Trudy. Moscow.
Akad. Nauk SSSR, Izv., Ser. Geogr.	Akademiya Nauk SSSR, Izvestiya, Seriya Geograficheskaya. Moscow.
Akad. Nauk SSSR, Izv., Ser. Geol.	Akademiya Nauk SSSR, Izvestiya, Seriya Geologicheskaya. Moscow.
Akad. Nauk SSSR, Karel. Fil., Inst. Geol., Tr.	Akademiya Nauk SSSR, Karel'skiy, Filial, Institut Geologii, Trudy. Leningrad.
Akad. Nauk SSSR, Kom. Izuch. Chetvertich. Perioda, Byull.	Akademiya Nauk SSSR, Komissiya po Izucheniyu Chetvertichnogo Perioda, Byulleten'. Moscow.
Akad. Nauk SSSR, Kom. Opred. Absol. Vozrasta Geol. Form., Tr.	Akademiya Nauk SSSR, Komissiya po Opredeleniyu Absolyutnogo Vozrasta Geologicheskikh Formatsiy, Trudy. Moscow.
Akad. Nauk SSSR, Mezhduved. Geofiz. Kom., Rezul't. Issled. Mezhdunar. Geofiz. Proyekt., Verkn. Mantiya	Akademiya Nauk SSSR, Mezhduvedomstvennyy Geofizicheskiy Komitet, Rezul'taty Issledovaniy po Mezhdunarodnym Geofizicheskim Proyektam, Verkhnyaya Mantiya. Moscow.
Akad. Nauk SSSR, Paleontol. Inst., Tr.	Akademiya Nauk SSSR, Paleontologicheskiy Institut, Trudy. Moscow.
Akad. Nauk SSSR, Sib. Otd., Inst. Geol. Geofiz., Tr.	Akademiya Nauk SSSR, Sibirskoye Otdeleniye, Institut Geologii i Geofiziki, Trudy. Moscow.
Akad. Nauk SSSR, Sib. Otd., Izv., Ser. Khim. Nauk	Akademiya Nauk SSSR, Sibirskoye Otdeleniye, Izvestiya, Seriya Khimicheskikh Nauk. Novosibirsk.
Akad. Nauk SSSR, Sib. Otd., Sev.-Vost. Kompleksn. Nauchno-Issled. Inst., Tr.	Akademiya Nauk SSSR, Sibirskoye Otdeleniye, Severo-Vostochnyy Kompleksnyy Nauchno-Issledovatel'skiy Institut, Trudy. Magadan.
Akad. Nauk SSSR, Ural. Filial, Inst. Geol. Geokhim., Tr.	Akademiya Nauk SSSR, Ural'skiy Filial, Institut Geologii i Geokhimii, Trudy. Sverdlovsk.
Akad. Nauk SSSR, Vestn.	Akademiya Nauk SSSR, Vestnik. Moscow.
Akad. Nauk Tadzh. SSR, Dokl.	Akademiya Nauk Tadzhikskoy SSR, Doklady. Dushanbe.
Akad. Nauk Turkm. SSR, Izv., Ser. Fiz.-Tekh., Khim. Geol. Nauk	Akademiya Nauk Turkmenskoy SSR, Izvestiya, Seriya Fiziko-Tekhnicheskikh, Khimicheskikh i Geologicheskikh Nauk. Ashkhabad.
Akad. Nauk Ukr. RSR, Dopov., Ser. B	Akademiya Nauk Ukrainskoi RSR, Dopovidi, Seriya B, Geologiya, Geofizika, Khimiya, ta Biologiya. Kiev.
Akad. Nauk Uzb. SSR, Dokl.	Akademiya Nauk UzSSR, Doklady. Tashkent.
Ala. Acad. Sci., J.	Alabama Academy of Science, Journal. Auburn.
Ala., Geol. Surv., Bull.	Alabama, Geological Survey, Bulletin. University.
Ala., Geol. Surv., Circ.	Alabama, Geological Survey, Circular. University.
Ala., Geol. Surv., Map	Alabama, Geological Survey, Map. University.
Alaska, Univ., Geophys. Inst., Rep.	Alaska, University, Geophysical Institute, Report. College.

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Alaska, Univ., Inst. Mar. Sci., Rep.	Alaska, University, Institute of Marine Science, Report. College.
Alaska, Univ., Miner. Ind. Res. Lab., Rep.	Alaska, University, Mineral Industry Research Laboratory, Report. College.
Alpenk. Stud.	Alpenkundliche Studien (Innsbruck, Universitaet, Veroeffentlichungen).
Alsace-Lorraine, Serv. Carte Geol., Bull.	Alsace-Lorraine, Service de la Carte Geologique, Bulletin. Strasbourg.
Alsace-Lorraine, Serv. Carte Geol., Mem.	Alsace-Lorraine, Service de la Carte Geologique, Memoires. Strasbourg.
Am. Assoc. Pet. Geol.—Soc. Eng. Geol., Pac. Sect., Annu. Mtg., Tech. Program Prepr.	American Association of Petroleum Geologists--Society of Engineering Geologists, Pacific Section, Annual Meeting, Technical Program Preprints. Bakersfield, California.
Am. Assoc. Pet. Geol., Bull.	American Association of Petroleum Geologists, Bulletin. Tulsa, Oklahoma.
Am. Assoc. Pet. Geol., East. Sect., Annu. Mtg., Program Abstr.	American Association of Petroleum Geologists, Eastern Section, Annual Meeting, Program and Abstracts.
Am. Assoc. Pet. Geol., Mem.	American Association of Petrolem Geologists, Memoir. Tulsa, Oklahoma.
Am. Assoc. Pet. Geol., Repr. Ser.	American Association of Petroleum Geologists, Reprint Series. [Tulsa].
Am. Assoc. Stratigr. Palynol., Annu. Mtg., Field Trip Guideb.	American Association of Stratigraphic Palynologists, Annual Meeting, Field Trip Guidebook.
Am. Congr. Surv. Mapp., Proc.	American Congress on Surveying and Mapping, Proceedings. Washington, D.C.
Am. Geophys. Union, Geophys. Monogr.	American Geophysical Union, Geophysical Monograph (National Academy of Sciences-National Research Council, Publication). Washington, D.C.
Am. J. Sci.	American Journal of Science. New Haven, Connecticut.
Am. Microsc. Soc., Trans.	American Microscopical Society, Transactions. [Lawrence, Kansas].
Am. Midl. Nat.	The American Midland Naturalist (University of Notre Dame). Notre Dame, Indiana.
Am. Mineral.	American Mineralogist (Mineralogical Society of America, Journal). Washington, D.C.
Am. Mus. Nat. Hist., Bull.	American Museum of Natural History, Bulletin. New York.
Am. Philos. Soc., Proc.	American Philosophical Society, Proceedings. Philadelphia, Pennsylvania.
Am. Philos. Soc., Trans.	American Philosophical Society, Transactions. Philadelphia, Pennsylvania.
Am. Quat. Assoc., Natl. Conf., Abstr.	American Quaternary Association, National Conference, Abstracts.
Am. Sci.	American Scientist (Society of the Sigma Xi). New Haven, Connecticut.
Am. Soc. Civ. Eng., Proc., J. Constr. Div.	American Society of Civil Engineers, Proceedings, Journal of the Construction Division. New York.
Am. Soc. Civ. Eng., Proc., J. Hydraul. Div.	American Society of Civil Engineers, Proceedings, Journal of Hydraulics Division. New York.
Am. Soc. Civ. Eng., Proc., J. Irrig. Drain. Div.	American Society of Civil Engineers, Proceedings, Journal of the Irrigation and Drainage Division. New York.
Am. Soc. Civ. Eng., Proc., J. Soil Mech. Found. Div.	American Society of Civil Engineers, Proceedings, Journal of the Soil Mechanics and Foundations Division. New York.
Am. Soc. Civ., Eng., Proc., J. Surv. Mapp. Div.	American Society of Civil Engineers, Proceedings, Journal of the Surveying and Mapping Division. New York.

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Am. Soc. Photogramm., Proc.	American Society of Photogrammetry, Proceedings. Falls Church, Virginia.
Am. Water Resour. Assoc., Proc. Ser.	American Water Resources Association, Proceedings Series. Urbana, Illinois.
Am. Water Works Assoc., J.	American Water Works Association, Journal. New York.
Am. Zool.	American Zoologist (American Society of Zoologists). Utica, New York.
Amat. Geol.	The Amateur Geologist. Manchester.
Ambio	Ambio; A Journal of the Human Environment: Research and Management. Universitetsforlaget, Oslo.
Amdel Bull.	Amdel Bulletin (Australian Mineral Development Laboratories, Bulletin. Frewville, South Australia.
Ameghiniana	Ameghiniana (Asociacion Paleontologica Argentina, Revista). Buenos Aires.
Amst., Univ., Fys. Geogr. Bodemkd. Lab., Publ.	Amsterdam, Universiteit, Fysisch-Geografisch en Bodemkundig Laboratorium, Publicaties.
An. Quim.	Anales de Quimica (Real Sociedad Espanola de Fisica y Quimica). Madrid.
Anal. Chim. Acta	Analytica Chimica Acta; International Monthly Devoted to all Branches of Analytical Chemistry. Elsevier Publ. Co., Amsterdam.
Analyst	The Analyst (Society for Analytical Chemistry, Journal). Cambridge.
Angew. Chem. (Int. Ed.)	Angewandte Chemie (International Edition in English). Heidelberg.
Angola, Serv. Geol. Minas, Bol.	Angola, Servicos de Geologia e Minas, Boletim. Luanda.
Angola, Serv. Geol. Minas, Mem.	Angola, Servicos de Geologia e Minas, Memoria. Luanda.
Ann. Geogr.	Annales de Geographie (Societe de Geographie, Bulletin). Paris.
Ann. Mines (Paris)	Annales des Mines. Paris.
Ann. Paleontol., Invertebres	Annales de Paleontologie, Invertebres. Paris.
Ann. Paleontol., Vertebres	Annales de Paleontologie, Vertebres. Paris.
Ann. Sci.	Annals of Science; a Quarterly Review of the History of Science and Technology Since the Renaissance. London.
Annu. Conf. Expo., Mar. Tech. Soc., Prepr.	Annual Conference and Exposition, Marine Technology Society, Preprints. Washington, D.C.
Annu. Eng. Geol. Soils Eng. Symp., Proc.	Annual Engineering Geology and Soils Engineering Symposium, Proceedings.
Annu. Field Conf. Pa. Geol., Guideb.	Annual Field Conference of Pennsylvania Geologists, Guidebook.
Annu. Highway Geol. Symp., Proc.	Annual Highway Geology Symposium, Proceedings. Norman, Oklahoma.
Annu. Rev. Fluid Mech.	Annual Review of Fluid Mechanics. Palo Alto, California.
Annu. Rev. Phys. Chem.	Annual Review of Physical Chemistry. Palo Alto, California.
Annu. Tri-State Geol. Field Conf., Guideb.	Annual Tri-State Geological Field Conference. Guidebook.
Antarct. Map Folio Ser. (Am. Geogr. Soc.)	Antarctic Map Folio Series (American Geographical Society). New York.
Antarct. Rec.	Antarctic Record (Japanese Antarctic Research Expedition, Reports). Tokyo.
Antarct. Res. Ser.	Antarctic Research Series (American Geophysical Union) (National Academy of Sciences-National Research Council, Publication). Washington, D.C.
Antarctic J.	Antarctic Journal of the United States (National Science Foundation, Office of Antarctic Programs-Department of Defense, U.S. Naval Support Force, Antarctica). Washington, D.C.

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Antarktika	Antarktika (Akademiya Nauk SSSR). Moscow.
Anthropos	Anthropos; Studia Musei Moravie (Studie z oboru anthropologie, paleoethnologie, paleontologie a kvarterni geologie). Brno.
Appl. Mineral	Applied Mineralogy. Technische Mineralogie. New York.
Arch. Gorn.	Archiwum Gornictwa (Polska Akademia Nauk). Warsaw.
Arch. Hydrotech.	Archiwum Hydrotechniki (Polska Akademia Nauk, Institut Budownictwa Wodnego). Warsaw.
Arch. Sci. (Soc. Phys. Hist. Nat. Geneve)	Archives des Sciences (Societe de Physique et d'Histoire Naturelle de Geneve).
Arct. Alp. Res.	Arctic and Alpine Research (Institute of Arctic and Alpine Research). Boulder, Colorado.
Arctic	Arctic (Arctic Institute of North America, Journal). Ottawa.
Argent., Dir. Nac. Geol. Min., Bol.	Argentina, Direccion Nacional de Geologia y Mineria, Boletin. Buenos Aires.
Argent., Dir. Nac. Geol. Min., Rev.	Argentina, Direccion Nacional de Geologia y Mineria, Revista. Buenos Aires.
Argent., Serv. Hidrogr. Nav., Bol.	Argentina, Servicio de Hidrografia Naval, Boletin. Buenos Aires.
Ariz. Bur. Mines, Bull.	Arizona Bureau of Mines, Bulletin. University of Arizona, Tucson.
Ariz. Geol. Soc. Dig.	Arizona Geological Society Digest. Tucson.
Ariz., Univ., Dep. Geochron., Interim Res. Rep.	Arizona, University, Department of Geochronology, Interim Research Report. Tucson.
Ariz. Univ., Dep. Hydrol. Water Resour., Tech. Rep.	Arizona, University, Department of Hydrology and Water Resources, Technical Report. Tucson.
Ariz. Water Comm., Bull.	Arizona Water Commission, Bulletin. Phoenix.
Arkansas Acad. Sci., Proc.	Arkansas Academy of Science, Proceedings. Fayetteville, Arkansas.
Arnoldia	Arnoldia (National Museums of Rhodesia, Series of Miscellaneous Publications). Salisbury.
Asbestos	Asbestos. Willow Grove, Pennsylvania.
Asian Inst. Technol., Res. Rep.	Asian Institute of Technology, Research Report. Bangkok.
Asian Inst. Technol., Thesis	Asian Institute of Technology, Thesis. Bangkok.
Asoc. Geol. Argent., Rev.	Asociacion Geologica Argentina, Revista. Buenos Aires.
Asoc. Venez. Geol., Min. Pet., Bol. Inf.	Asociacion Venezolana de Geologia, Mineria y Petroleo, Boletin Informativo. [Caracas].
Assoc. Am. Geogr., Ann.	Association of American Geographers, Annals. Washington, D.C.
Assoc. Am. Geogr., Comm. Coll. Geogr. Resour. Pap.	Association of American Geographers, Commission on College Geography, Resource Paper. Washington, D.C.
Assoc. Eng. Geol. Annu. Mtg., Guide Field Trips	Association of Engineering Geologists Annual Meeting, Guide to Field Trips.
Assoc. Eng. Geol. Bull.	Association of Engineering Geologists, Bulletin. Berkeley, California.
Assoc. Fr. Etude Quat., Bull.	Association Francaise pour l'Etude du Quaternaire, Bulletin. Paris.
Assoc. Fr. Tech. Pet., Rev.	Association Francaise des Techniciens du Petrole, Revue. Paris.
Assoc. Geogr. Fr., Bull.	Association de Geographes Francais, Bulletin. Paris.
Assoc. Geol. Bassin Paris, Bull. Inf.	Association des Geologues du Bassin de Paris, Bulletin d'Information. Paris.
Assoc. Mex. Cave Stud., Cave Rep. Ser.	Association for Mexican Cave Studies, Cave Report Series. Austin.
Assoc. Senegal. Etude Quat. Ouest Afr., Bull.	Association Senegalaise pour l'Etude du Quaternaire de l'Ouest Africain, Bulletin de Liaison. Dakar.

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Astron. Space	Astronomy and Space. Devon, England.
At. Energ.	Atomnaya Energiya (Akademiya Nauk Soyuza-Gosudarstvennyy Komitet po Ispol'zovaniyu Atomnoy Energii SSSR). Moscow.
Aufschluss	Der Aufschluss (Zeitschrift fuer die Freunde der Mineralogie und Geologie). Goettingen.
Aust., Bur. Miner. Resour., Geol. Geophys., Bull.	Australia, Bureau of Mineral Resources, Geology and Geophysics, Bulletin. Canberra.
Aust., Bur. Miner. Resour., Geol. Geophys., Rep.	Australia, Bureau of Mineral Resources, Geology and Geophysics, Report. Canberra.
Aust., Commonw. Sci. Ind. Res. Organ., Div. Appl. Geomech., Tech. Rep.	Australia, Commonwealth Scientific and Industrial Research Organization, Division of Applied Geomechanics, Technical Report. Victoria.
Aust., Commonw. Sci. Ind. Res. Organ., Div. Miner. Chem., Invest. Rep.	Australia, Commonwealth Scientific and Industrial Research Organization, Division of Mineral Chemistry, Investigation Report. Chatswood, New South Wales.
Aust., Commonw. Sci. Ind. Res. Organ., Div. Soil Mech., Tech. Paper	Australia, Commonwealth Scientific and Industrial Research Organization, Division of Soil Mechanics, Technical Paper. Melbourne.
Aust., Commonw. Sci. Ind. Res. Organ., Land Res. Ser.	Australia, Commonwealth Scientific and Industrial Research Organization, Land Research Series. Melbourne.
Aust., Commonw. Sci. Ind. Res. Organ., Soil Publ.	Australia, Commonwealth Scientific and Industrial Research Organization, Soil Publication. Melbourne.
Aust. Gas J.	Australian Gas Journal. Melbourne.
Aust. Gemmol.	The Australian Gemmologist (Gemmological Association of Australia, Journal). Sydney.
Aust. Geogr.	The Australian Geographer (Geographical Society of New South Wales, Journal). Sydney.
Aust. Geogr. Stud.	Australian Geographical Studies (Institute of Australian Geographers, Journal). Melbourne.
Aust. Geomech. J.	Australian Geomechanics Journal. Sydney.
Aust. J. Soil Res.	Australian Journal of Soil Research. Melbourne.
Aust. Min.	Australian Mining. [Chippendale, New South Wales].
Aust. Miner. Ind.	Australian Mineral Industry (Bureau of Mineral Resources, Geology and Geophysics). Canberra.
Aust. Nat. Hist.	Australian Natural History (Australian Museum). Sydney.
Aust. Natl. Univ., Dep. Geol. Publ.	Australia National University, Department of Geology Publication. Canberra.
Aust. Soc. Explor. Geophys., Bull.	Australian Society of Exploration Geophysicists, Bulletin. Sydney.
Aust. Water Resour. Counc., Hydrol. Ser.	Australian Water Resources Council, Hydrological Series. Canberra.
Aust. Water Resour. Counc., Water Resour. Newsl.	Australian Water Resources Council, Water Resources Newsletter. Canberra.
Aust.-N.Z. Conf. Geomech., Proc.	Australian-New Zealand Conference on Geomechanics, Proceedings. Melbourne.
Australas. Inst. Min. Metall., Proc.	Australasian Institute of Mining and Metallurgy, Proceedings. Melbourne.
Australas. Oil Gas Rev.	Australasian Oil & Gas Review. Sydney.
Austria, Geol. Bundesanst. Abh.	Austria, Geologische Bundesanstalt, Abhandlungen. Vienna.
Austria, Geol. Bundesanst., Jahrb.	Austria, Geologische Bundesanstalt, Jahrbuch. Vienna.
Austria, Geol. Bundesanst., Jahrb., Sonderb.	Austria, Geologische Bundesanstalt, Jahrbuch, Sonderband. Vienna.
Austria, Geol. Bundesanst., Verh.	Austria, Geologische Bundesanstalt, Verhandlungen. Vienna.

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B. C., Dep. Mines Pet. Resour., Bull.	British Columbia, Department of Mines and Petroleum Resources, Bulletin. Victoria.
B. C., Univ., Dep. Geol., Rep.	British Columbia, University, Department of Geology, Report. [Vancouver].
Badlands Nat. Hist. Assoc., Bull.	Badlands Natural History Association, Bulletin. Interior, South Dakota.
Balneol. Soc. Jap., J.	Balneological Society of Japan, Journal. Tokyo.
Bandung, Inst. Teknol., Proc.	Bandung, Institut Teknologi, Proceedings.
Barc., Inst. Prov. Paleontol., Paleontol. Evol.	Barcelona, Instituto Provincial de Paleontologia, Paleontologia y Evolucion. Sabadell.
Bayer. Akad. Wiss., Math.-Naturwiss. Kl., Abh.	Bayerische Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse, Abhandlungen. Munich.
Bayer. Akad. Wiss., Math.-Naturwiss. Kl., Sitzungsber.	Bayerische Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse, Sitzungsberichte. Munich.
Bayer. Staatssamml. Palaeontol. Hist. Geol., Mitt.	Bayerische Staatssammlung fuer Palaeontologie und Historische Geologie, Mitteilungen. Munich.
Baylor Geol. Stud., Bull.	Baylor Geological Studies, Bulletin. Baylor University, Waco, Texas.
Beitr. Geol. Karte Schweiz	Beitraege zur Geologischen Karte der Schweiz—Materiaux pour la Carte Geologique de la Suisse—Materiali per la Carta Geologica della Svizzera. Schweizerische Geologische Kommission, Bern.
Beitr. Geol. Schweiz, Geotech. Ser.	Beitraege zur Geologie der Schweiz, Geotechnische Serie (Schweizerische Geotechnische Kommission). Bern.
Beitr. Geol. Schweiz, Kleinere Mitt.	Beitraege zur Geologie der Schweiz, Kleinere Mitteilungen. Zuerich.
Belg., Serv. Geol., Prof. Pap.	Belgium, Service Geologique (Aardkundige Dienst van Belgie), Professional Paper. Brussels.
Bell Syst. Tech. J.	Bell System Technical Journal. New York.
Ber. Dtsch. Landeskd.	Berichte zur Deutschen Landeskunde (Zentralarchiv fuer Landeskunde von Deutschland, Institut fuer Landeskunde). Bad Godesberg.
Bern, Naturhist. Mus., Jahrb.	Bern, Naturhistorisches Museum, Jahrbuch.
Besancon, Univ., Ann. Sci., Ser. 3	Besancon, Universite, Annales Scientifiques, Serie 3, Geologie.
Bibliogr. Carboniferous Geol.	Bibliography of Carboniferous Geology (Rijks Geologische Dienst, Geologisch Bureau voor het Mijngebied). Heerlen, Netherlands.
Bibliogr. Seismol. (Edinb.)	Bibliography of Seismology. Edinburgh.
Biol. Soc. Wash., Bull.	Biological Society of Washington, Bulletin. Washington, D. C.
Biol. Soc. Wash., Proc.	Biological Society of Washington, Proceedings. Washington, D.C.
Biomineralisation—Biomineralization	Biomineralisation, Forschungsberichte—Biomineralization, Research Reports. Stuttgart.
Bohrtech. Brunnenbau Rohrleitungsbau	Bohrtechnik, Brunnenbau, Rohrleitungsbau. Cologne.
Bol. Estud. Geogr. (Mendoza)	Boletin de Estudios Geograficos (Universidad Nacional de Cuyo, Instituto de Geografia). Mendoza.
Bol. Minas (Port., Dir.-Geral Minas Serv. Geol.)	Boletim de Minas (Portugal, Direccao-Geral de Minas e Servicos Geologicos). Lisbon.
Bol. Paulista Geogr. (Sao Paulo)	Boletim Paulista de Geografia (Associao dos Geografos Brasileiros, Secao Regional de Sao Paulo). Sao Paulo.
Bol. Tec. Petrobras	Boletim Tecnico da Petrobras (Centro de Pesquisas e Desenvolvimento). Rio de Janeiro.
Boll. Geofis. Teor. Appl.	Bollettino di Geofisica Teorica ed Applicata (Osservatorio Geofisico Sperimentale). Trieste.
Boreas	Boreas; An International Journal of Quaternary Geology. Oslo.

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Bot. Rev.	The Botanical Review (New York Botanical Garden). Bronx, New York.
Br. Antarct. Surv., Bull.	British Antarctic Survey, Bulletin. London.
Br. Antarct. Surv., Sci. Rep.	British Antarctic Survey, Scientific Reports. London.
Br. Mus. (Nat. Hist.), Bull., Geol.	British Museum (Natural History), Bulletin, Geology. London.
Br. Mus. (Nat. Hist.), Bull. Zool.	British Museum (Natural History), Bulletin, Zoology. London.
Braunkohle	Braunkohle, Waerme und Energie. Dusseldorf.
Braunschweig. Wiss. Ges., Abh.	Braunschweigische Wissenschaftliche Gesellschaft, Abhandlungen.
Braz., Div. Fom. Prod. Miner., Bol.	Brazil, Divisao de Fomento da Producao Mineral, Boletim. Rio de Janeiro.
Braz., Div. Geol. Mineral., Notas Prelim. Estud.	Brazil, Divisao de Geologia e Mineralogia, Notas Preliminares e Estudos. Rio de Janeiro.
Braz., Supt. Desenvolvimento Nordeste, Div. Hidrogeol., Ser. Hidrogeol.	Brazil, Superintendencia do Desenvolvimento do Nordeste, Divisao de Hidrogeologia, Seric Hidrogeologia. Recife.
Brazil, Minist. Minas Energ., Dep. Nac. Prod. Miner., Bol.	Brazil, Ministerio das Minas e Energia, Departamento Nacional da Producao Mineral, Boletim. Rio de Janeiro.
Breviora	Breviora (Harvard University, Museum of Comparative Zoology). Cambridge, Massachusetts.
Brigham Young Univ. Geol. Stud.	Brigham Young University Geology Studies. Provo, Utah.
Bristol, Univ., Spelaeol. Soc., Proc.	Bristol, University, Spelaeological Society, Proceedings.
Brit. Speleol. Assoc., J.	British Speleological Association, Journal. Seattle, Yorkshire.
Brno, Univ., Prirod. Fak., Folia	Brno, Universita, Prirodovecka Fakulta, Folia. Brno.
Buchar., Univ., An., Geogr.	Bucharest, Universitatea, Analele, Geografie.
Buchar., Univ., An., Geol.	Bucharest, Universitatii, Analele, Geologie. Bucharest.
Bulg. Akad. Nauk, Dokl.	Bulgarska Akademiya na Naukite, Doklady (Academie Bulgare des Sciences, Comptes Rendus). Sofia.
Bulg. Akad. Nauk., Geol. Inst., Izv., Ser. Geokhim., Mineral. Petrogr.	Bulgarska Akademiya na Naukite, Geologicheski Institut, Izvestiya, Seriya Geokhimiya, Mineralogiya i Petrografiya. Sofia.
Bulg. Akad. Nauk., Geol. Inst., Izv., Ser. Geotektonika	Bulgarska Akademiya na Naukite, Geologicheski Institut, Izvestiya, Seriya Geotektonika. Sofia.
Bulg. Akad. Nauk., Geol. Inst., Izv., Ser Inzh. Geol. Khidrogeol.	Bulgarska Akademiya na Naukite, Geologicheski Institut, Izvestiya, Seriya Inzhenerna Geologiya i Khidrogeologiya. Sofia.
Bulg. Akad. Nauk., Geol. Inst., Izv., Ser. Neft. Vuglishtna Geol.	Bulgarska Akademiya na Naukite, Geologicheski Institut, Izvestiya, Seriya Neftena i Vuglishtna Geologiya. Sofia.
Bulg. Akad. Nauk., Geol. Inst., Izv., Ser. Paleontol.	Bulgarska Akademiya na Naukite, Geologicheski Institut, Izvestiya, Seriya Paleontologiya. Sofia.
Bulg. Akad. Nauk., Geol. Inst., Izv., Ser. Prilozh. Geofiz.	Bulgarska Akademiya na Naukite, Geologicheski Institut, Izvestiya, Seriya Prilozhna Geofizika. Sofia.
Bulg. Akad. Nauk., Geol. Inst., Izv., Ser. Stratigr. Litol.	Bulgarska Akademiya na Naukite, Geologicheski Institut, Izvestiya, Seriya Stratigrafiya i Litologiya. Sofia.
Bulg. Geol. Druzh., Spis.	Bulgarsko Geologichesko Druzhestvo, Spisaniye. Sofia.
Bull. Am. Paleontol.	Bulletins of American Paleontology. Ithaca, New York.
Bull. Can. Pet. Geol.	Bulletin of Canadian Petroleum Geology (Alberta Society of Petroleum Geologists). Calgary.
Bull. Geod.	Bulletin Geodesique (Union Geodesique et Geophysique Internationale, Association Internationale de Geodesie). Paris.

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Bull. Geophys.	Bulletin de Geophysique. Montreal.
Bull. Mar. Sci.	Bulletin of Marine Science (University of Miami, Institute of Marine Sciences). Miami, Florida.
Bull. Seismographic Stn. (Berkeley)	Bulletin of the Seismographic Stations. University of California, Berkeley, California.
Bull. Volcanol.	Bulletin Volcanologique (Union Geodesique et Geophysique Internationale, Association de Volcanologie). Naples.
Bull. Zool. Nomencl.	Bulletin of Zoological Nomenclature (International Commission on Zoological Nomenclature). London.
Butsuri-Tanko	Butsuri-Tanko (Geophysical Exploration) (Society of Exploration Geophysicists of Japan). Kawasaki.
Cah. Geogr. Que.	Cahiers de Geographie de Quebec (Universite Laval, Institut de Geographie). Quebec.
Cah. Geol.	Cahiers Geologiques (Association des Amis et Anciens Eleves du Laboratoire de Geologie S.P.C.N. de l'Universite de Paris).
Cah. Nat.	Cahiers des Naturalistes (Bulletin des Naturalistes Parisiens). Paris.
Calif. Acad. Sci., Occas. Pap.	California Academy of Sciences, Occasional Papers. San Francisco.
Calif. Acad. Sci., Proc.	California Academy of Sciences, Proceedings. San Francisco.
Calif., Dep. Water Resour., Bull.	California, Department of Water Resources, Bulletin. [Sacramento].
Calif. Div. Mines Geol., Map Sheet Ser.	California Division of Mines and Geology, Map Sheet Series. Sacramento.
Calif. Div. Mines Geol., Prelim. Rep.	California Division of Mines and Geology, Preliminary Report. Sacramento.
Calif. Div. Mines Geol., Spec. Rep.	California Division of Mines and Geology, Special Report. San Francisco.
Calif., Div. Oil Gas, Summ. Oper., Calif. Oil Fields	California, Division of Oil and Gas, Summary of Operations, California Oil Fields (Annual Report of the State Oil and Gas Supervisor). Sacramento.
Calif. Geol.	California Geology (California Division of Mines and Geology, Publication). Sacramento.
Calif. Univ., Dep. Geogr., Tech. Rep. (Riverside)	California, University, Department of Geography, Technical Report. Riverside.
Calif., Univ., Publ. Entomol.	California, University, Publications in Entomology. Berkeley.
Calif., Univ., Publ. Geol. Sci.	California, University, Publications in Geological Sciences. Berkeley Los Angeles.
Calif., Univ. (Riverside), Campus Mus. Contrib.	California, University, Campus Museum Contributions. Riverside.
Calif., Univ. Scripps Inst. Oceanogr., Contrib.	California, University, Scripps Institution of Oceanography, Contributions. La Jolla.
Cameroon, Dir. Mines Geol., Bull.	Cameroon, Direction des Mines et de la Geologie, Bulletin. Yaounde.
Cameroun, Univ. Fed., Fac. Sci., Ann.	Cameroun, Universite Federale, Faculte des Sciences, Annales. Yaounde.
Can., Dep. Agric., Res. Br., Publ.	Canada, Department of Agriculture, Research Branch, Publication. Ottawa.
Can., Dep. Energy, Mines Resour., Earth Phys. Br., Publ.	Canada, Department of Energy, Mines and Resources, Earth Physics Branch, Publications. Ottawa.
Can., Dep. Energy, Mines Resour., Inland Waters Br., Rep. Ser.	Canada, Department of Energy, Mines and Resources, Inland Waters Branch, Report Series. Ottawa.
Can., Dep. Energy, Mines Resour., Miner. Res. Br., Miner. Bull.	Canada, Department of Energy, Mines and Resources, Mineral Resources Branch, Mineral Bulletin. Ottawa.

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Can., Dep. Energy, Mines Resour., Mines Br., Inf. Circ.	Canada, Department of Energy, Mines and Resources, Mines Branch, Information Circular. Ottawa.
Can., Dep. Energy Mines Resour., Mines Br., Res. Rep.	Canada, Department of Energy, Mines and Resources, Mines Branch, Research Report. Ottawa.
Can., Dep. Energy, Mines Resour., Mines Br., Tech. Bull.	Canada, Department of Energy, Mines and Resources, Mines Branch, Technical Bulletin. Ottawa.
Can., Dep. Environ., Inland Waters Br., Glacier Inventory Note	Canada, Department of the Environment, Inland Waters Branch, Glacier Inventory Note. Ottawa.
Can., Dep. Environ., Mar. Sci. Dir., Manuscr. Rep. Ser.	Canada, Department of the Environment, Marine Sciences Directorate, Manuscript Report Series. Ottawa.
Can. Geogr. J.	Canadian Geographical Journal (Royal Canadian Geographical Society). Ottawa.
Can., Geol. Surv., Bull.	Canada, Geological Survey, Bulletin. Ottawa.
Can., Geol. Surv., Econ. Geol. Rep.	Canada, Geological Survey, Economic Geology Report. Ottawa.
Can., Geol. Surv., Map	Canada, Geological Survey, Map. Ottawa.
Can., Geol. Surv., Mem.	Canada, Geological Survey, Memoir. Ottawa.
Can., Geol. Surv., Misc. Rep.	Canada, Geological Survey, Miscellaneous Report. Ottawa.
Can., Geol. Surv., Pap.	Canada, Geological Survey, Paper. Ottawa.
Can. Geotech. J.	Canadian Geotechnical Journal = Revue Canadienne de Geotechnique (National Research Council, Associate Committee on Geotechnical Research Engineering Institute of Canada, Geotechnical Engineering Division). Toronto.
Can. Inst. Min. Met., Spec. Vol.	Canadian Institute of Mining and Metallurgy, Special Volume. [Toronto].
Can. J. Botany	Canadian Journal of Botany. National Research Council of Canada. Ottawa.
Can. J. Earth Sci.	Canadian Journal of Earth Sciences (National Research Council of Canada). Ottawa.
Can. J. Soil Sci.	Canadian Journal of Soil Science (Agricultural Institute of Canada). Ottawa.
Can., Mar. Sci. Br., Mar. Sci. Pap.	Canada, Marine Sciences Branch, Marine Science Paper. Ottawa.
Can. Min. J.	Canadian Mining Journal. Gardenvale, Quebec.
Can. Min. Metall. Bull.	Canadian Mining and Metallurgical Bulletin (Canadian Institute of Mining and Metallurgy). Montreal.
Can. Mineral.	Canadian Mineralogist (Mineralogical Association of Canada). Ottawa.
Can. Rock Mech. Symp., Proc.	Canadian Rock Mechanics Symposium, Proceedings. Ottawa.
Can. Soc. Explor. Geophys., J.	Canadian Society of Exploration Geophysicists, Journal. Calgary, Alberta.
Can. Spectrosc.	Canadian Spectroscopy. Montreal.
Cape Town, Univ., Dep. Geol., Precambrian Res. Unit, Bull.	Cape Town, University, Department of Geology, Precambrian Research Unit, Bulletin.
Caribb. Geol. Conf., Trans.	Caribbean Geological Conference, Transactions.
Caribb. J. Sci.	Caribbean Journal of Science (University of Puerto Rico, Institute of Caribbean Science). Mayaguez.
Carinthia II, Sonderh.	Carinthia II, Sonderheft. Klagenfurt.
Carnegie Inst. Wash., Yearb.	Carnegie Institution of Washington, Yearbook. [Washington, D.C.].

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Carnegie Mus., Ann.	Carnegie Museum, Annals. Pittsburgh, Pennsylvania.
Cartogr. (Aust. Inst. Cartogr.)	Cartography (Australian Institute of Cartographers). Canberra.
Cas. Mineral. Geol.	Casopis pro Mineralogii a Geologii (Societas Mineralogica et Geologica Bohemoslovaca). Prague.
Cat. Fossil Spores Pollen	Catalogue of Fossil Spores and Pollen. University Park, Pennsylvania.
Cave Res. Group G. B., Trans.	Cave Research Group of Great Britain, Transactions. Ledbury (Herefordshire).
Caves Karst	Caves and Karst; Research in Speleology (Cave Research Associates). Castro Valley, California.
CEGS Programs Publ.	CEGS (Council on Education in the Geological Sciences) Programs Publication. American Geological Institute. Washington, D.C.
Cent. Geomorphol. Caen, Bull.	Centre de Geomorphologie de Caen, Bulletin Trimestriel (Centre National de la Recherche Scientifique). Caen.
Cent. Natl. Geol. Houillere—Natl. Cent. Geol. Steenkolenformaties, Publ.	Centre National de Geologie Houillere--Nationaal Centrum voor Geologie der Steenkolenformaties, Publication. Brussels.
Cent. Rech. Pau, Bull.	Centre de Recherches de Pau (Societe Nationale des Petroles d'Aquitaine), Bulletin.
Ceram. Ind.	Ceramiques Industrielles (Association de Eleves de l'Ecole Nationale Superieure de Ceramique Industrielle). Sevres.
Cesk. Akad. Ved, Geogr. Ustav Brno, Stud. Geogr.	Ceskoslovenska Akademie Ved, Geograficky Ustav Brno, Studia Geographica. Brno.
Cesk. Akad. Ved, Geogr. Ustav, Zpr.	Ceskoslovenska Akademia Ved, Geograficky Ustav, Zpravy. Brno.
Cesk. Akad. Ved, Rozpr., Rada Mat. Prirdn. Ved	Ceskoslovenska Akademia Ved, Rozpravy, Rada Matematickych Prirodnich PrIrodnIch Ved. Prague.
Cesk. Akad. Ved, Stud. Geophys. Geod.	Ceskoslovenska Akademie Ved, Studia Geophysica et Geodaetica. Prague.
Cesk. Spol. Zemepisna, Sb.	Ceskoslovenska Spolecnost Zemepisna, Sbornik. Prague.
Ceylon Assoc. Advan. Sci., Proc.	Ceylon Association for the Advancement of Science, Proceedings. Colombo.
Ceylon, Geol. Surv., Admin. Rep. Dir.	Ceylon, Geological Survey, Administration Report of the Director. Colombo.
Chem. Geol.	Chemical Geology; an International Journal. Elsevier Publ. Co., Amsterdam.
Chem. Soc. Jap., Bull.	Chemical Society of Japan, Bulletin. Tokyo.
Chikyukagaku (Geochem.)	Chikyukagaku (Geochemistry) (Geochemical Society of Japan). Nagoya.
Chile, Inst. Invest. Geol., Bol.	Chile, Instituto de Investigaciones Geologicas, Boletin. Santiago.
Chile, Inst. Invest. Geol., Carta	Chile, Instituto de Investigaciones Geologicas, Carta. Santiago.
Chile, Univ. Fac. Cience. Fis. Mat., Publ.	Chile, Universidad, Facultad de Ciencias Fisicas y Matematicas, Publicacion. Santiago.
Ciel Terre	Ciel et Terre; Societe Belge d'Astronomie, de Meteorologie et de Physique du Globe, Bulletin. Brussels.
Cienc., Tec. Pet., Sec. Explor. Pet.	Ciencia, Tecnica, Petroleo, Secao Exploracao de Petroleo (Petrobras). Rio de Janeiro.
Clausthal. Hefte Lagerstaettenk. Geochem. Miner. Rohstoffe	Clausthaler Hefte zur Lagerstaettenkunde und Geochemie der Mineralischen Rohstoffe. Berlin-Nikolassee.
Clausthal. Tektonische Hefte	Clausthaler Tektonische Hefte. Clausthal-Zellerfeld.
Clausthaler Geol. abh.	Clausthaler Geologische Abhandlungen. Clausthal-Zellerfeld.

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Clay Miner.	Clay Minerals (Mineralogical Society, Clay Minerals Group, Journal). Oxford–Edinburgh.
Clay Miner. Conf., Program Abstr.	Clay Minerals Conference (Clay Minerals Society). [Rapid City, S.D.].
Clay Sci.	Clay Science (Clay Science Society of Japan). Tokyo.
Clays Clay Miner.	Clays and Clay Minerals (Clay Minerals Society, Journal). Pergamon Press, New York–Oxford.
Clermont, Univ., Fac. Sci., Ann.	Clermont, Universite, Faculte des Sciences, Annales. Clermont-Ferrand.
Clermont-Ferrand, Fac. Lett., Inst. Geogr., [Trav.]	Clermont-Ferrand, Faculte des Lettres, Institut de Geographie, [Travaux].
Cluj, Univ., Stud., Ser. Geogr.	Cluj, Universitatea Babes-Bolyai, Studia, Series Geographia.
Cluj, Univ., Stud., Ser. Geol.-Mineral.	Cluj, Universitatea Babes-Bolyai, Studia, Series Geologia-Mineralogia.
Coast. Plains Cent. Mar. Dev. Serv., Publ.	Coastal Plains Center for Marine Development Services, Publication. Wilmington, North Carolina.
Colloq. Spectrosc., Int. Proc.	Colloquium Spectrscopicum Internationale, Proceedings.
Colo. Sch. Mines, Q.	Colorado School of Mines, Quarterly. Golden.
Colo. State Univ., Hydrol. Pap.	Colorado State University, Hydrology Papers. Fort Collins, Colorado.
Colo. Water Conserv. Bd., Basic-Data Release	Colorado Water Conservation Board, Basic-Data Release. Denver.
Colo., Water Conserv. Bd., Water Res. Circ.	Colorado, Water Conservation Board, Water Resources Circular. Denver.
Colomb., Serv. Geol. Nac., Bol. Geol.	Colombia, Servicio Geologico Nacional, Boletin Geologico. Bogota.
Col-Pa (Madr., Univ., Fac. Cienc.)	Col-Pa (Coloquios de la Catedra de Paleontologia) (Madrid, Universidad, Facultad de Ciencias).
Com. Naz. Energ. Nucl. [Repr.]	Comitato Nazionale Energia Nucleare, [Reprints]. Bari, Italy.
Comments Earth Sci.; Geophys.	Comments on Earth Science: Geophysics (a Journal of Critical Discussion of the Current Literature). London–New York.
Conf. Great Lakes Res., Abstr.	Conference on Great Lakes Research, Abstracts. International Association for Great Lakes Research, Ann Arbor, Michigan.
Conf. Publ. Sci. Inf. Can., C. R.–Open Conf. Inf. Sci. Can., Proc.	Conference Publique sur les Sciences de l'Information au Canada, Compte Rendu—Open Conference on Information Science in Canada, Proceedings. L'Energie Atomique du Canada Limitee—Atomic Energy of Canada Limited, Chalk River, Ontario.
Congr. Geol. Argent., Resumenes	Congreso Geologico Argentino, Resumenes. Asociacion Geologica Argentina, [Buenos Aires].
Congr. Hisp.-Luso-Am. Geol. Econ., Comun. (Relatos)—Comun. (Relatos)	Congreso Hispano-Luso-Americano de Geologia Economica, Comunicaciones (Relatos)—Comunicacoes (Relatos).
Congr. Hisp.-Luso-Am. Geol. Econ., Livro-Guia Excursao	Congreso Hispano-Luso-Americano de Geologia Economica, Livro-Guia da Excursao.
Congr. Hisp.-Luso-Am. Geol. Econ., [Trab.]	Congreso Hispano-Luso-Americano de Geologia Economica, [Trabajos]. Madrid.
Conn. Acad. Arts Sci., Trans.	Connecticut Academy of Arts. and Sciences, Transactions. New Haven, Connecticut.
Conn., Water Resour. Comm., Conn. Water Resour. Bull.	Connecticut, Water Resources Commission, Connecticut Water Resources Bulletin. [Hartford].
Contrib. Geol. (Wyo., Univ.)	Contributions to Geology (Wyoming, University). Laramie.

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Contrib. Hist. Geol.	Contributions to the History of Geology. Hafner Publishing Company, New York.
Contrib. Mineral. Petrol. Beitr. Mineral. Petrol.	Contributions to Mineralogy and Petrology Beitraege zur Mineralogie und Petrologie. Berlin Heidelberg-New York.
Copenh., Univ., Mus. Mineral. Geol., Commun. Geol.	Copenhagen, Universite, Museum de Mineralogie et de Geologie, Communications Geologiques. Copenhagen.
Costa Rica, Dir. Geol. Minas Pet., Inf. Tec. Notas Geol.	Costa Rica, Direccion de Geologia Minas y Petroleo, Informes Tecnicos y Notas Geologicas. San Jose.
Cotteswold Nat. Field Club, Proc.	Cotteswold Naturalists' Field Club. Proceedings. Gloucester.
Crystallogr. (Sov. Phys.)	Crystallography (Soviet Physics) (*English translation of* Kristallografiya). American Institute of Physics, New York.
Cuad. Geol. Iber.	Cuadernos de Geologia Iberica (Madrid, Universidad, Facultad de Ciencias, Instituto de Geologia Economica Departamento de Estratigrafia).
Curr. Sci.	Current Science. Bangalore.
Cushman Found. Foraminiferal Res., Spec. Publ.	Cushman Foundation for Foraminiferal Research, Special Publication. Ithaca, New York.
Czas. Geogr.	Czasopismo Geograficzne--Geographical Journal (Polskie Towarzystwo Geograficzne—Polish Geographical Society). Wroclaw.
Czech., Ustav Geol. Inz., Pr.	Czechoslovakia, Ustav Geologickeho Inzenyrstvi, Prace. Brno.
Czech., Ustred. Ustav Geol., Knih.	Czechoslovakia, Ustredni Ustav Geologicky, Knihovna. Prague.
Czech., Ustred. Ustav. Geol., Rozpr.	Czechoslovakia, Ustredni Ustav Geologicky, Rozpravy. Prague.
Czech., Ustred. Ustav Geol., Vestn.	Czechoslovakia, Ustredni Ustav Geologicky, Vestnik. Prague.
Dakar, Univ., Fac. Sci., Dep. Geol., Rapp.	Dakar, Universite, Faculte des Sciences, Department de Geologie, Rapport. Dakar, Senegal.
Dan. Geol. Unders., Raekke 2	Danmarks Geologiske Undersoegelse, Raekke 2. Copenhagen.
Dan. Geol. Unders., Raekke 3	Danmarks Geologiske Undersoegelse, Raekke 3—Geological Survey of Denmark, Series 3. Copenhagen.
Dan. Geol. Unders., Rapp.	Danmarks Geologiske Undersoegelse, Rapport. Copenhagen.
Danzig, Univ., Wydz. Biol. Nauk Ziemi, Zesz. Nauk., Geogr.	Danzig, Uniwersytet, Wydzial Biologii i Nauk o Ziemi, Zeszyty Naukowe, Geografia. Danzig.
Decheniana	Decheniana (Naturhistorischer Verein der Rheinlande und Westfalens, Verhandlungen). Bonn.
Deep-Sea Res.	Deep-Sea Research and Oceanographic Abstracts. London.
Del. Geol. Surv., Rep. Invest.	Delaware Geological Survey, Report of Investigations. Newark, Delaware.
Dev. Sedimentol.	Developments in Sedimentology. Elsevier Publ. Co., Amsterdam.
Diss. Abstr. Int.	Dissertation Abstracts International; Abstracts of Dissertations Available on Microfilm or as Xerox Reproductions. Ann Arbor, Michigan.
Dresden, Staatl. Mus. Mineral. Geol., Abh.	Dresden, Staatliches Museum fuer Mineralogie und Geologie, Abhandlungen.
Dtsch. Akad. Wiss. Berl., Monatsber.	Deutsche Akademie der Wissenschaften zu Berlin, Monatsberichte.
Dtsch. Gemmol. Ges., Z.	Deutsche Gemmologische Gesellschaft, Zeitschrift. Idar-Oberstein.

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Dtsch. Geol. Ges., Z.	Deutsche Geologische Gesellschaft, Zeitschrift. Hanover.
Dtsch. Ges. Geol. Wiss., Ber., Reihe A, Geol. Palaontol.	Deutsche Gesellschaft fuer Geologische Wissenschaften Berichte, Reihe A, Geologie und Palaeontologie. Berlin.
Dtsch. Ges. Geol. Wiss., Ber., Reihe B, Mineral. Lagerstattenforsch.	Deutsche Gesellschaft fuer Geologische Wissenschaften Berichte, Reihe B, Mineralogie und Lagerstaettenforschung. Berlin.
Dtsch. Gewaesserk. Mitt.	Deutsche Gewaesserkundliche Mitteilungen; Mitteilungsblatt der Gewaesserkundlichen Dienststellen des Bundes und der Laender (Germany, Bundesanstalt fuer Gewaesserkunde). Coblenz.
Dumfriesshire Galloway Nat. Hist. Antiq. Soc., Trans.	Dumfriesshire and Galloway Natural History Antiquarian Society, Transactions. Dumfries.
Durham, Univ., Dep. Geogr., Occas. Pap. Ser.	Durham, University, Department of Geography, Occasional Papers Series.
Dyna	Dyna (Colombia, Universidad, Facultad Nacional de Minas). Medellin.
Earth Miner. Sci.	Earth and Mineral Sciences (Pennsylvania State University, College of Earth and Mineral Sciences). University Park, Pennsylvania.
Earth Planet. Sci. Lett.	Earth and Planetary Science Letters; a Letter Journal Devoted to the Development in Time of the Earth and Planetary System. North-Holland Publ. Co., Amsterdam.
Earth Sci.	Earth Science (Midwest Federation of Mineralogical Societies). Colorado Springs, Colorado.
Earth Sci. Bull.	Earth Science Bulletin (Wyoming Geological Association). Casper.
Earth Sci. (Chikyu Kagaku)	Earth Science (Chikyu Kagaku); Association for the Geological Collaboration of Japan, Journal. Tokoyo.
Earth Sci. J. (Waikato Geol. Soc.)	Earth Science Journal (Waikato Geological Society). Hamilton, New Zealand.
Earthquake Eng. Struct. Dyn.	Earthquake Engineering and Structural Dynamics (International Association for Earthquake Engineering, Journal). Wiley Interscience, London.
Earthquake Notes	Earthquake Notes (Seismological Society of America, Eastern Section). Washington, D.C.
Earth-Sci. Rev.	Earth-Science Reviews; International Magazine for Geo-Scientists. Elsevier Publ. Co., Amsterdam.
East Midl. Geogr.	The East Midland Geographer (Nottingham, University, Department of Geography).
Echo	Echo (The Western Society of Malacologists, Abstracts and Proceedings). San Diego, California.
Eclogae Geol. Helv.	Eclogae Geologicae Helvetiae. Basel.
Ecol. Monogr.	Ecological Monographys (Ecological Society of America). Durham, North Carolina.
Econ. Geol.	Economic Geology and the Bulletin of the Society of Economic Geologists. New Haven, Connecticut.
Ecuador, Inst. Ecuat. Cienc. Nat., Contrib.	Ecuador, Instituto Ecuatoriano de Ciencias Naturales, Contribucion. Quito.
Eesti NSV Tead. Akad., Toim., Keemia Geol.	Eesti NSV Teaduste Akadeemia, Toimetised, Keemia, Geoloogia (Akademiya Nauk Estonskoy SSR, Izvestiya, Khimiya, Geologiya). Tallinn.
Eiszeitalter Gegenw.	Eiszeitalter und Gegenwart (Deutsche Quartaervereinigung, Jahrbuch). Oehringen.
Endeavour	Endeavour. London.
Eng. Geol.	Engineering Geology; an International Journal. Elsevier Publ. Co., Amsterdam.

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Eng. Geol. Case Hist.	Engineering Geology Case Histories (Geological Society of America, Division on Engineering Geology). Boulder, Colorado.
Environ. Geol. Dig.	Environmental Geology Digest. Kansas Geological Survey, Lawrence.
Environ. Pollut.	Environmental Pollution; An International Journal. Barking, Essex, England.
Environ. Southwest	Environment Southwest (San Diego Society of Natural History). San Diego, California.
Eos (Am. Geophys. Union, Trans.)	Eos (American Geophysical Union, Transactions). Washington, D.C.
Erdkunde	Erdkunde; Archiv fuer Wissenschaftliche Geographie. Bonn.
Erlanger Geol. Abh.	Erlanger Geologische Abhandlungen. Erlangen.
Erzmetall	Erzmetall (Zeitschrift Metallhuettenwesen). Stuttgart.
Estud. Geogr. (Inst. "Juan Sebastian Elcano")	Estudios Geograficos (Instituto "Juan Sebastian Elcano"). Madrid.
Estud. Geol. (Inst. Invest. Geol. "Lucas Mallada")	Estudios Geologicos (Instituto de Investigaciones Geologicas "Lucas Mallada"). Madrid.
Eur. Conf. Soil Mech. Found. Eng., Proc.	European Conference on Soil Mechanics and Foundation Engineering, Proceedings.
Evolution	Evolution; International Journal of Organic Evolution (Society for the Study of Evolution). Lawrence, Kansas.
Fed. Fr. Soc. Sci. Nat., Rev.	Federation Francaise des Societes de Sciences Naturelles, Revue. Paris.
Fennia	Fennia (Societas Geographica Fenniae). Helsinki.
Ferrara, Univ., Ann., Sez. 9	Ferrara, Universita, Annali, Sezione 9, Scienze Geologiche e Paleontologiche.
Ferrara, Univ., Mem. Geopalcontol.	Ferrara, Universita, Memorie Geopaleontologiche.
Field Stud. (Lond.)	Field Studies (Field Studies Council). London.
Fieldiana; Geol.	Fieldiana; Geology (Field Museum of Natural History). Chicago.
Fieldiana; Geol. Mem.	Fieldiana; Geology Memoirs (Field Museum of Natural History). Chicago.
Fiji, Geol. Surv. Dep., Bull.	Fiji, Geological Survey Department, Bulletin. Suva.
Finl., Comm. Geol., Bull.	Finland, Commission Geologique (Geologinen Tutkimuslaitos), Bulletin. Helsinki.
Finl., Geol. Tutkimslaitos, Tutkimusrap.	Finland, Geologinen Tutkimuslaitos, Tutkimusraportti (Finland, Geological Survey, Report of Investigations). Otaniemi.
Fla., Bur. Geol., Geol. Bull.	Florida, Bureau of Geology, Geological Bulletin. Tallahassee.
Fla., Bur. Geol., Inf. Circ.	Florida, Bureau of Geology, Information Circular. Tallahassee.
Fla., Bur. Geol., Rep. Invest.	Florida, Bureau of Geology, Report of Investigation. Tallahassee.
Fla., Bur. Geol., Spec. Publ.	Florida, Bureau of Geology, Special Publication. Tallahassee.
Fla. State Univ., Dep. Geol., Sedimentol. Res. Lab., Contrib.	Florida State University, Department of Geology, Sedimentological Research Laboratory, Contribution. Tallahassee.
Fla., Univ., Water Resour. Res. Cent., Publ.	Florida, University, Water Resources Research Center, Publication. Gainesville.
Foeldt. Koezl.	Foeldtani Koezlony (Magyar Foeldtani Tarsulat, Folyoirata). Budapest.
Folia Geobot. Phytotaxon.	Folia Geobotanica et Phytotaxonomica (Czechoslovak Academy of Sciences). Prague.
Folia Geogr., Ser. Geogr.-Phys.	Folia Geographica, Series Geographica-Physica (Polska Akademia Nauk, Oddzial. w Krakowie, Komisja Nauk Geograficznych). Krakow.

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Folia Limnol. Scand.	Folia Limnologica Scandinavica. Lund.
Folia Quaternaria	Folia Quaternaria (Polska Akademia Nauk, Oddzial. w Krakowie). Krakow.
Forsch. Deut. Landesk.	Forschungen zur Deutschen Landeskunde (Institut fuer Landeskunde). Bad Godesberg.
Fortschr. Mineral.	Fortschritte der Mineralogie (Deutsche Mineralogische Gesellschaft). Stuttgart.
Fossil Cnidaria	Fossil Cnidaria; an International Newsletter. Paris.
Fr., Bur. Rech. Geol. Minieres, Bull. (Ser. 2), Sect. 1	France, Bureau de Recherches Geologiques et Minieres, Bulletin (Serie 2), Section 1, Geologie de la France, Travaux des Collaborateurs pour la Carte Geologique. Orleans.
Fr., Bur. Rech. Geol. Minieres, Bull. (Ser. 2), Sect. 2	France, Bureau de Recherches Geologiques et Minieres, Bulletin (Serie 2), Section 2, Geologie Appliquee. Orleans.
Fr., Bur. Rech. Geol. Minieres, Bull. (Ser. 2), Sect. 3	France, Bureau de Recherches Geologiques et Minieres, Bulletin (Serie 2), Section 3, Hydrogeologie. Orleans.
Fr., Bur. Rech. Geol. Minieres, Bull. (Ser. 2), Sect. 4	France, Bureau de Recherches Geologiques et Minieres, Bulletin (Serie 2), Section 4, Geologie Generale et Divers. Orleans.
Fr., Bur. Rech. Geol. Minieres, Mem.	France, Bureau de Recherches Geologiques et Minieres, Memoires. Paris.
Fr., Cent. Rech. Doc. Cartogr. Geogr., Mem. Doc.	France, Centre de Recherches et Documentation Cartographiques et Geographiques, Memoires et Documents. Paris.
Fr., Cent. Rech. Zones Arides, [Publ.], Ser. Geol.	France, Centre de Recherches sur les Zones Arides, [Publications], Serie Geologie. Centre National de la Recherche Scientifique, Paris.
Fr., Off. Rech. Sci. Tech. Outre-Mer, Cah., Ser. Geol.	France, Office de la Recherche Scientifique et Technique Outre-Mer, Cahiers, Serie Geologie. Paris.
Fr., Off. Rech. Sci. Tech. Outre-Mer, Cah., Ser. Pedol.	France, Office de la Recherche Scientifique et Technique Outre-Mer, Cahiers, Serie Pedologie. Paris.
Fr., Off. Rech. Sci. Tech. Outre-Mer, Mem.	France, Office de la Recherche Scientifique et Technique Outre-Mer, Memoires. Paris.
Fragm. Mineral. Palaeontol.	Fragmenta Mineralogica et Palaeontologica (Termeszettudomanyi Muzeum). Budapest.
Freiberg. Forschungsh., Reihe C	Freiberger Forschungshefte (Bergakademie Freiberg). Reihe C. Leipzig.
G. B., Geol. Surv., Bull.	Great Britain, Geological Survey, Bulletin. London.
G. B., Geol. Surv., Mem., Engl. Wales	Great Britain, Geological Survey, Memoirs, England and Wales. London.
G. B., Inst. Geol. Sci., Miner. Dossier	Great Britain, Institute of Geological Sciences, Mineral Dossier. London.
G. B., Inst. Geol. Sci., Rep.	Great Britain, Institute of Geological Sciences, Report. London.
G. B., Inst. Geol. Sci., Water Supply Pap., Res. Rep.	Great Britain, Institute of Geological Sciences, Water Supply Papers, Research Report. [London].
G. B. Overseas Dev. Adm., Land Resour. Div., Land Resour. Stud.	Great Britain, Overseas Development Administration, Land Resources Division, Land Resource Study. Surbiton, Surrey, England.
G. B., Soil Surv., Mem., Engl. Wales	Great Britain, Soil Survey, Memoirs, England and Wales. Harpenden.
G. B., Water Resour. Bd., Publ.	Great Britain, Water Resources Board, Publication. Reading.
G. Geol. (Bologna, Mus. Geol.)	Giornale di Geologia (Museo Geologico di Bologna, Annali).
Ga. Acad. Sci., Bull.	Georgia Academy of Science, Bulletin. Atlanta.
Ga. Dep. Nat. Resour., Earth Water Div., Circ.	Georgia Department of Natural Resources, Earth and Water Division, Circular. Atlanta.

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Ga. Geol. Soc., Guideb.	Georgia Geological Society, Guidebook. Atlanta.
Ga., Geol. Surv., Bull.	Georgia, Geological Survey, Bulletin. Atlanta.
Ga., Geol. Surv., Inf. Circ.	Georgia, Geological Survey, Information Circular. Atlanta.
Gas Wasser Abwasser	Gas, Wasser, Abwasser Gaz, Eaux, Eaux Usees (Schweizerische Zeitschrift fuer Gasversorgung und Siedlungswasserwirtschaft Revue Suisse pour l'Industrie du Gaz, l'Alimentation en Eaux et l'Assainissement). Zuerich.
Gas- Wasserfach, Wasser Abwasser	Das Gas- und Wasserfach, Wasser Abwasser. Munich.
Gems Gemol.	Gems and Gemology (Gemological Institute of America). Los Angeles, California.
Genoa, Univ., Ist. Geol., Atti	Genoa, Universita, Istituto di Geologia, Atti.
Geobios	Geobios (Paleontologie, Stratigraphie, Paleoecologie) (*continuation of* Lyons, Universite, Faculte des Sciences, Laboratoires de Geologie, Travaux). Lyons.
Geochem.; Geochem. Methods Data	Geochemie; Geochemical Methods and Data. Czechoslovakia, Ustredni Ustav Geologicky, Prague.
Geochem. Int.	Geochemistry International (Selected Translations from Geokhimiya and Other Articles in Geochemistry). American Geological Institute Geochemical Society, Washington, D.C.
Geochim. Cosmochim. Acta	Geochimica et Cosmochimica Acta (The Geochemical Society, Journal). Pergamon Press, Oxford.
Geociencias (Resistencia)	Geociencias (Universidad Nacional del Nordeste, Laboratorio de Geologia, Publicacion). Resistencia, Argentina.
Geoderma	Geoderma, an International Journal of Soil Science. Elsevier Publ. Co., Amsterdam.
Geoexploration	Geoexploration; International Journal of Mining and Technical Geophysics and Related Subjects. Elsevier Publ. Co., Amsterdam.
Geofis. Int.	Geofisica International (Union Geofisica Mexicana, Revista). Mexico City.
Geofis. Panam.	Geofisica Panamericana (Instituto Panamericano de Geografia e Historia, Comision de Geofisica Organizacion de Estados Americanos). La Paz.
Geofiz. Byull.	Geofizicheskiy Byulletin' Geophysical Bulletin (Akademiya Nauk SSSR, Mezhduvedomstvennyy Geofizicheskiy Komitet Academy of Sciences of the USSR, Soviet Geophysical Committee). Moscow.
Geofiz. Koezlem.	Geofizikai Koezlemenyek (Magyar Allami Eoetvoes Lorand Geofizikai Intezet). Budapest.
Geoforum	Geoforum; Journal of Physical, Human and Regional Geosciences. Pergamon Vieweg, Braunschweig.
Geogr. Ann., Ser. A	Geografiska Annaler, Series A, Physical Geography (Svenska Saellskapet for Antropologi och Geografi). Stockholm.
Geogr. Ber.	Geographische Berichte (Geographische Gesellschaft der Deutschen Demokratischen Republik, Mitteilungen). Leipzig.
Geogr. Cas. (Bratislava)	Geograficky Casopis (Slovenska Akademia Vied). Bratislava.
Geogr. Ges. Bern, Jahresber.	Geographische Gesellschaft von Bern, Jahresbericht.
Geogr. J.	Geographical Journal (Royal Geographical Society). London.
Geogr. Mag. (Lond.)	Geographical Magazine. London.
Geogr. O-vo SSSR, Altay. Otd., Izv.	Geograficheskoye Obshchestvo Soyuza SSR, Altayskiy Otdel, Izvestiya. Barnaul.

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Geogr. Pol.	Geographia Polonica (Polish Academy of Sciences, Institute of Geography). Warsaw.
Geogr. Rev. Jap.	Geographical Review of Japan (Chirigaku-Hyoron) (Association of Japanese Geographers—Nippon-Chiri-Gakkai). Tokyo.
Geogr. Z.	Geographische Zeitschrift. Wiesbaden.
Geogr. Z., Beih.	Geographische Zeitschrift, Beihefte. Wiesbaden.
Geokhim. (Akad. Nauk SSSR)	Geokhimiya (Akademiya Nauk SSSR). Moscow.
Geol. Alp.	Geologie Alpine (*supersedes* Grenoble, Faculte des Sciences, Laboratoire de Geologie, Travaux.)
Geol. An. Balk. Poluostrva	Geoloski Anali Balkanskoga Poluostrva.
Geol. Appl. Idrogeol.	Geologia Applicata e Idrogeologia (Bari, Universita, Istituto di Geologia Applicata all'Ingegneria).
Geol. Assoc. Can., Proc.	Geological Association of Canada, Proceedings. Toronto.
Geol. Assoc. Can., Spec. Pap.	Geological Association of Canada, Special Papers. Toronto.
Geol. Assoc. (Lond.), [Circ.]	Geologists' Association (London), [Circular]. Colchester.
Geol. Assoc. (Lond.), Guide	Geologists' Association (London), Guides. Colchester.
Geol. Assoc. (Lond.), Proc.	Geologists' Association (London), Proceedings. Colchester.
Geol. Bavarica	Geologica Bavarica (Bayerisches Geologisches Landesamt). Munich.
Geol. Bl. Nordost-Bayern	Geologische Blaetter fuer Nordost-Bayern und Angrenzende Gebiete. Erlangen.
Geol. Foeren. Stockh., Foerh.	Geologiska Foereningen i Stockholm, Foerhandlingar.
Geol. Geofiz. (Akad. Nauk SSSR, Sib. Otd.)	Geologiya i Geofizika (Akademiya Nauk SSSR, Sibirskoye Otdeleniye). Novosibirsk.
Geol. Geokhim. Goryuch. Kopalin (Akad. Nauk Ukr. RSR)	Geologiya i Geokhimiya Goryuchikh Kopalin (Akademiya Nauk Ukrain'skoi RSR). Kiev.
Geol. Ges. Wien, Mitt.	Geologische Gesellschaft in Wien, Mitteilungen. Vienna.
Geol. Mag.	Geological Magazine. Hertford.
Geol. Metal. (San Luis Potosi)	Geologia y Metalurgia (Universidad Autonoma Potosina, Instituto de Geologia y Metalurgia). San Luis Potosi.
Geol. Mijnbouw	Geologie en Mijnbouw (Koninklijk Nederlands Geologisch Mijnbouwkundig Genootschap, Maandblad). The Hague.
Geol., Min. Metall. Soc. India, Q. J.	Geological, Mining and Metallurgical Society of India, Quarterly Journal. Calcutta.
Geol. Mitt. (Aachen)	Geologische Mitteilungen. Aachen.
Geol. Nefti Gaza	Geologiya Nefti i Gaza. Moscow.
Geol. Palaeontol.	Geologica et Palaeontologica (Philipps-Universitaet, Geologisch-Palaeontologisches Institut). Marburg.
Geol. Prace, Zpr.	Geologicke Prace, Zpravy (Czechoslovakia, Geologicky Ustav Dionyza Stura). Bratislava.
Geol. Rom.	Geologica Romana (Rome, Universita, Istituto di Geologia e Paleontologia Consiglio Nazionale delle Ricerche, Centro di Studio per la Geologia dell'Italia Centrale). Rome.
Geol. Rud. Mestorozhd.	Geologiya Rudnykh Mestorozhdeniy (Akademiya Nauk SSSR). Moscow.
Geol. Rundsch.	Geologische Rundschau: Internationale Zeitschrift fur Geologie (Geologische Vereinigung). Stuttgart.
Geol. Sb. (L'vov. Geol. Obshch.)	Geologicheskiy Sbornik (L'vovskoye Geologicheskoye Obshchestvo pri L'vovskom Gosudarstvennom Universitete). L'vov.
Geol. Soc. Am., Abstr.	Geological Society of America, Abstracts with Programs. Boulder, Colorado.
Geol. Soc. Am., Bull.	Geological Society of America, Bulletin. Boulder, Colorado.

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Geol. Soc. Aust., J.	Geological Society of Australia, Journal. Adelaide.
Geol. Soc. Aust., Spec. Publ.	Geological Society of Australia, Special Publication. Canberra.
Geol. Soc. China, Proc.	Geological Society of China, Proceedings. Taipei.
Geol. Soc. Den., Bull.	Geological Society of Denmark, Bulletin (Dansk Geologisk Forening, Meddelelser). Copenhagen.
Geol. Soc. Finl., Bull.	Geological Society of Finland, Bulletin. Helsinki.
Geol. Soc. Greece, Bull.	Geological Society of Greece, Bulletin. Athens.
Geol. Soc. India, J.	Geological Society of India, Journal. Bangalore.
Geol. Soc. Iraq, J.	The Geological Society of Iraq, Journal. Baghdad.
Geol. Soc. Jap., J.	Geological Society of Japan, Journal. Tokyo.
Geol. Soc. Lond., J.	Geological Society of London, Journal (*continuation of* Geological Society of London, Quarterly Journal).
Geol. Soc. Lond., Spec. Publ.	Geological Society of London, Special Publication. London.
Geol. Soc. Lond., Spec. Rep.	Geological Society of London, Special Report. London.
Geol. Soc. Malays., Bull.	Geological Society of Malaysia, Bulletin. Kuala Lumpur.
Geol. Soc. Malays., Newsl.	Geological Society of Malaysia—Kesatuan Kajibumi Malaysia, Newsletter. Kuala Lumpur.
Geol. Soc. N.Z., Newsl.	Geological Society of New Zealand, Newsletter. [Christchurch].
Geol. Soc. S. Afr., Trans.	Geological Society of South Africa, Transactions. Johannesburg.
Geol. Soc. Thailand, Newsl.	Geological Society of Thailand, Newsletter. Bangkok.
Geol. Tec.	Geologia Tecnica (Ordine Nazionale Geologi). Milan.
Geol. Zb. (Slov. Akad. Vied)	Geologicky Zbornik-Geologica Carpathica (Slovenska Akademia Vied). Bratislava.
Geol. Zh.	Geologichniy Zhurnal (Akademiya Nauk URSR). Kiev.
Geol. Zh. (Russ. Ed.)	Geologicheskiy Zhurnal (*Russian edition of* Geologichniy Zhurnal). Akademiya Nauk URSR, Kiev.
Geologie (Berl.)	Geologie; Zeitschrift fuer das Gesamtgebiet der Geologischen Wissenschaften (Deutsche Gesellschaft fur Geologische Wissenschaften). Berlin.
Geologues	Geologues. Paris.
Geology: Assoc. Teachers Geol., J.	Geology; Association of Teachers of Geology, Journal. Cardiff.
Geology (Boulder)	Geology. Geological Society of America, Boulder, Colorado.
Geol.-Palaeontol. Mitt. Innsb.	Geologisch-Palaeontologische Mitteilungen Innsbruck.
Geomagn. Aeron.	Geomagnetism and Aeronomy (*English translation of* Geomagnetizm i Aeronomiya). American Geophysical Union, Washington, D.C.
Geomorfologiya	Geomorfologiya (Akademiya Nauk SSSR). Moscow.
Geonews (Pak., Geol. Surv.)	Geonews (Pakistan, Geological Survey). Karachi.
Geophys. Fluid Dyn.	Geophysical Fluid Dynamics (A Journal of the Mechanics and Energetics of Atmospheres and Oceans). New York.
Geophys. Prospect. (The Hague)	Geophysical Prospecting (European Associaton of Exploration Geophysicists). The Hague.
Geophys. Surv.	Geophysical Surveys. Dordrecht.
Geophysics	Geophysics (Society of Exploration Geophysicists, Journal). Tulsa, Oklahoma.
Geosci. Bull., Ser. A	Geosciences Bulletin, Series A. Rand, Santa Monica, California.
Geosci. Man	Geoscience and Man. Louisiana State University, School of Geoscience, Baton Rouge.
Geoscope	Geoscope (Geographers Association, University of Ottawa). Ottawa.

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Geotechnique	Geotechnique (Institution of Civil Engineers). London.
Geotectonics	Geotectonics (*English translation of* Geotektonika). American Geophysical Union, Washington, D.C.
Geotektonika	Geotektonika (Akademiya Nauk SSSR). Moscow.
Geotektonische Forsch.	Geotektonische Forschungen. E. Schweizerbart'sche Verlagsbuchhandlung (Naegele u. Obermiller), Stuttgart.
Geothermics	Geothermics; International Journal of Geothermal Research. Pisa, Italy.
Geotimes	Geotimes (American Geological Institute). Washington, D.C.
Ger., Bundesanst. Bodenforsch., Geol. Jahrb.	Germany, Bundesanstalt fuer Bodenforschung und Geologische Landesaemter, Geologisches Jahrbuch. Hanover.
Ger., Bundesanst. Bodenforsch., Geol. Jahrb., Beih.	Germany, Bundesanstalt fuer Bodenforschung und Geologische Landesaemter, Geologisches Jahrbuch, Beiheft. Hanover.
Ger., Bundesanst. Bodenforsch. Geol. Landesaemt., Geol. Jahrb., Reihe A	Germany, Bundesanstalt fuer Bodenforschung und Geologische Landesaemter, Geologisches Jahrbuch, Reihe A, Allgemeine u. Regionale Geologie BR-Deutschland u. Nachbargebiete, Tektonik, Stratigraphie, Palaeontologie. Hanover.
Ger., Bundesanst. Bodenforsch. Geol. Landesaemt., Geol. Jahrb., Reihe B	Germany, Bundesanstalt fuer Bodenforschung und Geologische Landesaemter, Geologisches Jahrbuch, Reihe B. Regionale Geologie Ausland. Hanover.
Ger., Bundesanst. Bodenforsch. Geol. Landesaemt., Geol. Jahrb., Reihe C	Germany, Bundesanstalt fuer Bodenforschung und Geologische Landesaemter, Geologisches Jahrbuch, Reihe C., Hydrologie, Ingenieurgeologie. Hanover.
Ger., Bundesanst. Bodenforsch. Geol. Landesaemt., Geol. Jahrb., Reihe D	Germany, Bundesanstalt fuer Bodenforschung und Geologische Landesaemter, Geologisches Jahrbuch, Reihe D, Mineralogie, Petrographie, Geochemie, Lagerstaettenkunde. Hanover.
Ger., Zent. Geol. Inst., Abh.	Germany, Zentrales Geologisches Institut, Abhandlungen. Berlin.
Gerlands Beitr. Geophys.	Gerlands Beitraege zur Geophysik. Leipzig.
Ges. Dtsch. Metallhuetten- und Bergleute, Schr.	Gesellschaft Deutscher Metallhuetten- und Bergleute, Schriften. Clausthal-Zellerfeld.
Ges. Naturkd. Wuerttemb., Jahresh.	Gesellschaft fuer Naturkunde in Wuerttemberg, Jahreshefte (*continuation of* Verein fuer Vaterlaendische Naturkunde in Wuerttemberg, Jahreshefte). Stuttgart.
Ghana, Geol. Surv., Bull.	Ghana, Geological Survey, Bulletin. Accra.
Gidrogeol. Karstoved.	Gidrogeologiya i Karstovedeniye. Perm.
Gidrokhim. Mater.	Gidrokhimicheskiye Materialy (Glavnoye Upravleniye Gidrometeorologicheskoy Sluzhby, Gidrokhimicheskiy Institut, g. Novocherkassk). Leningrad.
Giessen. Geogr. Schr.	Giessener Geographische Schriften. Geographische Institut der Justus Liebig Universitaet Giessen, Giessen.
Glueckauf	Glueckauf; Bergmaennische Zeitschrift. Essen.
Glueckauf; Forschungsh.	Glueckauf; Forschungshefte. Essen.
Glyatsiologiya Altaya	Glyatsiologiya Altaya (Tomskiy Gosudarstvenny Universitet-Geograficheskoye Obshchestvo SSSR, Tomskiy Otdel). Tomsk.

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Goett. Arb. Geol. Palaeontol.	Goettinger Arbeiten zur Geologie und Palaeontologie. Goettingen.
Grana	Grana; an International Journal of Palynology (*supersedes* Grana Palynologica). Stockholm.
Graz, Landesmus. Joanneum," Mus. Bergbau Geol. Tech., Mitt.	Graz, Landesmuseum Joanneum," Museum fuer Bergbau, Geologie und Technik, Mitteilungen.
Grenoble, Fac. Sci., Lab. Geol., Mem.	Grenoble, Faculte des Sciences, Laboratoire de Geologie, Memoires.
Groenland	Groenland (Det Groenlandske Selskab). Charlottenlund, Denmark.
Groenlands Geol. Unders., Bull.	Groenlands Geologiske Undersoegelse, Bulletin. Copenhagen.
Groenlands Geol. Unders. Misc. Pap.	Groenlands Geologiske Undersoegelse, Miscellaneous Papers. Copenhagen.
Groenlands Geol. Unders., Rapp.	Groenlands Geologiske Undersoegelse, Rapport---Greenland, Geological Survey, Report. Copenhagen.
Ground Water	Ground Water (National Water Well Association, Technical Division, Journal). Urbana, Illinois.
Groupe Fr. Argiles, Bull.	Groupe Francais des Argiles, Bulletin (*continuation of* France, Centre National de la Recherche Scientifique, Groupe Francais des Argiles, Bulletin). Paris.
GUA Pap. Geol., Ser. 1 (Amst.)	GUA Papers of Geology, Series 1. Amsterdam.
Gulf Coast Assoc. Geol. Soc., Trans.	Gulf Coast Association of Geological Societies, Transactions. Jackson, Mississippi.
Hamburg. Geogr. Stud.	Hamburger Geographische Studien (Hamburg, Universitaet, Institut fuer Geographie und Wirtschaftsgeographie).
Hamburg, Univ., Geol.-Palaontol. Inst., Mitt.	Hamburg, Universitat, Geologisch-Palaontologisches Institut, Mitteilungen (*supersedes* Hamburg, Geologisches Staatsinstitut, Mitteilungen).
Hannover, Tech. Univ., Geol. Inst., Mitt.	Hannover, Technische Universitaet, Geologisches Institut, Mitteilungen.
Harv. Univ., Mus. Comp. Zool., Bull.	Harvard University, Museum of Comparative Zoology, Bulletin. Cambridge, Massachusetts.
Hawaii, Div. Water Land Dev., Circ.	Hawaii, Division of Water and Land Development, Circular. Honolulu.
Hawaii, Uni., Water Resour. Cent., Tech. Rep.	Hawaii, University, Water Resources Research Center, Technical Report. Honolulu.
Hawaii, Univ., Inst. Geophys., Contrib.	Hawaii, University, Institute of Geophysics, Contributions.
Hawaii, Univ., Inst. Geophys., [Rep.]	Hawaii, University, Institute of Geophysics, [Report]. [Honolulu].
Heidelb. Geogr. Arb.	Heidelberger Geographische Arbeiten.
Helictite	Helictite; Journal of Australasian Cave Research. Broadway, New South Wales.
Hess. Landesamt Bodenforsch., Abh.	Hessisches Landesamt fuer Bodenforschung, Abhandlungen. Wiesbaden.
Hess. Landesamt Bodenforsch., Notizbl.	Hessisches Landesamt fuer Bodenforschung, Notizblatt. Wiesbaden.
Hidrol. Koezl.	Hidrologiai Koezloeny (Magyar Hidrologiai Tarsasag). Budapest.
Himalayan Geol.	Himalayan Geology (Wadia Institute of Himalayan Geology). Dehli.
Hiroshima Univ., J. Sci., Ser. C	Hiroshima University, Journal of Science, Series C, Geology and Mineralogy.
Hoehle	Die Hoehle; Zeitschrift fuer Karst- und Hoehlenkunde (Verband Oesterreichischer Hoehlenforscher-Verband der Deutschen Hoehlen-und Karstforscher). Vienna.
Hokkaido Univ., Fac. Sci., J., Ser. 4	Hokkaido University, Faculty of Science, Journal, Series 4, Geology and Mineralogy. Sapporo.

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Hung., Magy. All. Foeldt. Intez., Evi Jel.	Hungary, Magyar Allami Foeldtani Intezet, Evi Jelentese. Budapest.
Hung., Magy. Allami Foeldt. Intez., Evk.	Hungary, Magyar Allami Foeldtani Intezet, Evkoenyve. Budapest.
Hydrobiologia (The Hague)	Hydrobiologia. Dr. W. Junk N.V. Publ., The Hague.
I.A.E.A., Panel Proc. Ser.	International Atomic Energy Agency, Panel Proceedings Series. Vienna.
I.A.E.A., Tech. Rep. Ser.	International Atomic Energy Agency, Technical Reports Series. Vienna.
Iasi, Univ., An. Stiint., Sect. 2, B (Ser. Noua)	Iasi, Universitatea, Analele Stiintifice; Sectinunea 2, B, Geologie (Serie Noua) (*continues* Iasi, Universitatea, Analele Stiintifice, Sectiunea 2, Stiinte Naturale, B, Geologie-Geografie). Jassy.
Iasi, Univ., An. Stiint., Sect. 2, C	Iasi, Universitatea, Analele Stiintifice, Sectiunea 2, C, Geografie. Jassy.
Icarus (N. Y.)	Icarus; International Journal of Solar System Studies. Academic Press, New York London.
Icefield Ranges Res. Proj., Sci. Results	Icefield Ranges Research Project, Scientific Results, American Geographical Society, New York-Arctic Institute of North America, Montreal.
Idaho Bur. Mines Geol., Inf. Circ.	Idaho Bureau of Mines and Geology, Information Circular. Moscow.
Idaho Bur. Mines Geol., Pam.	Idaho Bureau of Mines and Geology, Pamphlet. Moscow.
Idaho Dep. Reclam., Water Inform. Bull.	Idaho Department of Reclamation, Water Information Bulletin. Moscow.
Ill. Geogr. Soc., Bull.	Illinois Geographical Society, Bulletin. DeKalb.
Ill., Geol. Surv., Circ.	Illinois State Geological Survey, Circular. Urbana.
Ill., Geol. Surv., Environ. Geol. Notes	Illinois State Geological Survey, Environmental Geology Notes. Urbana.
Ill., Geol. Surv., Guide Leafl.	Illinois State Geological Survey, Guide Leaflet. Urbana.
Ill., Geol. Surv., Guideb. Ser.	Illinois State Geological Survey, Guidebook Series. Urbana.
Ill., Geol. Surv., Ill. Pet.	Illinois State Geological Survey, Illinois Petroleum. Urbana.
Ill., Geol. Surv., Ind. Miner. Notes	Illinois State Geological Survey, Industrial Minerals Notes. Urbana.
Ill. State Mus., Rep. Invest.	Illinois State Museum, Reports of Investigations. Springfield.
Ill., Water Surv., Circ.	Illinois State Water Survey, Circular. Urbana, Illinois.
Ind. Ceram.	L'Industrie Ceramique (Societe Francaise de Ceramique). Paris.
Ind. Lab. (Engl. Ed.)	Industrial Laboratory (*English translation of* Zavodskaya Laboratoriya). Consultants Bureau, New York.
Ind. Min. (Rome)	Industria Mineraria. Rome.
India, Geol. Surv., Misc. Publ.	India, Geological Survey, Miscellaneous Publication. Calcutta.
India, Geol. Surv., Rec.	India, Geological Survey, Records. Calcutta.
India, Oil Nat. Gas Comm., Dir. Geol., Spec. Pap.	India, Oil and Natural Gas Commission, Directorate of Geology, Special Paper. Dehra Dun.
Indian Acad. Sci., Proc., Sect. B	Indian Academy of Sciences, Proceedings, Section B. Bangalore.
Indian Geohydrol.	Indian Geohydrology (Indian Association of Geohydrologists). Calcutta.
Indian Geotech. J.	Indian Geotechnical Journal. New Delhi.
Indian J. Meteorol. Geophys.	Indian Journal of Meteorology & Geophysics (India Meteorological Department). New Delhi.
Indian J. Power River Val. Dev.	Indian Journal of Power and River Valley Development. Calcutta.

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Indian Natl. Sci. Acad., Proc., Part A	Indian National Science Academy, Proceedings, Part A, Physical Sciences (*continuation of* National Institute of Sciences of India, Proceedings, Part A, Physical Sciences). New Delhi.
Indian Soc. Soil Sci., J.	Indian Society of Soil Science, Journal. New Delhi.
Indiana Acad. Sci., Proc.	Indiana Academy of Science, Proceedings. Indianapolis.
Indiana State Univ., Dep. Geogr. Geol., Prof. Pap.	Indiana State University, Department of Geography and Geology, Professional Paper. Terre Haute.
Indones., Geol. Surv., Bull.	Indonesia, Geological Survey, Bulletin. [Bandung].
Indo-Pac. Mollusca	Indo-Pacific Mollusca (Delaware Museum of Natural History). Greenville.
Inf. Geogr.	L Information Geographique. J. B. Bailliere et Fils, Paris.
Infrared Phys.	Infrared Physics; An International Research Journal. Pergamon Press, Oxford.
Ingeominas (Colomb., Inst. Nac. Invest. Geol.-Mineras, Inf.)	Ingeominas (Colombia, Instituto Nacional de Investigaciones Geologico-Mineras, Informe). Bogota.
Inst. Antart. Argent., Contrib.	Instituto Antartico Argentino, Contribuciones. Buenos Aires.
Inst. Antart. Argent., Prog. Rep.	Instituto Antartico Argentino, Progress Report (Direccion Nacional del Antartico). Buenos Aires.
Inst. Br. Geogr., Spec. Publ.	Institute of British Geographers, Special Publication. London.
Inst. Br. Geogr., Trans.	Institute of British Geographers, Transactions. London.
Inst. Civ. Eng. (Lond.), Proc.	Institution of Civil Engineers, Proceedings. London.
Inst. Elec. Electron. Eng., Trans. Geosci. Electron.	Institute of Electrical and Electronic Engineers, Transactions on Geoscience Electronics. New York.
Inst. Fondam. Afr. Noire, Bull., Ser. A	Institut Fondamental d'Afrique Noire, Serie A, Sciences Naturelles, Bulletin. Dakar.
Inst. Fr. Pet., Rev.	Institut Francais du Petrole, Revue, et Annales des Combustibles Liquides. Paris.
Inst. Geofis. Andes Colomb., Publ., Ser. A	Instituto Geofisico de los Andes Colombianos, Publicacion, Serie A, Sismologia. Bogota.
Inst. Geofis. Andes Colomb., Publ., Ser. C.	Instituto Geofisico de los Andes Colombianos, Publicacion, Serie C, Geologia. Bogota.
Inst. Geogr. Nat., Bull. Inf.	Institut Geographique National, Bulletin d'Information. Paris.
Inst. Geol. Bassin Aquitaine, Bull.	Institut de Geologie du Bassin d'Aquitaine, Bulletin. Talence.
Inst. Invest. Cient. Angola, Bol.	Instituto de Investigacao Cientifica de Angola, Boletim. Luanda.
Inst. Mex. Pet., Rev.	Instituto Mexicano del Petroleo, Revista. Mexico City.
Inst. Min. Metall., Trans., Sect. B	Institution of Mining and Metallurgy, Transactions, Section B, Applied Science. London.
Inst. Oceanogr., Ann.	Institut Oceanographique, Annales. Paris.
Inst. Phys. Chem. Res. (Rikagaku Kenkyusho), Sci. Pap.	Institute of Physical and Chemical Research (Rikagaku Kenkyusho), Scientific Papers. Wako-shi, Saitama, Japan.
Inst. R. Sci. Nat. Belg., Bull.	Institut Royal des Sciences Naturelles de Belgique, Bulletin (Koninklijk Belgisch Instituut voor Natuurwetenschappen, Bulletin). Brussels.
Inst. Speol. "Emile Racovitza", Trav.	Institut de Speologie "Emile Racovitza", Travaux. Bucharest.
Inst. Water Eng., J.	Institution of Water Engineers, Journal. London.
Int. Assoc. Eng. Geol., Bull.—Assoc. Int. Geol. Ing., Bull.	International Association of Engineering Geology, Bulletin—Association Internationale de Geologie de l'Ingenieur, Bulletin. Paris.

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Int. Assoc. Hydrol. Sci.—Assoc. Int. Sci. Hydrol., Bull.	International Association of Hydrological Sciences—Association Internationale des Sciences Hydrologiques, Bulletin. Wallingford, England.
Int. Assoc. Math. Geol., J.	International Association for Mathematical Geology, Journal. Plenum Publ. Co., New York–London.
Int. Assoc. Sci. Hydrol., Publ.	International Association of Scientific Hydrology—Association Internationale d'Hydrologie Scientifique (International Union of Geodesy and Geophysics—Union de Geodesie et de Geophysique Internationale), Publication. [Louvain].
Int. Assoc. Sci. Hydrol.-Unesco, Stud. Rep. Hydrol.	International Association of Scientific Hydrology-Unesco, Studies and Reports in Hydrology. Gentbrugge-Paris.
Int. Astron. Union, Symp.	International Astronomical Union, Symposium. D. Reidel Publ. Co., Dordrecht (Holland)-Springer-Verlag, New York.
Int. Conf. Geophys. Earth Oceans, Abstr.	International Conference on Geophysics of the Earth and the Oceans, Abstracts. Australian Institute of Physics—Australasian Institute of Mining and Metallurgy—Australian Society of Exploration Geophysicists, [Sydney].
Int. Geochem. Explor. Symp., Proc.	International Geochemical Exploration Symposium, Proceedings. London.
Int. Geogr. Congr., Pap.—Congr. Int. Geogr., Commun.	International Geographical Congress, Papers—Congres International de Geographie, Communications. University of Toronto Press.
Int. Geol. Congr., Guideb.	International Geological Congress, Guidebook.
Int. Geol. Congr., Int. Subcomm. Stratigr. Classif., Rep.	International Geological Congress, International Subcommission on Stratigraphic Classification, Report. Montreal.
Int. Geol. Congr., Proc.—Congr. Geol. Int., Programme	International Geological Congress, Proceedings-Congres Geologique Internationale, Programme.
Int. Geol. Rev.	International Geology Review. American Geological Institute, Washington, D. C.
Int. Inst. Land Reclam. Improv., Bull.	International Institute for Land Reclamation and Improvement, Bulletin. Wageningen.
Int. Inst. Seismol. Earthquake Eng., Bull.	International Institute of Seismology and Earthquake Engineering, Bulletin. Tokyo.
Int. Inst. Seismol. Earthquake Eng., Individ. Stud.	International Institute of Seismology and Earthquake Engineering, Individual Studies by Participants. Tokyo.
Int. J. Environ. Stud.	International Journal of Environmental Studies. Gordon and Breach Sci. Publ., London.
Int. J. Rock Mech. Min. Sci.	International Journal of Rock Mechanics and Mining Sciences. Pergamon Press, Oxford.
Int. Oil Scouts Assoc., Yearb.	International Oil Scouts Association, Yearbook. Austin, Texas.
Int. Rev. Gesamten Hydrobiol.	Internationale Revue der Gesamten Hydrobiolobie. Berlin.
Int. Sci. Congr. Volcano Thera, Acta	International Scientific Congress on the Volcano of Thera, Acta. Athens.
Int. Seismol. Cent., Bull.	International Seismological Centre, Bulletin. Edinburgh.
Int. Ser. Monogr. Earth Sci.	International Series of Monographs in Earth Sciences. Pergamon Press, Oxford.
Int. Symp. Hydrogeochem. Biogeochem., Abstr.	International Symposium on Hydrogeochemistry and Biogeochemistry, Abstracts. Tokyo.
Int. Symp. Salt, Tech. Program Abstr. Book	International Symposium on Salt, Technical Program and Abstract Book.
Int. Union Geol. Sci., Int. Subcomm. Stratigr. Cl., Circ.	International Union of Geological Sciences, International Subcommission on Stratigraphic Classification, Circular (*continuation of* International Commission on

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	Stratigraphy, International Subcommission on Stratigraphic Classification, Circular). [Princeton, New Jersey].
Int. Union Geol. Sci., [Publ.], Ser. A	International Union of Geological Sciences, [Publication], Series A. E. Schweizerbart'sche Verlagsbuchhandlung (Nagele u. Obermiller), Stuttgart.
Int. Union Geol. Sci., [Publ.], Ser. B.	International Union of Geological Sciences, [Publication], Series B.
Intermet Bull.	Intermet Bulletin (Utah, University, Department of Mining, Metallurgical and Fuel Engineering). Salt Lake City.
Interstate Oil Compact Comm., Comm. Bull.	Interstate Oil Compact Commission, Committee Bulletin. Oklahoma City.
Introd. Geol. Ser.	Introducing Geology Series. London.
Iowa Acad. Sci., Proc.	Iowa Academy of Science, Proceedings. Des Moines.
Ir. Nat. J.	The Irish Naturalists' Journal. Belfast.
Iran. Geol. Surv., Rep.	Iran, Geological Survey, Report. Teheran.
Irel., Geol. Surv., Bull.	Ireland, Geological Survey, Bulletin. [Dublin].
Irel., Geol. Surv., Inf. Circ.	Ireland, Geological Survey, Information Circular. Dublin.
Irel., Geol. Surv., Spec. Pap.	Ireland, Geological Survey, Special Paper. Dublin.
Isis	Isis; an International Review Devoted to the History of Science and Its Cultural Influences (History of Science Society). Smithsonian Institution, Washington, D.C.
Isochron/West	Isochron/West; a Bulletin of Isotopic Geochronology. Socorro, New Mexico.
Isr., Geol. Surv., Bull.	Israel, Geological Survey, Bulletin. Jerusalem.
Isr., Geol. Surv., Rep.	Israel, Geological Survey, Report. Jerusalem.
Isr. J. Earth-Sci.	Israel Journal of Earth-Sciences. Jerusalem.
Ist. Veneto Sci. Lett. Arti Venezia, Atti, Cl. Sci. Mat. Natur.	Istituto Veneto di Scienze, Lettere ed Arti Venezia, Atti, Classe di Scienze Matematiche e Naturali. Venice.
Istanbul Univ., Cografya Enst., Yayin.	Istanbul Universitesi, Cografya Enstitusu, Yayinlari.
Istanbul Univ., Fen Fak., Mecm., Ser. B	Istanbul Universitesi, Fen Fakultesi, Mecmuasi—Istanbul, Universite, Faculte des Sciences, Revue.
Istanbul, Univ., Geogr. Inst., Rev. (Int. Ed.)	Istanbul, University, Geographical Institute, Review (International Edition).
Italy, Serv. Geol., Boll.	Italy, Servizio Geologico, Bollettino. Rome.
ITC Publ., Ser. B	ITC Publications (International Institute for Aerial Survey and Earth Sciences, Series B. Delft, Netherlands.
J. Anal. Chem. USSR	Journal of Analytical Chemistry of the USSR (*English translation of* Zhurnal Analiticheskoi Khimii). Consultants Bureau, New York.
J. Appl. Chem. USSR	Journal of Applied Chemistry of the USSR (*translation of* Zhurnal Prikladnoy Khimii). Consultants Bureau, New York.
J. Atmos. Terr. Phys.	Journal of Atmospheric and Terrestrial Physics. Pergamon Press, Oxford.
J. Ecol. (Br. Ecol. Soc.)	Journal of Ecology (British Ecological Society). London.
J. Environ. Qual.	Journal of Environmental Quality. Madison, Wisconsin.
J. Fluid Mech.	Journal of Fluid Mechanics. London.
J. Foraminiferal Res.	Journal of Foraminiferal Research (Cushman Foundation for Foraminiferal Research) (*continuation of* Cushman Foundation for Foraminiferal Research Contributions). Washington, D.C.
J. Gemmol.	Journal of Gemmology (Gemmological Association of Great Britain, Proceedings). London.
J. Geochem. Explor.	Journal of Geochemical Exploration (Association of Exploration Geochemists, Journal). Elsevier Publ. Co. Amsterdam.

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J. Geogr.	Journal of Geography. Lancaster, Pennsylvania.
J. Geogr. (Tokyo)	Journal of Geography (Tokyo Geographical Society) (Tokyo Chigaku Kyokai).
J. Geol.	Journal of Geology. Chicago, Illinois.
J. Geol. Educ.	Journal of Geological Education. Washington, D.C.
J. Geomagn. Geoelec.	Journal of Geomagnetism and Geoelectricity (Society of Terrestrial Magnetism and Electricity, Japan). Tokyo.
J. Geophys. Res.	Journal of Geophysical Research (American Geophysical Union). Washington, D.C.
J. Glaciol.	Journal of Glaciology. Cambridge, England.
J. Hydrol.	Journal of Hydrology. North-Holland Publ. Co., Amsterdam.
J. Hydrol. (N.Z. Hydrol. Soc.)	Journal of Hydrology (New Zealand Hydrological Society). [Dunedin].
J. Inorg. Nucl. Chem.	Journal of Inorganic and Nuclear Chemistry. Pergamon Press, Oxford.
J. Microsc.	Journal de Microscopie. Paris.
J. Mines, Met. Fuels (Calcutta)	Journal of Mines, Metals & Fuels (*incorporating* Indian Mining Journal and the official organ of the National Association of Colliery Managers, Indian Branch). Calcutta.
J. Nat. Hist.	Journal of Natural History; an International Journal of Taxonomic and General Biology (*supersedes* The Annals & Magazine of Natural History). London.
J. Paleontol.	Journal of Paleontology. Tulsa, Oklahoma.
J. Palynol. (Palynol. Soc. India)	Journal of Palynology; an International Publication (Palynological Society of India). Lucknow.
J. Petrol.	Journal of Petrology. Oxford.
J. Phycol.	Journal of Phycology. Baltimore, Maryland.
J. Protozool.	Journal of Protozoology (Society of Protozoologist). Lawrence, Kansas.
J. Radioanal. Chem.	Journal of Radioanalytical Chemistry: International Journal Dealing with All Aspects of Nuclear Analytical Methods. Elsevier Publ. Co., Amsterdam Akademiai Kiado, Budapest.
J. Res. U.S. Geol. Surv.	Journal of Research of the U.S. Geological Survey. Washington, D.C.
J. Sediment. Petrol.	Journal of Sedimentary Petrology. Tulsa, Oklahoma.
J. Soil Sci.	Journal of Soil Science. Oxford.
J. Solid State Chem.	Journal of Solid State Chemistry. Academic Press, New York.
Jam., Geol. Surv. Dep., Bull.	Jamaica, Geological Survey Department, Bulletin. Kingston.
Jam., Geol. Surv. Dep., Econ. Geol. Rep.	Jamaica, Geological Survey Department, Economic Geology Report. Kingston.
James Cook Univ. N. Queensl., Dep. Geogr., Monogr. Ser.	James Cook University of North Queensland, Department of Geography, Monograph Series. Townsville.
Jap. Acad., Proc.	Japan Academy, Proceedings. Tokyo.
Jap. Assoc. Mineral., Petrol., Econ. Geol., J.	Japanese Association of Mineralogists, Petrologists and Economic Geologists, Journal. Sendai.
Jap. Geol. Surv., Bull.	Japan, Geological Survey, Bulletin. Kawasaki.
Jap. J. Ecol.	Japanese Journal of Ecology (Ecological Society of Japan). Sendai.
Jap. Public Works Res. Inst., Rep. (Minist. Constr.)	Japan, Public Works Research Institute, Report (Ministry of Construction). Tokyo.
Jap. Soc. Photogramm., J.	Japan Society of Photogrammetry, Journal. [Tokyo].
Joekull	Joekull (Joeklarannsoknafelag Islands, Arsrit). Reykjavik.

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John Hopkins Univ., Chesapeake Bay Inst., Spec. Rep.	John Hopkins University, Chesapeake Bay Institute, Special Report. Baltimore, Maryland.
K. Fysiogr. Saellsk. I Lund, Arsb.	Kungl. Fysiografiska Saellskapets I Lund, Arsbok. Lund.
Kali Steinsalz	Kali und Steinsalz (Kaliverein E. V., Hannover). Essen.
Kans., Geol. Surv., Bull.	Kansas, Geological Survey, Bulletin. Lawrence.
Kans., Univ., Paleontol. Contrib., Pap.	Kansas, University, Paleontological Contributions, Paper. Lawrence.
Karszt Barlangkut.	Karszt- es Barlangkutatas (Magyar Karszt- es Barlangkutato Tarsulat, Evkonyve). Budapest.
Kenya, Geol. Surv., Bull.	Kenya, Geological Survey, Bulletin. Nairobi.
Kenya, Geol. Surv., Rep.	Kenya, Geological Survey, Report. [Nairobi].
Kiev. Univ., Nauchno-Issled. Sekt., Sb. Nauchn. Rabot.	Kiev, Universitet, Nauchno-Issledovatel'skiy Sektor, Sbornik Nauchnykh Rabot.
Kiev, Univ., Visn., Ser. Geol.	Kiivs'ki Universitet, Visnik, Seriya Geologii.
Kingston Geol. Rev.	Kingston Geological Review (Kingston Polytechnic Geology Club). Kingston upon Thames.
Kirtlandia	Kirtlandia (Cleveland Museum of Natural History).
Kochi Univ., Res. Rep., Natur. Sci.	Kochi University, Research Reports, Natural Science.
Kompleksn. Issled. Prirod. Okeana	Kompleksnye Issledovaniya Prirody Okeana. Moskovskiy Universitet, Moscow.
Konst. Svoystva Miner.	Konstitutsiya i Svoystva Mineralov (Akademiya Nauk Ukrainskoy SSR, Institut Geokhimiii i Fiziki Mineralov Vsesoyuznoye Mineralogicheskoye Obshchestvo, Ukrainskoye Otdeleniye). Kiev.
Korea, Geol. Surv., Bull.	Korea, Geological Survey, Bulletin. Seoul.
Korean Inst. Min., J.	Korean Institute of Mining, Journal. Seoul.
Kosmos	Kosmos. Stuttgart.
Kristallografiya	Kristallografiya (Akademiya Nauk SSSR). Moscow.
Kumamoto J. Sci., Geol.	Kumamoto Journal of Science, Geology (*supersedes* Kumamoto Journal of Science, Series B, Section 1, Geology). Kumamoto, Japan.
Kwart. Geol. (Pol., Inst. Geol.)	Kwartalnik Geologiczny (Poland, Instytut Geologiczny). Warsaw.
Kyoto Univ., Disaster Prev. Res. Inst., Ann.	Kyoto University, Disaster Prevention Research Institute, Annuals.
Kyoto Univ., Geophys. Inst., Contrib.	Kyoto University, Geophysical Institute, Contributions (*formerly* Kyoto University, Geophysical Institute, Special Contributions. Kyoto.
Kyushu Univ., Dep. Gen. Educ., Rep. Earth Sci.	Kyushu University, Department of General Education, Reports on Earth Sciences. [Fukuoka].
Kyushu Univ., Fac. Sci., Mem., Ser. D	Kyushu University, Faculty of Science, Memoirs, Series D, Geology. Fukuoka.
La., Geol. Surv., Dep. Public Works, Water Resour. Bull.	Louisiana, Geological Survey and Department of Public Works, Water Resources Bulletin. Baton Rouge.
La Plata, Univ. Nac., Mus., Rev., Geol.	La Plata, Universidad Nacional, Museo, Revista, Geologia.
La Plata, Univ. Nac., Mus., Rev., Paleontol.	La Plata, Universidad Nacional, Museo, Revista, Paleontologia.
La. State Univ., Coast Stud. Inst., Tech. Rep.	Louisiana State University Coastal Studies Institute, Technical Report. Baton Rouge, Louisiana.
La. Water Resour. Res. Inst., Bull.	Louisiana Water Resources Research Institute, Bulletin. Baton Rouge.
Lagena	Lagena (Universidad de Oriente, Instituto Oceanografico). Cumana.
Landslide Stud. S.D., Rep.	Landslide Studies in South Dakota, Report. Vermillion, South Dakota.
Languedoc, Univ. Sci. Tech., Publ., Ser. Geol. Struct.	Languedoc, Universite des Sciences et Techniques, Publications, Serie Geologie Structurale. Montpellier.

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Lapidary J.	Lapidary Journal. San Diego, California.
Leidse Geol. Meded.	Leidse Geologische Mededelingen (Leiden, Rijksmuseum van Geologie en Mineralogie–Leiden, Rijksuniversiteit, Geologisch-Mineralogisch Instituut).
Leningrad, Gorn. Inst., Zap.	Leningrad, Gorniy Institut, Zapiski.
Leningrad, Univ., Vestn., Geol. Geogr.	Leningradskiy Universitet, Vestnik, Geologiya, Geografiya.
Lethaia	Lethaia; an International Journal of Palaeontology and Stratigraphy. Universitetsforlaget, Oslo.
Liberia, Geol. Surv., Spec. Pap.	Liberia, Geological Survey, Special Papers. Monrovia.
Libyan J. Sci.	Libyan Journal of Science; and International Journal. University of Libya, Faculty of Science. Tripoli.
Liet. TSR Mokslu Akad., Darb., Ser. B	Lietuvos TSR Mosklu Akademijos, Darbai, B Seriua (Akademiya Nauk Litovskoy SSR, Trudy, Seriya B). Vilnius.
Limnol. Oceanogr.	Limnology and Oceanography (American Society of Limnology and Oceanography). Lawrence, Kansas.
Linn. Soc., Biol. J.	Linnean Society, Biology Journal (*supersedes* Linnean Society of London, Proceedings). London.
Linn. Soc. N.S.W., Proc.	Linnean Society of New South Wales, Proceedings. Sydney.
Lisb., Univ., Mus. Lab. Mineral. Geol., Bol.	Lisbon, Universidade, Museu e Laboratorio Mineralogico a Geologico, Boletim.
Lisbon, Univ., Fac. Cienc., Rev., Ser. 2, C (Cienc. Natur.)	Lisbon, Universidade, Faculdade de Ciencias, Revista, Serie 2, C, Ciencias Naturais.
Lithol. Miner. Resour.	Lithology and Mineral Resources (*English translation of* Litologiya i Poleznyye Iskopayemyye). Consultants Bureau, New York.
Lithos	Lithos; an International Journal of Mineralogy, Petrology, and Geochemistry. Oslo.
Litol. Polez. Iskop.	Litologiya i Poleznyye Iskopayemmye. Moscow.
Los Alamos Sci. Lab., [Rep.]	Los Alamos Scientific Laboratory (University of California), [Report]. Los Alamos, New Mexico.
Los Ang. Cty. Mus., Contrib. Sci.	Los Angeles County Museum, Contributions in Science.
Lund Stud. Geogr., Ser. A, Phys. Geogr.	Lund Studies in Geography, Ser. A, Physical Geography (Lund, University, Department of Geography).
Lund, Univ., Inst. Mineral., Paleontol., Quat. Geol., Publ.	Lund, University, Institutes of Mineralogy, Paleontology, and Quaternary Geology, Publications.
Luxembourg, Serv. Geol., Publ.	Luxembourg, Service Geologique, Publications—Luxemburger Geologischer Dienst, Veroffentlichungen.
Lyons, Fac. Sci., Lab. Geol., Doc.	Lyons, Faculte des Sciences, Laboratoires de Geologie, Documents.
Maden Tetkik Arama Enst. (Miner. Res. Explor. Inst. Turk.), Bull. (Foreign Ed.)	Maden Tetkik ve Arama Enstituesue (Mineral Research and Exploration Institute of Turkey), Bulletin, Foreign Edition. Ankara.
Maden Tetkik Arama Enst., Yayn.	Maden Tetkik ve Arama Enstitusu, Yayiniarindan. Ankara.
Maine Geol. Surv., Bull.	Maine Geological Survey, Bulletin. Augusta.
Malacologia	Malacologia; International Journal of Malacology. Ann Arbor, Michigan.
Malay. Sci.	Malayan Scientist (Journal of the Persatuan-Sains, University of Malaysia). Kuala Lumpur.
Malays. Geol. Surv., Map Bull. (Ipoh)	Malaysia Geological Survey, Map Bulletin. Ipoh, West Malaysia.
Malays. J. Sci.	Malaysian Journal of Science. University of Malaysia, Faculty of Science, Kuala Lumpur.

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Manit., Dep. Min. Nat. Resour., Mines Br., Geol. Pap.	Manitoba, Department of Mines and Natural Resources, Mines Branch, Geological Paper. Winnipeg.
Mar. Chem.	Marine Chemistry; An International Journal for Studies of All Chemical Aspects of the Marine Environment. Elsevier Publ. Co., Amsterdam.
Mar. Geol.	Marine Geology; International Journal of Marine Geology, Geochemistry and Geophysics. Elsevier Publ. Co., Amsterdam.
Mar. Geophys. Res.	Marine Geophysical Researches; an International Journal for the Study of the Earth beneath the Sea. D. Reidel Publ. Co., Dordrecht, Holland.
Marit. Sediments	Maritime Sediments. Halifax, Nova Scotia.
Mars. Fac. Sci., Ann.	Marseilles, Faculte des Sciences, Annales.
Mars., Provence, Univ., Lab. Geol. Hist. Paleontol., Trav.	Marseille, Provence, Universite, Laboratoire de Geologie Historique et de Paleontologie, Travaux.
Mater. Genet. Eksp. Mineral.	Materialy po Geneticheskoy i Eksperimental'noy Mineralogii (Akademiya Nauk SSSR, Sibirskoye Otdeleniye, Institut Geologii i Geofiziki). Novosibirsk.
Mater. Geol. Suisse, Geophys.	Materiaux pour la Geologie de la Suisse, Geophysique (Commission Geotechnique Suisse). Bern. (*see also* Beitrage zur Geologie der Schweiz, Geophysik.)
Mater. Poznaniyu Geol. Str. SSSR (Mosk. O-vo. Ispyt. Prir.), Nov. Ser.	Materialy k Poznaniyu Geologicheskogo Stroyeniya SSSR (Moskovskoye Obshchestvo Ispytateley Prirody), Novaya Seriya. Moscow.
Mater. Res. Bull.	Materials Research Bulletin; an International Journal reporting Research on Crystal Growth and Materials Preparation and Characterization. Pergamon Press, Oxford.
Mausolee	Le Mausolee; Revue Technique Mensuelle. Lyon.
McGill Univ., Axel Heiberg Isl. Res. Rep., Glaciol.	McGill University, Axel Heiberg Island Research Reports, Glaciology. Montreal.
Medd. Groenland	Meddelelser om Groenland (Kommission for Videnskabelige Undersoelgelser i Groenland). Copenhagen.
Mediterranee	Mediterranee. Paris.
Meerestech. Mar. Technol.	Meerestechnik—Marine Technology (Verein Deutscher Ingenieure). Dusseldorf.
Mercian Geol.	Mercian Geologist (East Midlands Geological Society, Journal). Nottingham.
Merzlotnyye Issled.	Merzlotnyye Issledovaniya; Sbornik Statey (Moskovskiy Gosudarstvennyy Universitet, Geologicheskiy Fakul'tet). Moscow.
"Meteor" Forschungsergeb., Reihe C	"Meteor" Forschungsergebnisse, Reihe C, Geologie und Geophysik (Deutsche Forschungsgemeinschaft). Gebrueder Borntrager, Berlin-Stuttgart.
"Meteor" Forschungsergeb., Reihe D	"Meteor" Forschungsergebnisse, Reihe D, Biologie. Berlin.
Meteoritics	Meteoritics (Meteoritical Society, Journal). Center for Meteorite Studies, Arizona State University, Tempe.
Meteoritika	Meteoritika (Akademiya Nauk SSSR, Komitet po Meteoritam). Moscow.
Meteorol. Gidrol.	Meteorologiya i Gidrologiya (USSR, Glavnoye Upravleniye Gidrometeorologicheskoy Sluzhby). Moscow.
Meteorol. Hydrol.	Meteorology and Hydrology. Bucharest.
Meyniana	Meyniana (Kiel, Universitat, Geologisches Institut). Neumunster.
Mezhdunar. Simp. Granitsa Silura Devona, Biostratigr. Silura, Nizhego Srednego Devona, Tr.	Mezhdunardnyy Simpozium po Granitsa Silura i Devona i Biostratigrafiya Silura, Nizhego Srednego Devona,

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Mezhved. Stratigr. Kom. SSSR (Akad. Nauk SSSR-Minist. Geol. SSSR), Tr.	Trudy. Leningrad. Mezhvedomstvennyy Stratigraficheskiy Komitet SSSR (Akademiya Nauk SSSR-Ministervo Geologii SSSR), Trudy. Izdatel'stvo Nauka, Moscow.
Mich. Acad.	Michigan Academician (Michigan Academy of Sciences, Arts, and Letters, Papers). Ann Arbor.
Mich., Geol. Surv., Annu. Stat. Summ.	Michigan, Geological Survey, Annual Statistical Summary. Lansing.
Mich., Geol. Surv. Div., Rep. Invest.	Michigan, Geological Survey Division, Report of Investigations. Lansing.
Mich. State Univ., Mus., Publ., Paleontol. Ser.	Michigan State University, Museum, Publications, Paleontological Series. East Lansing.
Mich., Univ., Mus. Paleontol., Contrib.	Michigan, University, Museum of Paleontology, Contributions. Ann Arbor.
Micropaleontology	Micropaleontology (American Museum of Natural History). New York.
Microscope	The Microscope. London.
Min. Eng.	Mining Engineering. American Institute of Mining, Metallurgical and Petroleum Engineers, New York.
Min. Mag.	Mining Magazine. London.
Min. Metal.	Mineracao, Metalurgia (*supersedes* Engenharia, Mineracao, Metalurgia). Rio de Janeiro.
Min. Metall. Q.	Mining and Metallurgy Quarterly (English translation of Rudarsko Metalurski Zbornik). NOLIT Publ. House, Belgrade.
Miner. Waste Util. Symp., Proc.	Mineral Waste Utilization Symposium, Proceedings. U. S. Bureau of Mines-IIT Research Institute, Washington, D. C.-Chicago, Illinois.
Miner. Wealth (Gujarat, Dir. Geol. Min.)	Mineral Wealth (Gujarat, Directorate of Geology & Mining). Ahmedabad [Ahmadabad].
Mineral. J. (Tokyo)	Mineralogical Journal (Mineralogical Society of Japan). Tokyo.
Mineral. Mag.	Mineralogical Magazine and Journal of the Mineralogical Society. London.
Mineral. Petrogr. Acta	Mineralogica et Petrographica Acta. Bologna.
Mineral. Pol.	Mineralogia Polonica (Polskie Towarzystwo Mineralogiczne). Warsaw.
Mineral. Rec.	The Mineralogical Record. Bowie, Maryland.
Mineral. Sb. (L'vov. Gos. Univ.)	Mineralogicheskiy Sbornik (L'vovskiy Gosudarstvennyy Universitet). Lvov.
Mineral. Slovaca	Mineralia Slovaca. Bratislava.
Mines Metall.	Mines et Metallurgie; Revue des Industries Minieres et Metallurgiques. Paris.
Minn. Geol. Surv., Guideb. Ser.	Minnesota Geological Survey, Guidebook Series. St. Paul.
Miss. Geol. Econ. Topogr. Surv., Bull.	Mississippi Geological, Economic and Topographic Survey, Bulletin. Jackson.
Mo., Geol. Surv. Water Resour., Eng. Geol. Ser.	Missouri Geological Survey and Water Resources, Engineering Geology Series. Rolla.
Mo., Geol. Surv. Water Resour., Inf. Circ.	Missouri Geological Survey and Water Resources, Information Circular. Rolla.
Mo., Geol. Surv. Water Resour., Rep. Invest.	Missouri Geological Survey and Water Resources, Report of Investigations. Rolla.
Mo. Miner. Ind. News	Missouri Mineral Industry News (Missouri Geological Survey). Rolla.
Mod. Geol.	Modern Geology. Gordon and Breach Sci. Publ., New York London Paris.
Monaco, Mus. Anthropol. Prehist., Bull.	Monaco, Musee d'Anthropologie Prehistorique Bulletin.
Mont., Bur. Mines Geol., Bull.	Montana, Bureau of Mines and Geology, Bulletin. Butte.

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Mont., Bur. Mines Geol., Mem.	Montana, Bureau of Mines and Geology, Memoir. Butte.
Mont., Bur. Mines Geol., Spec. Publ.	Montana, Bureau of Mines and Geology, Special Publication. Butte.
Mont. Geol. Soc., Annu. Field Conf. Guideb.	Montana Geological Society, Annual Field Conference Guidebook (*supersedes* Billings Geological Society Annual Field Conference Guidebook). Billings, Montana.
Mont., Univ., Dep. Geol., Geol. Ser.	Montana, University, Department of Geology, Geological Series. Missoula.
Montan-Rundsch.	Montan-Rundschau; Zeitschrift fur Bergbau, Huettenwesen und Energiewirtschaft. Vienna.
Moon	The Moon; an International Journal of Lunar Studies. D. Reidel Publ. Co., Dordrecht, Holland.
Morocco, Off. Natl. Peches, Inst. Peches Marit., Bull.	Morocco, Office National des Peches, Institute des Peches Maritimes, Bulletin. Casablanca.
Morocco, Serv. Geol., Notes Mem.	Morocco, Service Geologique, Notes et Memoires. Rabat.
Mosaic	Mosaic (National Science Foundation). Washington, D.C.
Moscow, Univ., Vestn., Ser. Geogr.	Moskovskiy Universitet, Vestnik, Seriya Geografii.
Moscow, Univ., Vestn., Ser. Geol.	Moskovskiy Universitet, Vestnik, Seriya Geologii.
Mosk. Ovo. Ispyt. Prir., Byull., Otd. Geol.	Moskovskoye Obshchestvo Ispytateley Prirody, Byulleten', Otdel Geologicheskiy. Moscow.
Mosk. O-vo Ispyt. Prir., Otd. Geol.-Geogr., Tr.	Moskovskoye Obshchestvo Ispytateley Prirody, Otdel Geologo-Geografsekskii, Trudy. Moscow.
Mt. Geol.	The Mountain Geologist (Rocky Mountain Association of Geologists). Denver, Colorado.
Muenster. Forsch. Geol. Palaeontol.	Muenstersche Forschungen zur Geologie und Palaeontologie (Muenster, Universitaet, Geologisch-Palaeontologisches Institut).
Mus. Hist. Nat. "Grigore Antipa", Trav.	Museum d'Histoire Naturelle "Grigore Antipa", Travaux. Bucharest.
Mus. Hist. Nat. Mars., Bull.	Museum d'Histoire Naturelle de Marseille, Bulletin.
Mus. Midden-Afr., Ann., Reeks in-8°, Geol. Wet.	Koninklijk Museum voor Midden-Afrika, Annalen, Reeks in-8°, Geologische Wetenschappen (Musee Royal de l'Afrique Centrale, Annales, Serie in-8°, Sciences Geologiques). Tervuren, Belgium.
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Mus. Natl. Hung., Ann. Hist.-Nat.	Museum Nationale Hungaricum, Annales Historico-Naturales (Termeszettudomanyi Muzeum, Evkonyve). Budapest.
Mus. North. Ariz. Bull.	Museum of Northern Arizona Bulletin. Flagstaff, Arizona.
Mus. Para., Emilio Goeldi, Bol. Geol.	Museu Paraense Emilio Goeldi (Instituto Nacional de Pesquisas da Amazonia). Boletim; Geologia. Belem.
Mysore, Dep. Mines Geol., Geol. Stud.	Mysore, Department of Mines and Geology, Geological Studies. Bangalore.
Mysore, Dep. Mines Geol., Groundwater Stud.	Mysore, Department of Mines and Geology, Groundwater Studies. Bangalore.
N. B., Dep. Nat. Resour., Miner. Resour. Br., Inf. Circ.	New Brunswick, Department of Natural Resources, Mineral Resources Branch, Information Circular. Fredericton.
N. B., Dep. Natl. Resourc., Miner. Resour. Br., Pop. Geol. Pap.	New Brunswick, Department of Natural Resources, Mineral Resources Branch, Popular Geology Paper. Fredericton.
N. B., Res. Prod. Counc., Res. Note	New Brunswick, Research and Productivity Council, Research Note. Fredericton.
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N. D. Geol. Surv., Educ. Ser.	North Dakota Geological Survey, Educational Series. Bismarck.
N. D. Geol. Surv., Misc. Ser.	North Dakota Geological Survey, Miscellaneous Series. Grand Forks.
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N. Y. Acad. Sci., Trans.	New York Academy of Sciences, Transactions. New York.
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N. Y. State Mus. Sci. Serv., Circ.	New York State Museum and Science Service, Circular. Albany.
N. Y. State Mus. Sci. Serv., Map Chart Ser.	New York State Museum and Science Service, Map and Chart Series. Albany.
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N. Z., Dep. Sci. Ind. Res., Inf. Ser.	New Zealand, Department of Scientific and Industrial Research, Information Series. Wellington.
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N. Z. J. Sci.	New Zealand Journal of Science. Wellington.
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Nar. Muz. (Prague), Cas., Oddil Prirodoved.	Narodni Muzeum, Casopis, Oddil Prirodovedny. Prague.
Nar. Muz. Praze, Sb.	Narodni Muzeum v Praze, Sbornik (Acta Musei Nationalis Progae), Rada B, Prirodni Vedy. Prague.

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Nat. Mus.	Natur und Museum (Senckenbergische Naturforschende Gesellschaft, Bericht). Frankfurt.
Nat. Resour. (Unesco)	Nature and Resources (International Hydrological Decade, Bulletin) (Unesco). Paris.
Nat. Sci. Mus. (Tokyo, Nat. Sci. Mus.)	Natural Science and Museums (Tokyo, National Science Museum).
Natl. Acad. Sci., Proc.	National Academy of Sciences of the United States of America, Proceedings. Washington, D.C.
Natl. Geogr. Mag.	National Geographic Magazine (National Geographic Society). Washington, D. C.
Natl. Inst. Geol. Min. Bandung, Bull.	National Institute of Geology and Mining Bandung, Bulletin. Indonesian Institute of Sciences, Bandung.
Natl. Iran. Oil Co., Geol. Lab., Publ.	National Iranian Oil Company, Geological Laboratories, Publication, Teheran.
Natl. Parks Conserv. Mag.	National Parks & Conservation Magazine: The Environmental Journal. Washington, D.C.
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Naturforsch. Ges. Zuer., Neujahrbl.	Naturforschende Gesellschaft in Zuerich, Neujahrsblatt.
Naturhist. Ges. Hannover, Ber.	Naturhistorische Gesellschaft zu Hannover, Bericht.
Naturhist. Mus. Wien, Ann.	Naturhistorisches Museum in Wien, Annalen. Vienna.
Naturwiss. Mus. Stadt Aschaffenburg, Nachr.	Naturwissenschafliche Museums der Stadt Aschaffenburg, Nachrichten.
Naturwiss. Rundsch.	Naturwissenschaftliche Rundschau. Stuttgart.
Naturwiss. Ver. Schleswig-Holstein, Schr.	Naturwissenschaftlicher Verein fuer Schleswig-Holstein, Schriften. Keil.
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Naturwissenschaften	Naturwissenschaften. Berlin.
Natuurwet. Tidjschr.	Natuurwetenschappelijk Tidjschrift. Ghent.
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Nauchno-Issled. Inst. Geol. Arktiki, Uch. Zap., Paleontol. Biostratigr.	Nauchno-Issledovatel'skiy Institut Geologii Arktiki, Ucheniyye Zapiski, Paleontologiya i Biostratigrafiya. Leningrad.
Nauchno-Issled. Inst. Geol. Arktiki, Uch. Zap., Reg. Geol.	Nauchno-Issledovatel'skiy Institut Geologii Arktiki, Ucheniyye Zapiski, Regional'naya Geologiya. Leningrad.
Nauchno-Issled. Lab. Geol. Zarubezh. Stran, Tr.	Nauchno-Issledovatel'skaya Laboratoriya Geologii Zarubezhnykh Stran, Trudy. Moscow.
Nebr. Acad. Sci., Trans.	Nebraska Academy of Sciences, Transactions. Lincoln.
Nebr., Univ., Conserv. Div., Resour. Atlas	Nebraska, University, Conservation and Survey Division, Resource Atlas. Lincoln.
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Neftegazov. Geol. Geofiz.	Neftegazovaya Geologiya i Geofiziki (Vsesoyuznyy Nauchno-Issledovatel'skiy Institut, Organizatsii Upravleniya i Ekonomiki Neftegazovoy Promyshlennosti). Moscow.
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Nobel Symp., Proc.	Nobel Symposium, Proceedings. Wiley Interscience, New York–Almqvist & Wiksell, Stockholm.
Nor. Geol. Tidsskr.	Norsk Geologisk Tidsskrift. Oslo.
Nor. Polarinst., Aarbok	Norsk Polarinstitutt, Aarbok. Oslo.
Nor. Polarinst., Skr.	Norsk Polarinstitutt, Skrifter. Oslo.
Norg. Geol. Unders.	Norges Geologiske Undersoekelse, [Publikasjoner]. Oslo.
Norg. Geotek. Inst., Publ.	Norges Geotekniske Institutt, Publikasjon. Oslo.
Norois	Norois (Revue Geographique de l'Ouest et des Pays de l'Atlantique Nord). Poitiers.
North Am. Rapid Excavation Tunneling Conf., Proc.	North American Rapid Excavation and Tunnelling Conference, Proceedings. American Institute of Mining, Metallurgical and Petroleum Engineers, New York.
Northwest Conf. Geothermal Power, Pap.	Northwest Conference on Geothermal Power, Papers. Olympia, Washington.
Northwest Geol.	Northwest Geology. University of Montana, Missoula.
Northwest Sci.	Northwest Science (Northwest Scientific Association). Pullman, Washington.
Notes Mem. Moyen-Orient	Notes et Memoires sur le Moyen-Orient (Museum National d'Histoire Naturelle). Paris.
Notic. Geomorfol.	Noticia Geomorfologica (Campinas, Universidade Catolica, Departamento de Geografia).
Nottingham, Univ., Dep. Geogr.–Uganda, Geol. Surv. Mines Dep., Geomorphol. Rep.	Nottingham, University, Department of Geography–Uganda, Geological Survey and Mines Department, Geomorphological Report. Nottingham, England–Entebbe, Uganda.
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Obshch. Vop. Evol. Paleobiol.	Obshchiye Voprosy Evolyutsionnoy Paleobiologii (Akademiya Nauk Gruzinskoy SSR, Institut Paleobiologii). Tiflis.
Oceanogr. Mar. Biol., Annu. Rev.	Oceanography and Marine Biology; an Annual Review. Hafner Publ. Co., New York.
Oceanogr. Soc. Jap., J.	Oceanographical Society of Japan, Journal. Tokyo.
Oceanology	Oceanology (*English translation of* Okeanologiya). American Geophysical Union, Washington, D.C.
Offshore Tech. Conf., Prepr.	Offshore Technology Conference, Preprints. Houston, Texas.
Ohio, Div. Geol. Surv., Inf. Circ.	Ohio, Division of Geological Survey, Information Circular. Columbus.
Ohio, Div. Geol. Surv., Rep. Invest.	Ohio, Division of Geological Survey, Report of Investigations. Columbus.
Ohio State Univ., Inst. Polar Stud., Rep.	Ohio State University, Institute of Polar Studies, Report. Columbus.
Oil Gas J.	Oil and Gas Journal. Tulsa, Oklahoma.
Okeanol. (Akad. Nauk SSSR)	Okeanologiya (Akademiya Nauk SSSR). Moscow.
Okla. Acad. Sci., Proc.	Oklahoma Academy of Science, Proceedings. Stillwater, Oklahoma.
Okla. Geol. Notes	Oklahoma Geology Notes (Oklahoma Geological Survey). Norman.
Okla. Geol. Surv., Bull.	Oklahoma Geological Survey, Bulletin, Norman.
Okla. Geol. Surv., Educ. Publ.	Oklahoma Geological Survey, Educational Publication. Norman.
Ont., Dep. Mines, Geol. Guide Book	Ontario, Department of Mines, Geological Guide Book.
Ont. Dep. Mines, Geol. Rep.	Ontario Department of Mines, Geological Report. Toronto.
Ont., Dep. Mines North Aff., Geol. Circ.	Ontario, Department of Mines and Northern Affairs, Geological Circular. Toronto.
Ont., Div. Mines, Pet. Resour. Sect., Pap.	Ontario, Division of Mines, Petroleum Resources Section, Paper.
Ont. Pet. Inst., Annu. Conf.	Ontario Petroleum Institute, Annual Conference. Blenheim, Ontario.
Ont. Water Resour. Comm., Water Resour. Bull.	Ontario Water Resources Commission, Water Resources Bulletin. Toronto
Ont. Water Resour. Comm., Water Resour. Rep.	Ontario Water Resources Commission, Water Resources Report. Toronto.
Ore Bin	The Ore Bin. Oregon, Department of Geology and Mineral Industries, Portland.
Oreg., Dep. Geol. Miner. Ind., Bull.	Oregon, Department of Geology and Mineral Industries, Bulletin. Portland.
Oreg., Dep. Geol. Miner. Ind., Misc. Paper	Oregon, Department of Geology and Mineral Industries, Miscellaneous Paper. Portland.
Oreg., State Eng., Ground Water Rep.	Oregon State Engineer, Ground Water Report. Salem.
Oreg., Univ., Mus. Nat. Hist., Bull.	Oregon, University, Museum of Natural History, Bulletin. Eugene.
Osaka Mus. Nat. Hist., Bull.	Osaka Museum of Natural History, Bulletin.
Osaka Univ., J. Geosci.	Osaka University, Journal of Geosciences.
Ostrava, Vys. Sk. Banska, Sb.	Ostrava, Vysoka Skola Banska, Sbornik, Rada Hornicko-Geologicka.

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P. R. Dep. Public Works, Water-Resour. Bull.	Puerto Rico Department of Public Works, Water-Resources Bulletin. San Juan.
Pa. Acad. Sci., Proc.	Pennsylvania Academy of Science, Proceedings. University Park.
Pa. Dep. Environ. Resour., Bur. Water Qual. Manage., Publ.	Pennsylvania Department of Environmental Resources, Bureau of Water Quality Management, Publication. Harrisburg.
Pa. Geogr.	Pennsylvanian Geographer; Journal of the Pennsylvania Council for Geography Education. Indiana, Pennsylvania.
Pa. Geol.	Pennsylvania Geology (Pennsylvania Geological Survey). Harrisburg.
Pa. Geol. Surv., Environ. Geol. Rep.	Pennsylvania Geological Survey, Environmental Geology Report. Harrisburg.
Pa. Geol. Surv., Gen. Geol. Rep.	Pennsylvania Geological Survey, General Geology Report. Harrisburg.
Pa. Geol. Surv., Inf. Circ.	Pennsylvania Geological Survey, Information Circular. Harrisburg.
Pa. Geol. Surv., Miner. Resour. Rep.	Pennsylvania Geological Survey, Mineral Resources Report. Harrisburg.
Pa. Geol. Surv., Prog. Rep.	Pennsylvania Geological Survey, Progress Report. Harrisburg.
Pac. Sci.	Pacific Science. Honolulu.
Pak., Geol. Surv., Mem.	Pakistan, Geological Survey, Memoirs. Karachi.
Pak. J. Sci.	Pakistan Journal of Science (Pakistan Association for the Advancement of Science). Lahore.
Pak. J. Sci. Ind. Res.	Pakistan Journal of Scientific and Industrial Research. Karachi.
Palaeobotanist (Lucknow)	The Palaeobotanist (Birbal Sahni Institute of Paleobotany).
Palaeoecol. Afr.	Palaeoecology of Africa and of the Surrounding Islands and Antarctica. Cape Town.
Palaeogeogr. Palaeoclimatol. Palaeoecol.	Palaeogeography, Palaeoclimatology, Palaeoecology; an International Journal for the Geo-Sciences. Elsevier Publ. Co., Amsterdam.
Palaeontogr., Abt. A	Palaeontographica, Abteilung A, Palaeozoologie-Stratigraphie. Stuttgart.
Palaeontogr., Abt. B	Palaeontographica, Abteilung B, Palaeophytologie. Stuttgart.
Palaeontogr. Soc., Monogr.	Palaeontographical Society, Monographs. London.
Palaeontol. Abh., Abt. A	Palaeontologische Abhandlungen, Abteilung A, Palaeozoologie. Berlin.
Palaeontol. Abh., Abt. B	Palaeontologische Abhandlungen, Abteilung B, Palaeobotanik. Berlin.
Palaeontol. Afr.	Palaeontologia Africana. Johannesburg.
Palaeontol. Jugoslav.	Palaeontologia Jugoslavica (Jugoslavenska Akademija Znanosti i Umjetnosti). Zagreb.
Palaeontol. Pol.	Palaeontologia Polonica. Warsaw.
Palaeontol. Soc. Jap., Trans. Proc.	Palaeontological Society of Japan, Transactions and Proceedings. Tokyo.
Palaeontol. Z.	Palaeontologische Zeitschrift. Stuttgart.
Palaeontology	Palaeontology (Palaeontological Association). London.
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Paleontol. Sb.	Paleontologicheskiy Sbornik. Lvov.
Panjab Univ., Res. Bull.	Panjab University, Research Bulletin. Chandigarh.
Paris, Ec. Prat. Hautes Etud., Lab. Geomorphol., Mem.	Paris, Ecole Pratique des Hautes Etudes, Laboratoire de Geomorphologie, Memoire.
Paris, Univ., Lab. Paleontol., Trav.	Paris, Universite, Laboratoire de Paleontologie, Travaux. Orsay.
Pedologie	Pedologie (Societe Belge de Pedologie—Belgische Bodemkundige Vereniging, Bulletin). Ghent.
Period. Mineral.	Periodico di Mineralogia. Rome.
Peru, Serv. Geol. Min., Bol.	Peru, Servicio de Geologia y Mineria, Boletin. Lima.
Peru, Serv. Geol. Miner., Estud. Espec.	Peru, Servicio de Geologia y Mineria, Estudios Especiales. Lima.
Pesquisas	Pesquisas (Rio Grande do Sul, Universidad Federal, Instituto de Geociencias). Porto Alegre, Brazil.
Pet. Geol.	Petroleum Geology (*English translation of* Geologiya Nefti i Gaza). McLean, Virginia.
Pet. Geol. Taiwan	Petroleum Geology of Taiwan. Miaoli.
Petermanns Geogr. Mitt.	Petermanns Geographische Mitteilungen. Gotha.
Petros	Petros (Students' Geological Society, Natal University). Durban.
Philipp., Bur. Mines, Rep. Invest.	Philippines, Bureau of Mines, Report of Investigation. Manila.
Photo interpretation (Paris)	Photo interpretation. Editions Technip, Paris.
Photogrammetria	Photogrammetria (International Society for Photogrammetry). Elsevier Publ. Co., Amsterdam.
Phys. Solid Earth (Engl. Ed.)	Physics of the Solid Earth (Academy of Sciences, USSR, Izvestiya). *English Edition*, American Geophysical Union, Washington, D.C.
Pirineos (Inst. Estud. Pirenaicos, Rev.)	Pirineos (Instituto de Estudios Pirenaicos, Revista). Zaragoza.
Planet. Space Sci.	Planetary and Space Science. Pergamon Press, Oxford.
Plaster Jacket	Plaster Jacket (Florida State Museum-University of Florida). Gainesville.
Plateau	Plateau (Northern Arizona Society of Science and Art). Flagstaff.
Pol. Akad. Nauk, Inst. Geogr., Dok. Geogr.	Polska Akademia Nauk, Instytut Geografii, Dokumentacja Geograficzna. Warsaw.
Pol. Akad. Nauk, Inst. Geogr., Pr. Geogr.	Polska Akademia Nauk, Instytut Geografii, Prace Geograficzne. Warsaw.
Pol. Akad. Nauk, Muz. Ziemi, Pr.	Polska Akademia Nauk, Muzeum Ziemi, Prace. Warsaw.
Pol. Akad. Nauk, Oddzial. Krakowie, Kom. Nauk Geol., Pr. Geol.	Polska Akademia Nauk, Oddzial. w Krakowie, Komisja Nauk Geologicznych, Prace Geologiczne. Warsaw.
Pol. Akad. Nauk, Oddzial. Krakowie, Kom. Nauk Mineral., Pr. Mineral.	Polska Akademia Nauk, Oddzial. w Krakowie, Komisja Nauk Mineralogicznych, Prace Mineralogiczne. Warsaw.
Pol. Akad. Nauk Zakl. Geofiz., Mater. Pr.	Polska Akademia Nauk, Zaklad Geofizyki, Materialy i Prace. Warsaw.
Pol., Inst. Geol., Biul.	Poland, Instytut Geologiczny, Biuletyn. Warsaw.
Pol., Inst. Geol., Pr.	Poland, Instytut Geologiczny, Prace. Warsaw.
Pol. Tow. Geol., Rocz.	Polskie Towarzystwo Geologiczne, Rocznik. Krakow.
Polarforschung	Polarforschung (Deutsche Gesellschaft fur Polarforschung). Munster.

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Port., Serv. Fom. Mineiro, Estud., Notas Trab.	Portugal, Servico de Fomento Mineiro, Estudos, Notas e Trabalhos. [Lisbon].
Port., Serv. Geol., Comun.	Portugal, Servicos Geologicos, Comunicaoes. Lisbon.
Port., Serv. Geol., Mem.	Portugal, Servicos Geologicos, Memoria. Lisbon.
Poznan. Tow. Przyj. Nauk, Kom. Geogr.-Geol., Pr.	Poznanskie Towarzystwo Przyjaciol Nauk, Komisja Geograficzno-Geologiczna, Prace. Poznan.
Pr. Inst. Naft.	Prace Instytutu Naftowego. Krakow.
Prir. Usloviya Zapadn. Sib.	Prirodnyye Usloviya Zapadnoy Sibiri (Moskva Universitet). Moscow.
Prirod. Obstanovka Fauny Proshlogo	Prirodnaya Obstanovka i Fauny Proshlogo (Akademiya Nauk Ukrainskoy SSR, Institut Zoologii). Kiev.
Priroda	Priroda (Akademiya Nauk SSSR). Moscow.
Prof. Geogr.	Professional Geographer (Association of American Geographers, Journal). Washington, D.C.
Protistologica (Paris)	Protistologica (Fr., Centre National de la Recherche Scientifique). Paris.
Przegl. Geofiz.	Przeglad Geofizyczny (Polskie Towarzystwo Geofizyczne). Warsaw.
Przegl. Geogr.	Przeglad Geograficzny. Warsaw.
Przegl. Geol.	Przeglad Geologiczny. Warsaw.
Purdue Univ., Water Resour. Res. Cent., Tech. Rep.	Purdue University, Water Resources Research Center, Technical Report. Lafayette, Indiana.
Quartaer	Quartaer; Jahrbuch fuer Erforschung des Eiszeitalters und der Steinzeit (Hugo Obermaier-Gesellschaft). Bonn.
Quat. Res. (Jap. Assoc. Quat. Res.)	Quaternary Research (Japan Association for Quaternary Research). Tokyo.
Quat. Res. (Wash., Univ., Quat. Res. Cent.)	Quaternary Research: an Interdisciplinary Journal (Washington, University, Quaternary Research Center). Academic Press, New York.
Quaternaria	Quaternaria. Rome.
Que., Cent. Rech. For. Laurentides, Rapp. Inf.	Quebec, Centre de Recherches Forestieres des Laurentides, Rapport d'Information. Quebec.
Que. Dep. Nat. Resour., Geol. Rep.	Quebec Department of Natural Resources, Geological Report.
Que. Dep. Nat. Resour., Spec. Pap.	Quebec Department of Natural Resources, Special Paper.
Queens Coll., Dep. Geo., Geol. Bull.	Queens College (City University of New York), Department of Geology, Geological Bulletin. Flushing.
Queensl., Geol. Surv., Publ.	Queensland, Geological Survey, Publication. Brisbane.
Queensl., Geol. Surv., Rep.	Queensland, Geological Survey, Report. Brisbane.
Queensl. Govt. Mining J.	Queensland Government Mining Journal. Queensland, Department of Mines, Brisbane.
Queensl. Mus., Mem.	Queensland Museum, Memoirs. Brisbane.
R. Astron. Soc., Geophys. J.	Royal Astronomical Society, Geophysical Journal. Oxford.
R. Dublin Soc., Sci. Proc., Ser. A	Royal Dublin Society, Scientific Proceedings, Series A.
R. Geol. Soc. Corn., Trans.	Royal Geological Society of Cornwall, Transactions. Penzance.
R. Ir. Acad., Proc., Sect. B	Royal Irish Academy, Proceedings, Section B. Dublin.
R. Ont. Mus., Life Sci. Contrib.	Royal Ontario Museum, Life Sciences Contributions. Toronto.
R. Ont. Mus., Life Sci. Occas. Pap.	Royal Ontario Museum, Life Science Occasional Papers. Toronto.
R. Scott. Mus., Inf. Ser., Geol.	Royal Scottish Museum, Information Series, Geology. Edinburgh.

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R. Soc. Edinb., Proc., Sect. B	Royal Society of Edinburgh, Proceedings, Section B (Biology).
R. Soc. Edinb., Trans.	Royal Society of Edinburgh, Transactions.
R. Soc. Lond., Philos. Trans., Ser. A	Royal Society of London, Philosophical Transactions, Series A, Mathematical and Physical Sciences.
R. Soc. Lond., Philos. Trans., Ser. B	Royal Society of London, Philosophical Transactions, Series B, Biological Sciences.
R. Soc. Lond., Proc., Ser. A	Royal Society of London, Proceedings, Series A, Mathematical and Physical Sciences.
R. Soc. N.S.W., J. Proc.	Royal Society of New South Wales, Journal and Proceedings. Sydney.
R. Soc. N.Z., J.	Royal Society of New Zealand, Journal (*supersedes* Royal Society of New Zealand, Transactions). Wellington.
R. Soc. Queensl., Proc.	Royal Society of Queensland, Proceedings. Brisbane.
R. Soc. S. Aust., Trans.	Royal Society of South Australia, Transactions. Adelaide.
R. Soc. Tasmania, Pap. Proc.	Royal Society of Tasmania, Papers and Proceedings. Hobart.
R. Soc. Victoria, Proc.	Royal Society of Victoria, Proceedings. Melbourne.
Radex-Rundsch.	Radex-Rundschau (Oesterreichisch-Amerikanische Magnisit A.G.). Radenthein.
Radio Sci.	Radio Science (International Union of Radio Science, United States National Committee, Journal). American Geophysical Union, Washington, D.C.
Radiocarbon (Am. J. Sci.)	Radiocarbon (American Journal of Science). New Haven, Connecticut.
Razved. Okhr. Nedr	Razvedka i Okhrana Nedr (Ministerstvo Geologii SSSR). Moscow.
Rec. Oceanogr. Works Jap.	Records of Oceanographic Works in Japan. Science Council of Japan. Tokyo.
Rech. Geol. Afr.	Recherches Geologiques en Afrique (France, Centre National de la Recherche Scientifique). Paris.
Recherche	La Recherche. Paris.
Remote Sensing Environ.	Remote Sensing of Environment; an International Journal. American Elsevier Publ. Co., New York.
Res. Counc. Alberta, Inf. Ser.	Research Council of Alberta, Information Series. Edmonton.
Res. Counc. Alberta, Rep.	Research Council of Alberta, Report. Edmonton.
Ressources	Ressources; Bulletin de la Direction Generale des Eaux (Quebec, Ministere des Richesses Naturelles). Quebec.
Reun. Annu. Sci. Terre, [Programme Resumes]	Reunion Annuelle des Sciences de la Terre, [Programme et Resumes]. Paris.
Rev. Algol.	Revue Algologique (Museum National d'Histoire Naturelle, Laboratoire de Cryptogamie). Paris.
Rev. Belge. Geogr.	Revue Belge de Geographie (Societe Royale Belge de Geographie). Brussels.
Rev. Bras. Geocienc.	Revista Brasileira de Geociencias (Sociedade Brasileira de Geologica). Sao Paulo.
Rev. Brasil. Geogr.	Revista Brasileira de Geografia (Instituto Brasileiro de Geografia e Estatistica). Rio de Janeiro.
Rev. Cienc. Geol. (Lourenco Marques, Univ.), Ser. A	Revista de Ciencias Geologicas (Lourenco Marques, Universidade), Serie A (*supersedes* Revista dos Estudos Gerais Universitarios de Moccambique, Serie 6, Ciencias Geologicas).
Rev. Espan. Micropaleontol.	Revista Espanola de Micropaleontologia. Madrid.
Rev. Geogr. Alpine	Revue de Geographie Alpine. Grenoble.
Rev. Geogr. Est	Revue Geographique de l'Est (Besancon, Dijon, Nancy, Strasbourg, Instituts de Geographie, Facultes des Lettres et des Sciences Humaines).
Rev. Geogr. Maroc	Revue de Geographie du Maroc. Rabat.

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Rev. Geogr. Montreal	La Revue de Geographie de Montreal (Montreal, Universite, Departement de Geographie).
Rev. Geogr. Phys. Geol. Dyn.	Revue de Geographie Physique et de Geologie Dynamique. Paris.
Rev. Geogr. Pyrenees Sud-Ouest	Revue Geographique des Pyrenees et du Sud-Ouest. Toulouse-Paris.
Rev. Geomorphol. Dyn.	Revue de Geomorphologie Dynamique. Paris.
Rev. Geophys. Space Phys.	Reviews of Geophysics and Space Physics (*continuation of* Reviews of Geophysics). American Geophysical Union. Washington, D.C.
Rev. Micropaleontol.	Revue de Micropaleontologie (Laboratoire de Micropaleontologie). Paris.
Rev. Min., Geol. Mineral.	Revista Minera, Geologia y Mineralogia (Sociedad Argentina de Mineria y Geologia). Buenos Aires.
Rev. Palaeobot. Palynol.	Review of Palaeobotany and Palynology. Elsevier Publ. Co., Amsterdam.
Rev. Quest. Sci.	Revue des Questions Scientifiques (Societe Scientifique de Bruxelles). Louvain.
Rev. Roum. Geol., Geophys. Geogr., Ser. Geogr.	Revue Roumaine de Geologie, Geophysique et Geographie, Serie de Geographie. Bucharest.
Rev. Roum. Geol., Geophys. Geogr., Ser. Geol.	Revue Roumaine de Geologie, Geophysique et Geographie, Serie de Geologie. Bucharest.
Rev. Roum. Geol., Geophys. Geogr., Ser. Geophys.	Revue Roumaine de Geologie, Geophysique et Geographie, Serie de Geophysique. Bucharest.
Rev. Sci. Natur. Auvergne	Revue des Sciences Naturelles d'Auvergne (Societe d'Histoire Naturelle d'Auvergne). Clermont-Ferrand.
Reykjavik, Mus. Nat. Hist., Dep. Geol. Geogr., Misc. Pap.	Reykjavik Museum of Natural History, Department of Geology and Geography, Miscellaneous Papers.
Rio de J., Univ. Fed., Inst. Geocienc., Geol., Bol.	Rio de Janeiro, Universidade Federal, Instituto de Geociencias, Geologia, Boletim.
Riv. Ital. Geotec.	Rivista Italiana di Geotecnica (Associazione Geotecnica Italiana). Naples.
Riv. Ital. Paleontol. Stratigr.	Rivista Italiana de Paleontologia e Stratigrafia. Milan.
Riv. Min. Sicil.	Rivista Mineraria Siciliana. Palermo.
Rock Mech.	Rock Mechanics (International Society of Rock Mechanics, Journal) (*continuation of* Felsmechanik und Ingenieurgeologie). Vienna.
Rocks Miner.	Rocks and Minerals. Peekskill, New York.
Rom., Com. Geol., Dari Seama Sedin.	Romania, Comitetul de Stat al Geologiei, Institutul Geologic, Dari de Seama ale Sedintelor. Bucharest.
Rom., Com. Geol., Mem.	Romania, Comitetul de Stat al Geologiei, Institutul Geologic, Memorii. Bucharest.
Rom., Inst. Geol., Stud. Teh. Econ., Ser. A	Romania, Institutul Geologic, Studii Tehnice si Economice, Seria A, Prospectiuni si Explorari Geologice (Romania, Institut Geologique, Etudes Techniques et Economiques, Serie A, Prospections et Explorations Geologiques). Bucharest.
Rom., Inst. Geol., Stud. Teh. Econ., Ser. D	Romania, Institutul Geologic, Studii Tehnice si Economice, Seria D, Prospectiuni Geofizice (Romania, Institut Geologique, Etudes Techniques et Economiques, Serie D, Prospections Geophysiques). Bucharest.
Rom., Inst. Geol., Stud. Teh. Econ., Ser. E	Romania, Institutul Geologic, Studii Tehnice si Economice, Seria E, Hidrogeologie (Romania, Institut Geologique, Etudes Techniques et Economiques, Serie E, Hydrogeologie). Bucharest.
Rom., Inst. Geol., Stud. Teh. Econ., Ser. H	Romania, Comitetul de Stat al Geologiei, Institutul Geologic, Studii Tehnice si Economice, Seria H, Geologia Cuaternarului (Romania, Comite d'Etat pour la Geologie, Institut Geologique, Etudes Techniques et Economiques, Serie H, Geologie du

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	Quaternaire). Bucharest.
Rom., Inst. Geol., Stud. Teh. Econ., Ser. I	Romania, Comitetul de Stat al Geologiei, Institutul Geologic, Studii Tehnice si Economice, Seria I, Mineralogie-Petrografie. Bucharest.
Rom., Inst. Geol., Stud. Teh. Econ., Ser. J	Romania, Institul Geologic, Studii Tehnice si Economice, Seria J, Stratigrafie. Bucharest.
Rom., Inst. Pet. Gaze Geol., Bul., Geol. Teh.	Romania, Institutului de Petrol Gaze si Geologie, Buletinul, Geologie Tehnica. Bucharest.
Rosario, Univ., Inst. Fisiogr. Geol., Notas	Rosario, Universidad, Instituto de Fisiografia y Geologia, Notas.
Rozpr. Hydrotech.	Rozprawy Hydrotechnicznych (Polska Akademia Nauk W Gdnasku, Instytut Budownictwa Wodnego). Warsaw.
Rud.-Metal. Zb.	Rudarsko Metalurski Zbornik, Ljubljana.
S. Afr., Geol. Surv., Bull.	South Africa, Geological Survey -Geologiese Opname, Bulletin. Pretoria.
S. Afr., Geol. Surv., Mem.	South Africa, Geological Survey, Memoir. Pretoria.
S. Afr., Geol. Surv., Spec. Publ.	South Africa, Geological Survey, Special Publication- -Geologiese Opname, Spesiale Publikasie. Pretoria.
S. Afr. J. Sci.	South African Journal of Science (South African Association for the Advancement of Science). Johannesburg.
S. Afr. Mus., Ann.	South African Museum, Annals. Cape Town.
S. Afr. Natl. Comm. Oceanogr. Res., Mar. Geol. Programme, Bull.	South African National Committee for Oceanographic Research, Marine Geology Programme, Bulletin. University of Cape Town, Department of Geology, Cape Town.
S. Afr. Natl. Comm. Oceanogr. Res. Mar. Geol. Programme, Tech. Rep.	South African National Committee for Oceanographic Research, Marine Geology Programme, Technical Report. University of Cape Town, Department of Geology, Cape Town.
S. Aust., Geol. Surv., Rep. Invest.	South Australia, Geological Survey, Report of Investigations. Adelaide.
S. Aust., Dir. Mines Gov. Geol., Annu. Rep.	South Australia, Director of Mines and Government Geologist, Annual Report. Adelaide.
S. C., Div. Geol., Miner. Resour. Ser.	South Carolina, State Development Board, Division of Geology, Mineral Resources Series. Columbia.
S. C. Water Resour. Comm., Rep.	South Carolina Water Resources Commission, Report. Columbia.
S. D. Geol. Surv., Bull.	South Dakota Geological Survey, Bulletin. Vermillion.
S. D. Geol. Surv., Educ. Ser.	South Dakota Geological Survey, Educational Series. Vermillion.
S. D. Geol. Surv., Rep. Invest.	South Dakota Geological Survey, Report of Investigations. Vermillion.
S. D. Geol. Surv., Spec. Rep.	South Dakota Geological Survey, Special Report. Vermillion.
Saarland, Geol. Landesamt, Beih. Geol. Landesaufn. Saarlandes	Saarland, Geologisches Landesamt, Beihefte zur Geologischen Landesaufnahme des Saarlandes. Saarbruecken.
Samml. Geol. Fuehrer	Sammlung Geologischer Fuehrer. Berlin.
San Diego Soc. Nat. Hist., Trans.	San Diego Society of Natural History, Transactions. San Diego, California.
San Joaquin Geol. Soc., Sel. Pap.	San Joaquin Geological Society, Selected Papers. San Joaquin, California.
Saneamiento	Saneamiento; Revista de Obras Sanitarias de la Nacion. Buenos Aires.

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Sask., Dep. Miner. Resour. Miner. Stat. Yearb.	Saskatchewan, Department of Mineral Resources, Mineral Statistical Yearbook. [Regina].
Sask., Dep. Miner. Resour., Rep.	Saskatchewan, Department of Mineral Resources, Report. Regina.
Sask. Res. Counc., Geol. Div., Rep.	Saskatchewan Research Council, Geology Division, Report. Saskatoon.
Sat. Rev. Sci.	Saturday Review of the Sciences. San Francisco.
Sb. Geol. Ved, Rada G	Sbornik Geologickych Ved, Rada G, Geologie (Czechoslovakia, Ustredni Ustav Geologicky). Prague.
Sb. Geol. Ved, Rada HIG	Sbornik Geologickych Ved, Rada HIG, Hydrogeologie Inzenyrska Geologie (Czechoslovakia, Ustredni Ustav Geologicky). Prague.
Sb. Geol. Ved, Rada LG	Sbornik Geologickych Ved, Rada LG, Lozikova Geologie (Czechoslovakia, Ustredni Ustav Glologicky). Prague.
Sb. Geol. Ved., Rada P	Sbornik Geologickych Ved, Rada P, Paleontologie (Czechoslovakia, Ustredni Ustav Geologicky). Prague.
Sc. Int. Fis. "Enrico Fermi", Rend., L Corso	Scuola Internazionale di Fisica "Enrico Fermi", Rendiconti, L Corso. Academic Press, New York.
Schweiz. Mineral. Petrogr. Mitt.	Schweizerische Mineralogische und Petrographische Mitteilungen Bulletin Suisse de Mineralogie et Petrographie -Bollettino Svizzero di Mineralogia e Petrografia. Zuerich.
Schweiz. Palaeontol. Abh. Mem. Suisse Paleontol.	Schweizerische Palaontologische Abhandlungen Memoires Suisses de Paleontologie. Basel.
Sci. Am.	Scientific American. New York.
Sci. Cult. (New Dehli)	Science and Culture. New Dehli.
Sci. Progr. Decouverte	Science Progres Decouverte (*supersedes* Science Progres, La Nature). Paris.
Sci. Pub. Aff.	Science and Public Affairs (Bulletin of the Atomic Scientists). Chicago.
Sci. Sin.	Scientia Sinica. [Peiping].
Sci. Terre	Sciences de la Terre (Nancy, Universite, Ecole Nationale Superieure de Geologie Appliquee et de Prospection Miniere).
Sci. Terre, Mem.	Sciences de la Terre (Nancy, Universite, Ecole Nationale Superieure de Geologie Appliquee et de Prospection Miniere), Memoires.
Science (AAAS)	Science (American Association for the Advancement of Science.) Washington, D.C.
Scot. Geogr. Mag.	Scottish Geographical Magazine (Royal Scottish Geographical Society). Edinburgh.
Scot. J. Geol.	Scottish Journal of Geology. Edinburgh.
Scr. Geol.	Scripta Geologica (Rijksmuseum van Geologie en Mineralogie). Leiden.
Sea Frontiers	Sea Frontiers (Magazine of the International Oceanographic Foundation). Miami, Florida.
Search	Search (*continuation of* Australian Journal of Science). Sydney.
Sediment. Geol.	Sedimentary Geology; International Journal of Applied and Regional Sedimentology. Elsevier Publ. Co., Amsterdam.
Sedimentation	Sedimentation: Annotated Bibliography of Foreign Literature. Isreal Program for Scientific Translation, Jerusalem.
Sedimentology	Sedimentology (International Association of Sedimentologists, Journal). Elsevier Publ. Co., Amsterdam.
Seismol. Soc. Am., Bull.	Seismological Society of America, Bulletin. Berkeley, California.

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Senckenb. Lethaea	Senckenbergiana Lethaea (Senckenbergische Naturforschende Gesellschaft, Wissenschaftliche Mitteilungen). Frankfurt am Main.
Senckenb. Mar.	Senckenbergiana Maritima (Senckenbergische Naturforschende Gesellschaft, Zeitschrift fur Meeresgeologie und Meeresbiologie). Frankfurt am Main.
Senckenb. Naturforsch. Ges., Abh.	Senckenbergische Naturforschende Gesellschaft, Abhandlungen. Frankfurt am Main.
Shale Shaker	Shale Shaker (Oklahoma City Geological Society). Oklahoma City, Oklahoma.
Sib. Nauchno-Issled. Inst. Geol. Geofiz. Miner. Syr'ya, Tr.	Sibirskiy Nauchno-Issledovatel'skiy Institut Geologii, Geofiziki i Mineral'nogo Syr'ya, Trudy. Moscow.
Smithson. Contrib. Earth Sci.	Smithsonian Contributions to the Earth Sciences (Smithsonian Institution). Washington, D.C.
Smithson. Contrib. Paleobiol.	Smithsonian Contributions in Paleobiology (Smithsonian Institution). Washington, D.C.
Smithson. Contrib. Zool.	Smithsonian Contributions to Zoology. Washington, D.C.
Soc. Amins Sci. Lett. Poznan, Bull., Ser. D, Sci. Biol.	Societe des Amins des Sciences et de Lettres de Poznan, Bulletin, Serie D, Sciences Biologiques. Poznan.
Soc. Belg. Geol., Paleontol. Hydrol., Bull.	Societe Belge de Geologie, de Paleontologie et d'Hydrologie, Bulletin. Brussels.
Soc. Bibliogr. Nat. Hist., J.	Society for the Bibliography of Natural History, Journal. London.
Soc. Cienc. Nat. La Salle, Mem.	Sociedad de Ciencias Naturales La Salle, Memoria. Caracas.
Soc. Econ. Paleontol. Mineral., Permian Basin Sect., Publ.	Society of Economic Paleontologists and Mineralogists, Permian Basin Section, Publication. Midland, Texas.
Soc. Espan. Hist. Nat., Bol., Secc. Geol.	Real Sociedad Espanola de Historia Natural, Boletin, Seccion Geologica. Madrid.
Soc. Explor. Geophys., Annu. Int. Mtg.	Society of Exploration Geophysicists, Annual International Meeting, Abstracts.
Soc. Fauna Flora Fenn., Memo.	Societas pro Fauna et Flora Fennica, Memoranda. Helsinki.
Soc. Fr. Mineral. Cristallogr., Bull.	Societe Francaise de Mineralogie et de Cristallographie, Bulletin. Paris.
Soc. Fr. Photogramm., Bull.	Societe Francaise de Photogrammetrie, Bulletin. Paris.
Soc. Frib. Sci. Nat., Bull.	Societe Fribourgeoise des Sciences Naturelles—Naturforschende Gesellschaft Freiburg, Bulletin.
Soc. Geogr. Egypte, Bull.	Societe de Geographie d'Egypte, Bulletin. Cairo.
Soc. Geol. Belg., Ann.	Societe Geolgique de Belgique, Annales. Liege.
Soc. Geol. Fr., Bull.	Societe Geologique de France, Bulletin. Paris.
Soc. Geol. Fr., Mem.	Societe Geologique de France, Memoires. Paris.
Soc. Geol. Ital., Boll.	Societa Geologica Italiana, Bollettino. Rome.
Soc. Geol. Mex., Conv. Nac., Mem.	Sociedad Geologica Mexicana, Convencion Nacional, Memoria.
Soc. Geol. Mineral. Bretagne, Mem.	Societe Geologique et Mineralogique de Bretagne, Memoires. Rennes.
Soc. Geol. Nord, Ann.	Societe Geologique du Nord, Annales. Lille.
Soc. Geol. Port., Bol.	Sociedade Geologica de Portugal, Boletim. Lisbon.
Soc. Hist. Nat. Afr. Nord, Bull.	Societe d'Histoire Naturelle de l'Afrique du Nord, Bulletin (Algiers, Universite, Faculte des Sciences).
Soc. Hist. Nat. Toulouse, Bull.	Societe d'Histoire Naturelle de Toulouse, Bulletin.
Soc. Ital. Mineral. Petrol., Rend.	Societa Italiana di Mineralogia e Petrologia, Rendiconti. Milan.
Soc. Ital. Sci. Nat., Mus. Civ. Stor. Nat. Milano, Atti.	Societa Italiana di Scienze Naturali e Museo Civico di Storia Naturale di Milano, Atti. Milan.

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Soc. Languedocienne Geogr., Bull.	Societe Languedocienne de Geographie, Bulletin. Montpellier.
Soc. Linn. Bord., Bull.	Societe Linneenne de Bordeaux, Bulletin. Bordeaux.
Soc. Linn. Lyon, Bull.	Societe Linneenne de Lyon, Bulletin Mensuel.
Soc. Linn. Normandie, Bull.	Societe Linneenne de Normandie, Bulletin. Caen.
Soc. Min. Eng. AIME, Trans.	Society of Mining Engineers of AIME (American Institute of Mining, Metallurgical, and Petroleum Engineers), Transactions. New York.
Soc. Palcontol. Ital., Boll.	Societa Paleontologica Italiana, Bollettino. Modena.
Soc. Pet. Eng. J.	Society of Petroleum Engineers Journal. Society of Petroleum Engineers of AIME. Dallas, Texas.
Soc. Pet. Eng., Trans.	Society of Petroleum Engineers, Transactions. Society of Petroleum Engineers of AIME, New York.
Soc. Phys. Hist. Nat. Geneve, C. R.	Societe de Physique et d'Histoire Naturelle de Geneve, Compte Rendu des Seances. Geneva.
Soc. Prof. Well Log Anal. Annu. Logging Symp., Trans.	Society of Professional Well Log Analysts Annual Logging Symposium, Transactions. Houston, Texas.
Soc. Savantes Haute-Normandie, Rev., Sci.	Societes Savantes de Haute-Normandie, Revue, Sciences. Rouen.
Soc. Sci. Fenn., Commentat. Biol.	Societas Scientiarum Fennica, Commentationes Biologicae. Helsinki.
Soc. Sci. Fenn., Commentat. Phys.-Math.	Societas Scientiarum Fennica, Commentationes Physico-Mathematicae. Helsinki.
Soc. Sci. Nat. Ouest Fr., Bull.	Societe des Sciences Naturelles de l'Ouest de la France, Bulletin. Nantes.
Soc. Vaudoise Sci. Nat., Bull.	Societe Vaudoise des Sciences Naturelles, Bulletin. Lausanne.
Soil Conserv. Soc. Am., Annu. Mtg., Proc.	Soil Conservation Society of America, Annual Meeting, Proceedings. Ankeny, Iowa.
Soil Crop Sci. Soc. Fla., Proc.	Soil and Crop Science Society of Florida, Proceedings. Gainsville, Florida.
Soil Sci.	Soil Science. Williams & Wilkins Co., Baltimore, Maryland.
Soil Sci. Soc. Am., Proc.	Soil Science Society of America, Proceedings. Madison, Wisconsin.
Soils Found. (Jap. Soc. Soil Mech. Found. Eng.)	Soils and Foundations (The Japanese Society of Soil Mechanics and Foundation Engineering). Tokyo, Japan.
Solid State Commun.	Solid State Communications; An International Journal (Journal of Physics and Chemistry of Solids, Supplement). Pergamon Press, New York.
South Aust., Geol. Surv., Q. Geol. Notes	South Australia, Geological Survey, Quarterly Geological Notes. Adelaide.
South Aust., Miner. Resour. Rev.	South Australia, Mineral Resources Review (*continuation of* South Australia, Department of Mines, Mining Review). Adelaide.
South. Calif. Acad. Sci., Bull.	Southern California Academy of Sciences, Bulletin. Los Angeles.
South. Tex. Geol. Soc., Bull.	South Texas Geological Society, Bulletin. San Antonio.
Southeast. Geol.	Southeastern Geology. Duke University, Department of Geology, Durham, North Carolina.
Southeast. Geol. Soc., Field Conf. Guideb.	Southeastern Geological Society, Field Conference Guidebook. Tallahassee, Florida.
Southwestern Nat.	Southwestern Naturalist. Austin, Texas.
Sov. Antarct. Exped., Inform. Bull.	Soviet Antarctic Expedition, Information Bulletin (*English translation of* Sovetskaya Antarkticheskaya Ekspeditsiya, Informatsionnyy Byulleten'). American Geophysical Union, Washington, D.C.
Sov. Antarkt. Eksped., Inform. Byull.	Sovetskaya Antarkticheskaya Ekspeditsiya (Glavnoye Upravleniye Gidrometeorologicheskoy Sluzhby), Informatsionnyy Byulleten', Leningrad.

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Sov. Geogr.	Soviet Geography; Review & Translation. American Geographical Society, New York.
Sov. Geol.	Sovetskaya Geologiya. Moscow.
Sov. Hydrol., Sel. Pap.	Soviet Hydrology, Selected Papers. American Geophysical Union, Washington, D.C.
Sov. Phys., Dokl.	Soviet Physics, Doklady; a Translation of the Physics Sections of the Proceedings of the Academy of Sciences of the USSR. American Institute of Physics, New York.
Sov. Soil Sci.	Soviet Soil Science (*English translation of* Pochvovedeniye). Washington, D.C.
Sovmestnaya Sov.-Mong. Nauchno-Issled. Geol. Eksped., Tr.	Sovmestnaya Sovetsko-Mongol'skaya Nauchno-Issledovatel'skaya Geologicheskaya Ekspeditsija, Trudy. Moscow.
Spain, Inst. Geol. Min., Bol. Geol. Min.	Spain, Instituto Geologico y Minero, Boletin Geologico y Minero. Madrid.
Spain, Inst. Geol. Min., Mem.	Spain, Instituto Geologico y Minero, Memorias. Madrid.
Spec. Pap. Palaeontol.	Special Papers in Palaeontology. Paleontological Association, London.
Spectrochim. Acta, Part A	Spectrochimica Acta, Part A, Molecular Spectroscopy. Pergamon Press, Oxford.
Spelunca	Spelunca; Federation Francaise de Speleologie, Bulletin. Paris.
Sredneaziat. Nauchno-Issled. Gidrometrol. Inst., Tr.	Sredneaziatskiy Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut, Trudy. Leningrad.
Stain Technol.	Stain Technology; A Journal for Microtechnic and Histochemistry (Biological Stain Commission). Baltimore, Maryland.
Stalactite	Stalactite (Organe de la Societe Suisse de Speologie). Neuchatel.
State Geol. J.	State Geologists Journal (Association of American State Geologists). Charlottesville, Virginia.
Steirische Beitr. Hydrogeol.	Steirische Beitraege zur Hydrogeologie (Graz, Technische Hochschule, Institut fuer Mineralogie und Technische Geologie Vereinigung fuer Hydrogeologische Forschungen in Graz).
Sterkiana	Sterkiana (Ohio State University). Columbus.
Stockh. Contrib. Geol.	Stockholm Contributions in Geology (Acta Universitatis Stockholmiensis).
Stud. Biol. Hung.	Studia Biologica Hungarica. Budapest.
Stud. Cercet. Geol., Geofiz., Geogr., Ser. Geofiz.	Studii si Cercetari de Geologie, Geofizica, Geografie, Seria Geofizica (Academia Republicii Socialiste Romania). Bucharest.
Stud. Cercet. Geol., Geofiz., Geogr., Ser. Geogr.	Studii si Cercetari de Geologie, Geofizica, Geografie, Seria Geografie (Academia Republicii Socialiste Romania). Bucharest.
Stud. Cercet. Geol., Geofiz., Geogr., Ser. Geol.	Studii si Cercetari de Geologie, Geofizica, Geografie, Seria Geologie (Academia Republicii Socialiste Romania). Bucharest.
Stud. Geol. Pol.	Studia Geologica Polonica (Polska Akademia Nauk, ZakLad Nauk Geologicznych). Warsaw.
Stud. Geotch., Fundatii Constr. Hidrotch.	Studii de Geotehnica, Fundatii si Constructii Hidrotehnice. Bucharest.
Stud. Speleol.	Studies in Speleology (William Pengelly Cave Studies Trust). London.
Studi Trentini Sci. Nat., Sez. B	Studi Trentini di Scienze Naturali, Sezione B, Biologica. Trent.
Studienh. Phys. Erdkoerpers	Studienhefte zur Physik des Erdkoerpers. Berlin.
Stuttg., Univ., Geol.-Paleontol. Inst., Arb.	Stuttgart, Universitaet, Geologisch-Palaeontologisches Institut, Arbeiten.

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Sudan, Geol. Surv. Dep., Bull.	Sudan, Geological Survey Department, Bulletin. Khartoum.
Sudan, Geol. Surv. Dep., Mem.	Sudan, Geological Survey Department, Memoir. Khartoum.
Sups. Univ., Geol. Inst., Bull.	Uppsala, University, Geological Institutions, Bulletin.
Surtsey Res. Prog. Rep.	Surtsey Research Progress Report (Surtsey Research Society). Reykjavik.
Sver. Geol. Unders., Aarberaett.	Sveriges Geologiska Undersoekning, Aarsberaettelse. Stockholm.
Sver. Geol. Unders., Aarsb.	Sveriges Geologiska Undersoekning, Aarsbok. Stockholm.
Sver. Geol. Unders., Ser. Ae, Geol. Kartbl. 1:50,000	Sveriges Geologiska Undersoekning, Serie Ae, Geologiska Kartblad i Skala 1:50,000 Stockholm.
Symp. Abnorm. Subsurf. Pressure. Proc.	Symposium on Abnormal Subsurface Pressure, Proceedings.
Symp. Rock Mech., Proc.	Symposium on Rock Mechanics, Proceedings (Society of Mining Engineers American Institute of Mining, Metallurgical, and Petroleum Engineers). New York.
Syst. Zool.	Systematic Zoology (Society of Systematic Zoology). Lawrence, Kansas.
Taiwan, Geol. Surv., Bull.	Taiwan, Geological Survey, Bulletin. Taipei.
Talanta	Talanta: an International Journal of Analytical Chemistry. Pergamon Press, New York -Oxford.
Tartu Riikliku Ulikooli, Toim., Toid Geol. Alalt	Tartu Riikliku Ulikooli, Toimetised, Toid Geoloogia Alalt (Tartuskiy Gosudarstvenniy Universitet, Uchenyye Zapiski, Trudy po Geologii). Tartu.
Taxon	Taxon (International Association for Plant Taxonomy). Utrecht.
Tebiwa	Tebiwa (Idaho State College Museum, Journal). Pocatello.
Tech. Eau	La Technique de l'Eau et de l'Assainissement. Brussels.
Tech. Poszukiwan	Technika Poszukiwan (Centralny Urzad Geologii). Warsaw.
Tech. Sci. Munic.	Techniques et Sciences Municipales. Paris.
Tectonophysics	Tectonophysics; International Journal of Geotectonics and the Geology and Physics of the Interior of the Earth. Elsevier Publ. Co., Amsterdam.
Tektonika Stratigr.	Tektonika i Stratigrafiya (Akademiya Nauk Ukrains'koi RSR). Kiev.
Tenn., Dep. Conserv., Div. Water Resour., Misc. Publ.	Tennessee, Department of Conservation, Division of Water Resources, Miscellaneous Publication. Nashville.
Tenn., Div. Geol., Bull.	Tennessee, Division of Geology, Bulletin. Nashville.
Tenn. Div. Geol., Environ. Geol. Ser.	Tennessee Division of Geology, Environmental Geology Series. Nashville.
Tenn. Div. Geol., Geol. Map	Tennessee Division of Geology, Geologic Map. Nashville.
Tenn. Div. Geol., Miner. Resour. Sum.	Tennessee Division of Geology, Mineral Resources Summary. Nashville.
Tenn., Div. Geol., Rep. Invest.	Tennessee, State, Division of Geology, Report of Investigations. Nashville.
Terra	Terra (Suomen Maantieteellinen Seura, Aikakauskirja) (Geografiska Sallskapet i Finland, Tidskrift). Helsinki.
Terra (Soc. Stiinte Geogr. Rom.)	Terra (Societatea de Stiinte Geografice din R. S. Romania, Revista de Informare Geografica). Bucharest.
Tex. A & M Univ., Oceanogr. Stud.	Texas A & M University, Oceanographic Studies. College Station.
Tex. J. Sci.	Texas Journal of Science (Texas Academy of Science). San Angelo, Texas.
Tex. Mem. Mus., Bull.	Texas Memorial Museum, Bulletin. University of Texas, Austin

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Tex., Univ., Bur. Econ. Geol., Geol. Quad. Map	Texas, University, Bureau of Economic Geology, Geologic Quadrangle Map. Austin.
Tex., Univ., Bur. Econ. Geol., Guideb.	Texas, University, Bureau of Economic Geology, Guidebook. Austin.
Tex., Univ., Bur. Econ. Geol., Miner. Resour. Circ.	Texas, University, Bureau of Economic Geology, Mineral Resource Circular. Austin.
Tex., Univ., Bur. Econ. Geol., Rep. Invest.	Texas, University, Bureau of Economic Geology, Report of Investigations. Austin.
Tex., Water Dev. Bd., Bull.	Texas Water Development Board, Bulletin. San Antonio, Texas.
Tex. Water Dev. Bd., Rep.	Texas Water Development Board, Report. Austin.
Thermochim. Acta	Thermochimica Acta. Elsevier Publ. Co., Amsterdam.
Tohoku Univ., Inst. Geol. Paleontol., Contrib.	Tohoku University, Institute of Geology and Paleontology, Contributions. Sendai.
Tohoku Univ. Sci. Rep., Ser. 4	Tohoku University, Science Reports, Series 4, Biology. Sendai.
Tohoku Univ., Sci. Rep., Ser. 7	Tohoku University, Science Reports, Series 7, Geography. Sendai.
Tokyo Inst. Tech., Bull.	Tokyo Institute of Technology, Bulletin. Tokyo.
Tokyo, Univ., Coll. Gen. Educ., Sci. Pap.	Tokyo, University, College of General Education, Scientific Papers.
Tokyo, Univ., Ocean Res. Inst., Collect. Repr.	Tokyo, University, Ocean Research Institute, Collected Reprints.
Torrey Bot. Club, Bull.	Torrey Botanical Club, Bulletin (Rutgers University, Botanical Department). Lancaster, Pennsylvania.
Trab. Geol. (Oviedo, Univ., Fac. Cienc.)	Trabajos de Geologia (Oviedo, Universidad, Facultad de Ciencias).
Tschermaks Mineral. Petrogr. Mitt.	Tschermaks Mineralogische und Petrographische Mitteilungen. Vienna.
Tucuman, Univ. Nac., Fund. Inst. Miguel Lillo", Misc.	Tucuman, Universidad Nacional, Fundacion e Instituto Miguel Lillo", Miscelanea.
Tuebinger Geogr. Stud.	Tuebinger Geographische Studien. Tuebingen.
Tulane Stud. Geol.	Tulane Studies in Geology (Tulane University). New Orleans, Louisiana.
Tulsa Geol. Soc. Dig.	Tulsa Geological Society Digest. Tulsa, Oklahoma.
Turk. Jeol. Kurumu, Bul.	Turkiye Jeoloji Kurumu, Bulteni. Ankara.
Turku, Univ., Inst. Geogr., Publ.	Turku, Universitet, Institutum Geographicum, Publicationes.
U. N., Econ. Comm. Asia Far East, Miner. Resour. Dev. Ser.	United Nations, Economic Commission for Asia and the Far East, Natural Resources Division, Mineral Resources Development Series. New York.
U. S. A. E. C., Div. Raw Mater., [Publ.]	U. S. Atomic Energy Commission, Division of Raw Materials, [Publication]. Washington, D.C.
U. S. Army, Coastal Eng. Res. Cent., Misc. Pap.	U. S. Army, Coastal Engineering Research Center, Miscellaneous Paper. Washington, D.C.
U. S. Army, Coastal Eng. Res. Cent., Tech. Memo.	U. S. Army, Coastal Engineering Research Center, Technical Memorandum. [Washington, D.C.]
U. S. Army, Cold Reg. Res. Eng. Lab., Spec. Rep.	U. S. Army, Cold Regions Research and Engineering Laboratory, Special Report. Hanover, New Hampshire.
U. S. Army Eng. Waterw. Exp. Stn., Tech. Rep.	U. S. Army Engineers Waterways Experiment Station, Technical Report. Vicksburg, Mississippi.
U. S. Army, Natick Lab., Earth Sci. Lab., Tech. Rep.	U. S. Army, Natick Laboratories, Earth Science Laboratory, Technical Report. Natick, Massachusetts.
U. S. Bur. Mines, Inform. Circ.	U. S. Bureau of Mines, Information Circular. Washington, D.C.
U. S., Bur. Mines, Miner. Yearb.	U. S., Bureau of Mines, Mineral Yearbook. Washington, D. C.

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U. S. Dep. Commer., Fishery Bull.	U. S. Department of Commerce, Fishery Bulletin. Washington, D.C.
U. S., Dep. Commer., Natl. Bur. Stand., Monogr.	U. S., Department of Commerce, National Bureau of Standards, Monograph. Washington, D. C.
U. S. Dep. Commer., Natl. Bur. Stand., Spec. Publ.	U. S. Department of Commerce, National Bureau of Standards, Special Publication. Washington, D. C.
U. S. Dep. Commer., Natl. Oceanic Atmos. Admin., Environ. Data Ser., Key Geophys. Rec., Doc.	U. S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, Key to Geophysical Records, Documentation. Boulder, Colorado.
U. S. Dep. Commer., Natl. Oceanic Atmos. Admin., Tech. Rep.	U. S. Department of Commerce, National Oceanic and Atmospheric Administration, Technical Report. Boulder, Colorado.
U. S. Geol. Surv., Antarct. Map.	U. S. Geological Survey, Antarctic Map. Washington, D. C.
U. S. Geol. Surv., Bull.	U. S. Geological Survey, Bulletin. Washington, D.C.
U. S. Geol. Surv., Circ.	U. S. Geological Survey, Circular. Washington, D.C.
U. S. Geol. Surv., Interagency Rep., Astrogeol.	U. S. Geological Survey, Interagency Report, Astrogeology. Washington, D.C.
U. S. Geol. Surv., Misc. Geol. Invest. Map	U. S. Geological Survey, Miscellaneous Geologic Investigations Map. Washington, D.C.
U. S. Geol. Surv., Prof. Pap.	U. S. Geological Survey, Professional Paper. Washington, D.C.
U. S. Geol. Surv., Water Resour.-Invest.	U. S. Geological Survey, Water Resources-Investigations. [Washington, D. C.]
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U. S., Natl. Aeronaut. Space Admin., Spec. Publ.	U. S., National Aeronautics and Space Administration, Special Publication. Washington, D.C.
U. S. Natl. Aeronaut. Space Admin., Tech. Note	U. S. National Aeronautics and Space Administration, Technical Note. Washington, D. C.
U. S., Oak Ridge Natl. Lab., Environ. Inf. Syst. Off., [Publ.]	U. S., Oak Ridge National Laboratory, Environmental Information Systems Office, [Publication]. Oak Ridge, Tennessee.
Ukr. Nauchno-Issled. Geologorazved. Inst., Tr.	Ukrainskiy Nauchno-Issledovatel'skii Geologorazvedochnyy Institut, Trudy. Moscow.
Ulster J. Archaeol.	Ulster Journal of Archaeology. Belfast.
Umschau	Umschau in Wissenschaft und Technik. Frankfurt am Main.
Underwater J. (Surrey)	Underwater Journal and Information Bulletin. IPC Science and Technology Press, Surrey.
Unesco, Earth Sci. Ser.	Unesco, Earth Science Series. Paris.
Unesco, Tech. Pap. Hydrol.	United Nations Educational, Scientific and Cultural Organization, Technical Papers in Hydrology. Paris.
Union Burma J. Sci. Tech.	Union of Burma Journal of Science and Technology. Rangoon.
Union Geofis. Mex., Reun. Anu., Programa Resumenes	Union Geofisica Mexicana, Reunion Anual, Programa y Resumenes. Mexico City.
Univ. Maria Curie-SkLodowska, Ann., Sect. B	Universitas Maria Curie-SkLodowska, Annales, Sectio B, Geographia, Geologia, Mineralogia et Petrographia. Lublin.
Univ. Nac. Litoral, Inst. Fisiogr. Geol., Publ.	Universidad Nacional del Litoral, Instituto Fisiografia y Geologia, Publicaciones. Rosario.
Univ. Witwatersrand, Econ. Geol. Res. Unit, Inform. Circ.	University of the Witwatersrand, Economic Geology Research Unit, Information Circular. Johannesburg.

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Universum	Universum; Natur und Technik (Gesellschaft fur Natur und Technik). Vienna.
Uppsala Univ., Naturgeogr. Inst., Rapp.	Uppsala Universitet, Naturgeografiska Institutionen, Rapport. Uppsala.
Ural. Petrogr. Soveshch., Tr.	Ural'skoye Petrograficheskoye Soveshchaniye, Trudy (Akademiya Nauk SSSR, Ural'skiy Filial, Institut Geologii i Geokhimii). Sverdlovsk.
Ussher Soc., Proc.	Ussher Society, Proceedings. London.
Utah Dep. Nat. Resour., Div. Water Rights, Utah Basic-Data Release	Utah Department of Natural Resources, Division of Water Rights, Utah Basic-Data Release. Salt Lake City.
Utah Dep. Nat. Resour., Tech. Publ.	Utah Department of Natural Resources, Technical Publication. Salt Lake City.
Utah Div. Water Resour. Utah Water Res. Lab., [Prog. Rep.]	Utah Division of Water Resources Utah Water Research Laboratory, [Progress Report]. Logan.
Utah Geol. Mineral. Surv., Bull.	Utah Geological and Mineralogical Survey, Bulletin. Salt Lake City.
Utah Geol. Mineral. Surv., Monogr. Ser.	Utah Geological and Mineralogical Survey, Monograph Series. Salt Lake City.
Utah Geol. Mineral. Surv., Spec. Stud.	Utah Geological and Mineralogical Survey, Special Studies. Salt Lake City.
Utr. Micropaleontol. Bull.	Utrecht Micropaleontological Bulletins. Schotanus & Jens, Utrecht.
Uzbek. Geol. Zh.	Uzbekskiy Geologicheskiy Zhurnal (Akademiya Nauk Uzbekskoy SSR). Tashkent.
Uzbek. Khim. Zh.	Uzbekskiy Khimicheskiy Zhurnal (Akademiya Nauk Uzbekskoy SSR). Tashkent.
Va. Div. Miner. Resour., Bull.	Virginia Division of Mineral Resources, Bulletin. Charlottesville.
Va., Div. Miner. Resour., Miner. Resour. Rep.	Virginia, Division of Mineral Resources, Mineral Resources Report. Charlottesville.
Va., Div. Miner. Resour., Rep. Invest.	Virginia, Division of Mineral Resources, Report of Investigations. Charlottesville.
Va. J. Sci.	Virginia Journal of Science (Virginia Academy of Science). Richmond.
Va. Polytech. Inst. State Univ., Water Resour. Res. Cent., Bull.	Virginia Polytechnic Institute and State University, Water Resources Research Center, Bulletin. Blacksburg.
Venez., Dir. Geol., Bol. Geol., Publ. Esp.	Venezuela, Direccion de Geologia, Boletin de Geologia, Publicacion Especial. Caracas.
Ver. Schweiz. Pet.-Geol. Ing., Bull.	Vereinigung Schweizerischer Petroleum-Geologen und -Ingenieure, Bulletin. Zurich.
Ver. Verbr. Naturwiss. Kenntnisse Wien, Schr.	Verein zur Verbreitung Naturwissenschaftlicher Kenntnisse in Wien, Schriften. Vienna.
Victoria Univ., Antarct. Data Ser.	Victoria University of Wellington, Antarctic Data Series. Wellington, New Zealand.
Victorian Nat.	Victorian Naturalist (Field Naturalists Club of Victoria). [Springvale].
Vie Milieu	Vie et Milieu, Bulletin du Laboratoire Arago. Banyuls-sur-Mer.
Vilnius, Geol. Inst., Darb.	Vilnius, Geologijos Institutas, Darbai. (Vil'nyus, Institut Geologii, Trudy).
Volcanol. Soc. Jap., Bull.	Volcanological Society of Japan, Bulletin. Tokyo.
Vop. Mikropaleontol.	Voprosy Mikropaleontologii (Akademiya Nauk SSSR, Otdeleniye Nauk o Zemle, Geologicheskiy Institut). Moscow.
Vopr. Chetvert. Geol.	Voprosy Chetvertichnoy Geologii (Vsesoyuznyy Nauchno-Issledovatel'skiy Institut Morskoy Geologii i Geofiziki). Riga.

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Vopr. Magmat. Metamorf.	Voprosy Magmatizma i Metamorfizma (Leningrad Gosudarstvennyy Universitet, Geologicheskiy Fakul'tet). Leningrad.
Vses. Geogr. Ovo., Izv.	Vsesoyuznoye Geograficheskoye Obshchestvo, Izvestiya. Leningrad.
Vses. Mineral. Obshchest., Zap.	Vsesoyuznoye Mineralogicheskoye Obshchestvo, Zapiski. Leningrad.
Vses. Mineral. O-vo, Uzb. Otd., Zap.	Vsesoyuznoye Mineralogicheskoye Obshchestvo, Uzbekistanskoy Otdeleniye, Zapiski. Tashkent.
Vses. Nauchno-Issled. Geol. Inst., Tr.	Vsesoyuznyy Nauchno-Issledovatel'skiy Geologicheskiy Institut, Trudy. Moscow.
Vses. Nauchno-Issled. Geologorazved. Neft. Inst., Tr.	Vsesoyuznyy Nauchno-Issledovatel'skiy Geologorazvedochnyy Neftyanoy Institut, Trudy. Moscow.
Vses. Nauchno-Issled. Inst. Prirod. Gazov, Tr.	Vsesoyuznyy Nauchno-Issledovatel'skyy Institut Prirodnykh Gazov, Trudy. Moscow.
Vses. Neft. Nauchno-Issled. Geologorazved. Inst., Tr.	Vsesoyuznyy Neftyanoy Nauchno-Issledovatel'skiy Geologorazvedochnyy Institut, Trudy. Leningrad.
Vys. Sk. Chem. Tech. (Prague), Sb.	Vysoka Skola Chemicko-Technologicke v Praze, Sbornik. Prague.
Vysokogorn. Geofiz. Inst., Tr.	Vysokogornyy Geofizicheskiy Institut, Trudy. Leningrad.
Vyssh. Uchebn. Zaved., Izv., Geol. Razved.	Vysshoye Uchebnoye Zavedeniye (Ministerstvo Vysshego i Srednego Spetsial'nogo Obrazovaniya SSSR), Izvestiya, Geologiya i Razvedka. Moscow.
Vyssh. Uchebn. Zaved., Izv., Neft' Gaz	Vysshoye Uchebnoye Zavedeniye (Ministerstvo Vysshego i Srednego Spetsial'nogo Obrazovaniya SSSR), Izvestiya, Neft' i Gaz. Baku.
W. Malays., Geol. Surv., Dist. Mem.	West Malaysia, Geological Survey, District Memoir. Ipoh.
W. Va. Acad. Sci., Proc.	West Virginia Academy of Science, Proceedings. Morgantown.
W. Va. Geol. Econ. Surv., Circ.	West Virginia Geological and Economic Survey, Circular. Morgantown.
W. Va. Geol. Econ. Surv., Environ. Geol. Bull.	West Virginia Geological and Economic Survey, Environmental Geology Bulletin. Morgantown.
W. Va. Geol. Econ. Surv., Miner. Resour. Ser.	West Virginia Geological and Economic Survey, Mineral Resources Series. Morgantown.
W. Va. Geol. Surv., Newsl.	West Virginia Geological Survey, Newsletter. Morgantown.
W. Va. Speleol. Surv., Bull.	West Virginia Speleological Survey, Bulletin. [Morgantown].
Wales, Univ., Coll., Aberystwyth, Dep. Geol., Publ.	Wales, University College, Aberystwyth, Department of Geology, Publications.
Wash. Acad. Sci., J.	Washington Academy of Science, Journal. Washington, D.C.
Wash., Div. Mines Geol., Bull.	Washington, Division of Mines and Geology, Bulletin. Olympia.
Wash., Div. Mines Geol., Inf. Circ.	Washington, Division of Mines and Geology, Information Circular. Olympia.
Wash. Geol. Newsl.	Washington Geologic Newsletter (Washington, Division of Mines and Geology). Olympia.
Wasser Boden	Wasser und Boden. Hamburg.
Wasserwirt.-Wassertech.	Wasserwirtschaft-Wassertechnik: Wissenschaftliche Zeitung fuer Technik und Oekonomik der Wasserwirtschaft. Berlin.
Water Air Soil Pollut.	Water, Air, and Soil Pollution: An International Journal of Environmental Pollution. Dordrecht.
Water Resour. Bull.	Water Resources Bulletin (American Water Resources Association). Urbana, Illinois.
Water Resour. Res.	Water Resources Research (American Geophysical Union). Washington, D.C.

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Welsh Geol. Q.	Welsh Geological Quarterly (Geologists' Association, South Wales Group). Cardiff.
West. Aust., Geol. Surv., Miner. Resour. Bull.	Western Australia, Geological Survey, Mineral Resources Bulletin. Perth.
West. Mich. Univ., Off. Nav. Res., Geogr. Branch, Tech. Rep.	Western Michigan University, Office of Naval Research, Geography Branch, Technical Report. Kalamazoo.
West Tex. Geol. Soc., Publ.	West Texas Geological Society, Publication. Midland, Texas.
Western Miner	Western Miner. Vancouver, Canada.
Wis. Acad. Sci., Arts, Lett., Trans.	Wisconsin Academy of Sciences, Arts, and Letters, Transaction. Madison.
Wis., Geol. Nat. Hist. Surv., Inf. Circ.	Wisconsin, Geological and Natural History Survey, Information Circular. University of Wisconsin, Madison.
Woods Hole Oceanogr. Inst., Collect. Repr.	Woods Hole Oceanographic Institution, Collected Reprints, Woods Hole, Massachusetts.
World Min. (U.S. Ed.)	World Mining (United States Edition). San Francisco, California.
World Oil	World Oil. Houston, Texas.
Wuerzburg. Geogr. Arb.	Wuerzburger Geographische Arbeiten (Geographische Gesellschaft Wuerzburg, Mitteilungen).
Wyo., Geol. Surv., Cty. Resour. Ser.	Wyoming, Geological Survey, County Resources Series. Laramie.
Wyo. Water Plann. Program, Rep.	Wyoming, Water Planning Program, Report. Cheyenne.
X-ray Spectrom.	X-ray Spectrometry. London.
Ymer	Ymer (Svenska Saellskapet foer Antropologi och Geografi). Stockholm.
Yokohama Natl. Univ., Sci. Rep., Sect. 2	Yokohama National University, Science Reports, Section 2, Biological and Geological Sciences.
Yorkshire Geol. Soc., Proc.	Yorkshire Geological Society, Proceedings. Leeds.
Yugosl., Zavod Geol. Geofiz. Istrazivanja, Vesn., Geol.	Yugoslavia, Zavod za Geoloska i Geofizicka Istrazivanja—Institut de Recherches Geologiques et Geophysiques, Vesnik, Geologija; Serija A. Belgrade.
Z. Angew. Geol.	Zeitschrift fuer Angewandte Geologie. Berlin.
Z. Anorg. Allg. Chem.	Zeitschrift fuer Anorganische und Allgemeine Chemie. Leipzig.
Z. Erdkundeunterr.	Zeitschrift fuer den Erdkundeunterricht. Berlin.
Z. Geomorphol.	Zeitschrift fuer Geomorphologie—Annals of Geomorphology—Annales de Geomorphologie. Berlin.
Z. Geomorphol., Supplementband	Zeitschrift fuer Geomorphologie, Supplementband. Berlin-Stuttgart.
Z. Geophys.	Zeitschrift fuer Geophysik (Deutsche Geophysikalische Gesellschaft). Wuerzburg.
Z. Kristallogr.	Zeitschrift fuer Kristallographie, Kristallgeometrie, Kristallphysik, Kristallchemie. Frankfurt am Main.
Z. Naturforsch.	Zeitschrift fuer Naturforschung. Tuebingen.
Zambia, Geol. Surv. Dep., Occas. Pap.	Zambia, Geological Survey Department, Occasional Paper. Lusaka.
Zambia, Geol. Surv., Econ. Rep.	Zambia, Geological Survey, Economic Report. Lusaka.
Zambia, Geol. Surv., Rep.	Zambia, Geological Survey, Report. Lusaka.
Zapadn.-Sib. Nauchno-Issled. Geologorazved. Neft. Inst., Tr.	Zapadno-Sibirskiy Nauchno-Issledovatel'skiy Geologorazvedochnyy Neftyanoy Institut, Trudy. Tyumen.
Zb. Geol. Vied, Rada ZK	Zbornik Geologickych Vied, Rada ZK, Zapadne Karpaty (Czechoslovakia, Ustredni Ustav Geologicky). Bratislava.

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Zisin (Seismol. Soc. Jap., J)	Zisin (Seismological Society of Japan, Journal). Tokyo.
Zool. Anz.	Zoologischer Anzeiger. Leipzig.
Zool. Rec.	The Zoological Record (Zoological Society of London).
Zool. Zh.	Zoologicheskiy Zhurnal (Akademiya Nauk SSSR). Moscow.
Zuerich, Univ., Geol. Inst Eidgenoss. Tech. Hochsch., Geol. Inst., Mitt.	Zuerich, Universitaet, Geologisches Institut Eidgenoessische Technische Hochschule, Geologisches Insitut, Mitteilungen.

Notes