Index to the Geologic Names of North America

By DRUID WILSON, GRACE C. KEROHER, and BLANCHE E. HANSEN

GEOLOGIC NAMES OF NORTH AMERICA

GEOLOGICAL SURVEY BULLETIN 1056-B

Geologic names arranged by age and by area containing type locality. Includes names in Greenland, the West Indies, the Pacific Island possessions of the United States, and the Trust Territory of the Pacific Islands

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<td>Lower (Early)</td>
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<td></td>
<td>Precambrian</td>
<td>Informal subdivisions such as upper, middle, and lower, or upper and lower, or younger and older may be used locally.</td>
<td>3,000</td>
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</table>

Terms designating time are in parentheses. Informal time terms early, middle, and late may be used for eras, periods, and epochs where there is no formal subdivision into Early, Middle, and Late. Informal rock terms lower, middle, and upper may be used where there is no formal subdivision of a system or of a series.

1 Age values given are the Holmes "B" time scale points (Holmes, 1947, p. 145). Dates are rounded to the nearest 5 million years. The errors are unknown, but more recent age determinations by various physical methods are in partial agreement with these values. For a recent compilation of radiogenic dates see selection of Adolph Knopf in Longwell's "Geologic column and scale of time" (1958, AGI 5).

2 Provincial series accepted for use in U.S. Geological Survey reports are listed under both the time and the rock units.
INTRODUCTION

Beginning in 1902, the U.S. Geological Survey has published five compilations treating the names of geologic formations and stratigraphic classification and nomenclature:


"Names and Definitions of the Geologic Units of California," by M. Grace Wilmarth (Bull. 826, 1931).


The demand for compilations of geologic names is well attested by the circumstance surrounding the completion of the first Survey compilation by F. B. Weeks. In 1899, after it became apparent that the task was too great for one compiler, Survey geologists were asked to help, and were apportioned parts of the geologic literature to review. In this way the compilation was completed and published in 1902. The following geologists participated: M. R. Campbell, N. H. Darton, J. S. Diller, G. H. Girty, C. W. Hayes, F. H. Knowlton, F. L. Ransome, G. O. Smith, A. C. Spencer, T. W. Stanton, J. A. Taff, T. W. Vaughan, and David White.

Wilmarth's compilation of terms used in geologic-time classification was published in 1925 and is still invaluable for quotations of the original definitions and descriptions of the standard and other strati-
graphic and time divisions from widely scattered and sometimes unavailable sources. The California names and their annotations published in 1931 were repeated without change in Wilmarth's lexicon of the United States names in 1938. The reprinting of Wilmarth's lexicon in 1951 and 1957 confirms its place in the field of geologic publications. Brevity of format in "Geologic Names of North America Introduced in 1936-1955" made it possible to bring out quickly a compilation intended to be superseded by the first supplement to Wilmarth's lexicon, now in preparation.

In the present report the geologic names of North America, including Greenland, the West Indies, the Pacific Island possessions of the United States, and the Trust Territory of the Pacific Islands, that were published before 1956 are arranged to form a nonalphabetic index to Wilmarth's lexicon and to the "Geologic Names of North America Introduced in 1936-1955." This grouping of the names on the basis of the age and politico-geographic divisions containing the type locality is an easily used key not available elsewhere. The age of each formation (that is, rock unit) named from an area is shown, but not its complete geographic extent. The geologic-time and time-stratigraphic units are grouped together under the major time divisions.

Some names entered in Wilmarth's lexicon have been omitted. They include (a) all paleontologic and descriptive terms, (b) all names of economic units, such as miner's terms, trade names, and subsurface names identical with the names of formal rock units, (c) the names of moraines and other units of which physiography is an essential part of the definition, and (d) the names of orogenies. The American Commission on Stratigraphic Nomenclature (1955, p. 2008) has recommended that the names of moraines and other physiographic units be considered informal and not subject to the rules that apply to stratigraphic names.

The names of the rock units are listed once only—in the geographic area that contains or is assumed to contain the type area or locality. Thus, the Grenville series, a geologic name commonly used in the State of New York, is listed under the Canadian province of Ontario, where its type locality occurs; and the Colorado group or shale, used widely in Canada, is under the State of Colorado. Not all geologic formations end at political boundaries.

In the period of more than 20 years since the compilation of Wilmarth's lexicon, many names have been revised and many names not then accepted for use by the U.S. Geological Survey have been adopted. Adoption of names for use by the U.S. Geological Survey is based on the published and unpublished reports of Federal Survey geologists on areas of the United States and its possessions or trust
The U.S. Geological Survey has had occasion to consider for acceptance or rejection considerably less than one-half of the names of geologic units occurring in the United States. The names of units adopted through 1958 appear in boldface type under their currently designated ages. Changes in the designated rank and age of the named units accepted for use in U.S. Geological Survey reports are shown here as authorized by the Chief Geologist, upon the recommendation of the Geologic Names Committee of the Federal Survey. They embody all changes, published or unpublished, made before July 1, 1959.

Numerous inconsistencies in listed age assignments are apparent in this compilation. These result in part from differences of opinion of the original authors and in part from Survey-accepted revisions and investigations that have been made since the publication of Wilmarth's lexicon. Thus, the inconsistencies illustrate the essential subjectivity of all age assignments and reflect the objectivity that a compiler seeks to attain.

The compilers are responsible for listing changes in the age designations of certain non-Survey names. These are (a) age assignments of a few units whose ages had been listed in general terms; (b) placing under Paleocene some units formerly listed as Eocene; and (c) assignment of some units of Pennsylvanian age to provincial series in conformance to the nomenclature adopted by agreement of the State geological surveys of Iowa, Kansas, Missouri, Nebraska, and Oklahoma and for the most part accepted by the U.S. Geological Survey.

Age changes and future revisions of all units will be considered in supplements to Wilmarth's lexicon, where they can be adequately documented. The first supplement is now in preparation.

The names are grouped under two main categories: (a) geologic-time and time-stratigraphic units, and (b) rock units. Only the time units require explanation. There is general agreement among American geologists as to the major practical stratigraphic and time divisions, if not as to their boundaries. Those in use by most geologists and the U.S. Geological Survey are shown in the table (p. rv). Less agreement exists in the use of the term "series." "Series" has been used as a rock (rock-stratigraphic) term of higher rank than "group," but more commonly as a time-stratigraphic (time-rock) term for a subdivision of a system. In the following reports concerned with stratigraphic classification and nomenclature, "series" has been considered as a part of the time-stratigraphic classification: Schenck and Muller (1941, p. 1421), the American Commission on Stratigraphic Nomenclature (1947, p. 523), Hedberg (1948, p. 452; 1958, p. 1892), Woodring (1953, p. 1082), and Dunbar and Rodgers (1957, p. 297–298). The use of "series" as a time-stratigraphic term has been recom-
mended by the American Commission on Stratigraphic Nomenclature (1956, p. 2006), and the U.S. Geological Survey will consider this usage for acceptance when the Commission adopts the revised Stratigraphic Code.

Because of this variance in usage, the names of most series are listed with both the time and the rock units, but a few names of series that are undefined and have had little or no usage—for example, the Nutrian series of Jurassic age in Arizona—are listed only under the rock units. The names of some series and stages which have been derived from units listed in WilmARTH’s lexicon as rock units, and which are currently in wide usage, appear under the time units as a part of the standard sequences of certain periods. These are cited from the various sources from which the standard sequences were taken, and the designation under which they are entered in WilmARTH’s lexicon appears in brackets; the Osage series [see Osage group] of Early Mississippian age is an example. Precambrian series that have been used to indicate correlative time are listed with the time units, but the majority of the Precambrian series names are listed only under the rock units.

ACKNOWLEDGMENTS

We are grateful for the cooperation and assistance of George V. Cohee, chairman, and the staff of the Geologic Names Committee during the compilation of this index. Thanks are extended to Ellen James Trumbull for advice on the problems of arrangement and to Allison R. Palmer for advice concerning Cambrian time-stratigraphic terms. Other colleagues to whom we are indebted for helpful suggestions are: Jean M. Berdan, W. A. Cobban, P. E. Cloud, Jr., Helen Duncan, D. L. Durham, J. T. Dutro, James Gilluly, C. B. Hunt, G. E. Lewis, F. S. MacNeil, C. W. Merriam, G. N. Pipiringos, C. A. Repenning, R. J. Ross, Jr., W. J. Sando, G. R. Scott, J. E. Smedley, P. D. Snavely, Jr., Sandra Whalen Stock, Martha Toulmin, J. A. Vedder, and W. P. Woodring.

BIBLIOGRAPHY

Inasmuch as the correlation charts prepared by the Committee on Stratigraphy of the National Research Council, usually referred to as the GSA (Geological Society of America) correlation charts, are the major source of the arrangements of the standard time sequences given under the time units, they are listed here by number as a convenient source of reference. Other references follow, listed alphabetically.

GSA Charts


INDEX TO THE GEOLOGIC NAMES OF NORTH AMERICA

8a. Reeside, J. B., Jr., and others, 1957, Correlation of the Triassic formations of North America exclusive of Canada: ibid., v. 68, no. 11, p. 1481-1514.
8b. McLearn, F. H., 1953, Correlation of the Triassic formations of Canada: ibid., v. 64, no. 10, p. 1205-1227.
8d. Frebold, Hans, 1953, Correlation of the Jurassic formations of Canada: ibid., v. 64, no. 10, p. 1229-1246.

Reports

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SYMBOLS

Names printed in **boldface** type have been adopted for use by the U.S. Geological Survey.

†Names preceded by a dagger have been either abandoned by their authors or rejected for use by the U.S. Geological Survey.

1 Names followed by this superscript are in Wilmarth's "Lexicon of Geologic Names of the United States (Including Alaska)" (U.S. Geol. Survey Bull. 896).

2 Names followed by this superscript are in "Geologic Names of North America Introduced in 1936-1955" (U.S. Geol. Survey Bull. 1056-A).

Names in use by the U.S. Geological Survey for which the rank or lithic designation has been changed are followed by the former designation in parenthesis, except when the original combination is a part of the currently accepted usage. Examples (both from the Pleistocene names of Kansas):

- **Pearlette ash** 1 member (of Sappa formation)
- **Missler member** (of Ballard formation); (as member of Meade formation 2)
GEOLOGIC TIME AND TIME-STRATIGRAPHIC (TIME-ROCK) UNITS

Sequences of units commonly used as standards for North America are given under each major time division. They have been assembled from several sources, but mainly from the correlation charts prepared by the Committee on Stratigraphy of the National Research Council.

Certain of the sequences coincide in part or completely with current usage of the U.S. Geological Survey; thus the units adopted are shown in boldface type. A single unit in boldface within a sequence does not indicate that all or other parts of the sequence have been adopted; only those units appearing in boldface type are currently in use by the Survey. In all instances the precise rank and terminology, and certain restrictions in Survey usage, are noted.

TIME TERMS OF NONGEOGRAPHIC ORIGIN

The terms listed below have been proposed for various units of geologic time. The nongeographic origin probably indicates that all were intended for world-wide application. A few have had considerable usage, but most of the terms are currently replaced by standard divisions of geologic time (see table, p. iv). The nongeographic term Phanerozoic has come into usage as a convenient expression covering Cambrian plus all later time. It was proposed as the Phanerozoic or Phanerobiotic eon by Chadwick (1930, p. 48) together with the Cryptozoic or Cryptobiotic eon for all Precambrian time. Harris (1932, p. 489) independently proposed the Phenozoic and Cryptozoic eons for the same spans of time.

Recent
- Autocene
- Holocene
- †Psychozoic era

Quaternary
- Antropocene periodo
- Cenocene series
- Epicene series
- Hectozoic

Tertiary
- Neozoic
- Pentozoic

Miocene-Pliocene
- Neogene
- Neocene

Eocene-Oligocene
- Eogene

Paleocene-Oligocene
- Paleogene

Mesozoic
- Deutozoic
- Tetrazoic
- †Trizoic

Precambrian
- †Agnotozoic era
- †Archean period or system
- †Archeozoic era
- †Azoic era
- †Colozoic age
- †Eobiotic era
- †Eomorphic era
- †Eozoic era
- †Eoparchean
- †Hypozoic era
- †Progonic
- †Proterozoic era
- †Prozoic era

CENOZOIC

Pleistocene (glacial)

The following glacial and interglacial stages typically developed in central North America are commonly used as the North American standard sequence (see Cooke and Gardner in Cooke, Gardner, and Woodring, 1943, Chart 12):

- Wisconsin [glacial] stage (Wisconsin)*
- Sangamon [interglacial] stage (Illinois)
- Illinoian [glacial] stage (Illinois)
- Yarmouth [interglacial] stage (Iowa)
- Kansan [glacial] stage (Kansas; standard sections in Iowa)
- Aftonian [interglacial] stage (Iowa)
- Nebraskan [glacial] stage (Nebraska)

* The U.S. Geological Survey currently has under consideration the usage of time-stratigraphic nomenclature in the Pleistocene epoch.
Pleistocene (glacial)—Continued

The glacial Pleistocene time and time-stratigraphic units listed below have been used or are currently in use:

Central North America

*Pleistocene (Wisconsin)*
- Almenan subage 2 (Kansas)
- Ashawan 1 (Iowa)
- Bradyan interglacial substage 2 (Nebraska)
- Cary substage 1 (Illinois)
- Crandian glacial substage 2 (Ontario)
- Eldoran epoch and series 1 (Iowa)
- *Farndale substage* 2 (Illinois)
- *Hudsonian substage* 1 (Great Lakes region)
- *Iowan substage* (as stage 1) (Iowa)
- *Manitoban substage* 1 (Great Lakes region)
- *Mankato substage* 1 (Minnesota)
- *Peorian stage* 1 (Illinois)
- *Quebecan substage* 1 (Great Lakes region)
- Scandian subage 2 (Kansas)
- *Tazewell substage* 1 (Illinois)
- *Valders glacial substage* 2 (Wisconsin)
- *Wabash stage* 1 (Indiana)

*Pleistocene (Illinoian and Sangamon)*
- Centralian epoch and series 1 (Illinois)

*Pleistocene (Kansan and Yarmouth)*
- Ottumwan epoch and series 1 (Iowa)

*Pleistocene (Kansan)*
- Mahaskan glacial epoch 1 (Iowa)

*Pleistocene (Nebraskan and Aftonian)*
- Grandian epoch and series 1 (Iowa)

*Pleistocene (Nebraskan)*
- Adelphian 1 (Iowa)

*Pleistocene (“pre-Nebraskan”)*
- Gravoisan glacial epoch 1 (Missouri)
- Moingonan glacial epoch 1 (Iowa)

Northeastern United States and eastern Canada

*Pleistocene*
- *Champlain period* 1 (Vermont-New York-Quebec)
- *Iroquois stage* 1 (Great Lakes region)
- *St. Lawrence stage* 1 (St. Lawrence Valley)
- *Toronto stage* 1 (Ontario)
- *Warren stage* 1 (Great Lakes region)

Northeastern United States (Atlantic coastal region)

*Pleistocene*
- Boston glacial substage 2 (Massachusetts)
- College Point stage 1 (Long Island, N.Y.)
- *Gardiners stage* 1 (Gardiners Island, N.Y.)
- *Heampstead substage* 1 (Long Island, N.Y.)
- *Herod substage* 1 (Long Island, N.Y.)
- Jacob stage 1 (Long Island, N.Y.)
- *Jameco stage* 1 (Long Island, N.Y.)
- *Jerseyan stage* 1 (New Jersey)
- Lexington glacial substage 2 (Massachusetts)
- *Manhasset stage* 1 (Long Island, N.Y.)
- *Mannetto stage* 1 (Long Island, N.Y.)
- *Montauk substage* 1 (Long Island, N.Y.)
- *Port Washington stage* 1 (Long Island, N.Y.)
- Vineyard interglacial stage 1 (Massachusetts)

Cordilleran North America (Rocky Mountains region)

*Pleistocene*
- Albertan 1 (Alberta)
- Albion glacial stage 1 (Colorado)
- Alma glacial substage 2 (Colorado)
Pleistocene (glacial)—Continued
Cordilleran North America (Rocky Mountain Region)—Continued
American Lakes glacial substage 2 (Colorado)
Angel Lake glacial stage 1 (Nevada)
†Animas interglacial epoch 1 (Colorado)
Arapaho glacial stage 2 (Colorado)
Bigelow glacial substage 2 (Colorado)
†Bighorn glacial epoch 1 (Wyoming)
Blacks Fork glacial stage 1 (Utah)
Brisco glacial substage 2 (Colorado)
Buffalo glacial stage 1 (Wyoming)
Bull Lake glacial stage 1 (Wyoming)
Cerro glacial stage 1 (Colorado)
Chapman Gulch glaciation 2 (Colorado)
Clarkston stage 2 (Washington)
Corral Creek glacial substage 2 (Colorado)
Durango glacial stage 1 (Colorado)
Fairplay glacial substage 2 (Colorado)
Gould glacial substage 2 (Colorado)
Hell Gate glacial substage 2 (Colorado)
Hell Inlet glacial stage 2 (Colorado)
Home glacial substage 2 (Colorado)
Ivanhoe glacial substage 2 (Colorado)
Lamoille glacial stage 1 (Nevada)
Lime Creek glacial stage 2 (Colorado)
Little Dry glacial stage 1 (Utah)
Long Draw glacial substage 2 (Colorado)
Monarch glacial stage 2 (Colorado)
Neva glacial stage 2 (Colorado)
Owl Mountain glacial substage 1 (Colorado)
Pinedale glacial stage 1 (Wyoming)
Prairie Divide glacial stage 2 (Colorado)
Pretty Meadow glacial stage 2 (Colorado)
Provo epoch 1 or stage 1 (Utah)
River glacial stage 2 (Colorado)
St. Eugene interglacial epoch 1 (British Columbia)
†San Juan glacial epoch 1 (Colorado)
Silver Creek glacial substage 2 (Colorado)
Smith Fork glacial stage 1 (Utah)
Spokane glaciation 1 (Washington)
Sprague glacial substage 2 (Colorado)
Stillwater glacial stage 2 (Colorado)
Temple Lake glacial stage 2 (Wyoming)
Thomasville glacial substage 2 (Colorado)
† Uinta glacial epoch 1 (Colorado)
†Uncompahgre interglacial interval 1 (Colorado)
Walden Hollow glacial stage 2 (Colorado)
Wycliffe glacial epoch 1 (British Columbia)
Cordilleran North America (Sierra Nevada region, California)
Pleistocene
Aeolian Buttes stage (see Aeolian Buttes till 2)
El Portal stage 1
Glacier Point (glacial) stage 1
McGee glacial stage 1
Sherwin glacial stage 1
Tahoe glacial stage 1
Tioga glacial stage 1
Yosemite glacial epoch 1
Pleistocene (glacial)—Continued

Cordilleran North America (Cascade Range region)

**Pleistocene**
- Admiralty glacial epoch 1 (Washington)
- Cascadian stage 1 (Oregon)
- Detroit glacial stage 2 (Oregon)
- Jeffersonian stage 1 (Oregon)
- Leavenworth glacial stage 2 (Washington)
- Mill City glacial stage 2 (Oregon)
- Peshastin glacial stage 2 (Washington)
- Puyallup interglacial epoch 1 (Washington)
- Stuart glacial stage 2 (Washington)
- Tunnel Creek glacial stage 2 (Oregon)
- Vashon glacial epoch 1 (Washington)
- Willamettian stage 1 (Oregon)

Cordilleran North America (Alaska)

**Pleistocene**
- Anaktuvuk glaciation 2
- Brooks Lake glaciation 2
- Browne glaciation 2
- Caribou Hills glaciation 2
- Darling Creek glaciation 2
- Delta glaciation 2
- Donnelly glaciation 2
- Dry Creek glaciation 2
- Echooka glaciation 2
- Farewell glaciation 2
- Healy glaciation 2
- Iron Creek glaciation 2
- Itkillik glaciation 2
- Johnston Hill glaciation 2
- Mak Hill glaciation 2
- Mount Osborn glaciation 2
- Mount Susitna glaciation 2
- Naptowne glaciation 2
- Nikolai Creek glaciation 2
- Nome River glaciation 2
- Riley Creek glaciation 2
- Sagavanirktok glaciation 2
- Salmon Lake glaciation 2
- Selatna glaciation 2
- Swan Lake glaciation 2

Mexico

**Quaternary**

- Mexicana stage 2

Hawaii (Island of Hawaii)

**Pleistocene**
- Makana drift and stage 2
- Pohakuloa drift and stage 2

Cenozoic (marine)

Eastern North America

The subdivisions listed below make up the only part of the standard Tertiary section of the Atlantic and Gulf Coastal Plain for which geographically derived names are given by Cooke and Gardner (in Cooke, Gardner, and Woodring, 1943, Chart 12):

**Eocene**
- Clairborne [see Clairborne group 1; Claibornian 1 (Alabama)]
- Wilcox [see Wilcox group 1 (Alabama)]

**Paleocene**
- Midway [see Midway group 1; Midwayan 1 (Alabama)]
Cenozoic (marine)—Continued

Eastern North America—Continued

Other time units that have been used for parts of the Tertiary of eastern North America:

Atlantic and Gulf Coastal Plain

Tertiary
  †Alabama period 1 (Alabama)
  †Atlantic group 1 (New Jersey-Florida)
  †Gulf group 1 (Alabama-Texas)

Pliocene
  †Floridian epoch 1 (Florida)

Miocene and Pliocene
  †Sumter epoch 1 (South Carolina)

Miocene
  †Carolinian 1 (North and South Carolina)
  †Marylandian 1 (Maryland)
  †Virginian 1 (Virginia)
  †Yorktown epoch 1 (Virginia)

Oligocene
  †Vicksburgian 1 (Mississippi)

Eocene
  †Chickasawan stage 1 (Mississippi)

Caribbean region

Miocene, late
  Caimitoan stage 2 (Dominican Republic)
  Springvalean stage 2 (Trinidad)

Oligocene
  Stainforth (1953, p. 251) has recognized the use of the Antigua stage (middle Oligocene) and the Anguilla stage (late Oligocene). These stages are based on the Antigua and the Anguilla formations, from the islands of the same names, which are considered by other geologists to be of late Oligocene and early Miocene age, respectively.

Sequence of microfaunal substages proposed for the middle and late Miocene of the central Atlantic Coastal Plain by Malkin (1953, p. 767-768):

 Miocene
   | late
   | Yorktownian substage (Virginia)
   | St. Marysan substage (Maryland)
   | Choptankian substage (Maryland)
   | Calvertian substage (Maryland)

Western North America

Two sequences of stages are in use for the marine Cenozoic of western North America. The microfaunal stages are based on the chronologic occurrence of species or assemblages of species of foraminifera, believed to be independent of the lithic units in which they are found. The more or less informal megafaunal “stages” are based, according to Durham (1954, p. 23), on the distribution of species of megafauna, mainly mollusks and echinoids, within formations and sequences of formations from which the names of the “stages” are derived. The present arrangement is adapted from the marine Cenozoic correlation chart (Weaver and others, 1944, Chart 11), from later additions to the microfaunal sequence by Natland (1953) and by Mallory (1953; 1954; 1959), and from the charts of Durham, Kleinpell, and Savage (in Durham, 1954, p. 25) and Durham, Jahns, and Savage (1954, p. 60). The microfaunal stages proposed for the Pliocene and Pleistocene by Natland have not been fully defined and have not yet been used as widely in publication as the microfaunal stages proposed for the Oligocene by Schenck and Kleinpell (1936) and for the Miocene by Kleinpell (1934; 1935; 1938). The Paleocene and Eocene stages earlier proposed by Mallory were fully defined in 1959. The equivalence of the stages of the microfaunal and megafaunal sequences is fairly well established, but the adherents of the two time scales are not in complete agreement on correlation with the standard major Tertiary divisions. The disparity of the two correlations with the Tertiary divisions is graphically shown below. The spacing of the rules shows only the equivalence of the stages of the two scales; no indication of relative time span is intended. A partly dashed rule indicates doubt concerning precise correlation with the apposed stage. All type areas except those indicated are in California.
Cenozoic (marine)—Continued
Western North America—Continued

Microfaunal stages

<table>
<thead>
<tr>
<th>Stage</th>
<th>Pleistocene</th>
<th>Pliocene</th>
<th>Miocene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hallian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheelerian</td>
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<td></td>
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<tr>
<td>Venturian</td>
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<td>Repettian</td>
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<tr>
<td>Delmontian</td>
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<tr>
<td>Mohnian</td>
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<tr>
<td>Luisian</td>
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<tr>
<td>Relizian</td>
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<td></td>
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<tr>
<td>Saucesian</td>
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<tr>
<td>Zemorrian</td>
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<tr>
<td>Refugian</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Narizian</td>
<td>late</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ulatian</td>
<td>middle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penutian</td>
<td>early</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulitian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ynezian</td>
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</tbody>
</table>

Megafaunal "stages"

<table>
<thead>
<tr>
<th>Stage</th>
<th>Pleistocene</th>
<th>Pliocene</th>
<th>Miocene</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>San Joaquin [see San Joaquin fm. 1]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Etchegoin [see Etchegoin fm. 1]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jacalitos [see Jacalitos fm. 1]</td>
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<tr>
<td></td>
<td>Neroly [see Neroly fm. 1]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cierbo [see Cierbo ss. 1]</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Briones [see Briones ss. 1]</td>
<td></td>
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<tr>
<td></td>
<td>Tembler [see Temblor fm. 1]</td>
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<tr>
<td></td>
<td>Vaqueros [see Vaqueros ss. 1]</td>
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</tr>
<tr>
<td></td>
<td>Blakeley [see Blakeley fm. 1 (Wash.)]</td>
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</tr>
<tr>
<td></td>
<td>Lincoln [see Lincoln fm. 1 (Wash.)]</td>
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<tr>
<td></td>
<td>Keasey [see Keasey sh. 1 (Oreg.)]</td>
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</tr>
<tr>
<td></td>
<td>Tejon [see Tejon fm. 1]</td>
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<tr>
<td></td>
<td>&quot;Transition beds&quot;</td>
<td></td>
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<tr>
<td></td>
<td>Domengine [see Domengine fm. 1]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capay [see Capay fm. 1]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meganos [see Meganos fm. 1; lower Eocene according to U.S. Geol. Survey usage]</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Martinez [see Martinez fm. 1]</td>
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<td></td>
</tr>
</tbody>
</table>

Other Cenozoic time units that are in use or have been used in California:

- Pleistocene
  - Pedroian
  - Red Bluff epoch
  - San Pedran epoch
- Pliocene and Quaternary
  - Sierran
- Eocene, late
  - Fresnian stage
- Eocene, early
  - Juniperan stage
Cenozoic (continental)

Provincial time scale for the North American continental Tertiary based on mammal-bearing units, according to Wood* and others (1941, pl. 1):

<table>
<thead>
<tr>
<th>Tertiary</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pliocene</td>
<td>Blancan age (Texas)</td>
</tr>
<tr>
<td></td>
<td>Hemphillian age (Texas)</td>
</tr>
<tr>
<td>Miocene</td>
<td>Clarendonian age (Texas)</td>
</tr>
<tr>
<td></td>
<td>Barstovian age (California)</td>
</tr>
<tr>
<td></td>
<td>Hemingfordian age (Nebraska)</td>
</tr>
<tr>
<td>Oligocene</td>
<td>Arikarean age (Nebraska)</td>
</tr>
<tr>
<td></td>
<td>Whitneyan age (Nebraska)</td>
</tr>
<tr>
<td></td>
<td>Orellan age (Nebraska)</td>
</tr>
<tr>
<td>Eocene</td>
<td>Chadronian age (South Dakota)</td>
</tr>
<tr>
<td></td>
<td>Duchesnean age (Utah)</td>
</tr>
<tr>
<td></td>
<td>Uintan age (Utah)</td>
</tr>
<tr>
<td></td>
<td>Bridgerian age (Wyoming)</td>
</tr>
<tr>
<td>Paleocene</td>
<td>Wasatchian age (Wyoming-Utah)</td>
</tr>
<tr>
<td></td>
<td>Clarkforkian age (Wyoming)</td>
</tr>
<tr>
<td></td>
<td>Tiffanian age (Colorado)</td>
</tr>
<tr>
<td></td>
<td>Torrejonian age (New Mexico)</td>
</tr>
<tr>
<td></td>
<td>Dragonian age (Utah)</td>
</tr>
<tr>
<td></td>
<td>Fuercian age (New Mexico)</td>
</tr>
</tbody>
</table>

Other continental Cenozoic ages and stages:

North America

Pleistocene
Rancholabrean age 2 (California)
Irvingtonian age 2 (California)

California

Pliocene (Clarendonian)
Montediablan stage 2
Cerratejonian stage 2

MESOZOIC

The European stages listed below are commonly used for North America, and according to Longwell (1958, AGI 5) there is no other generally accepted classification. No standard American time classification is given for any of the periods or systems of the Mesozoic on the correlation charts prepared by the Committee on Stratigraphy of the National Research Council.

Cretaceous

Late
Maestrichtian
Campanian
Santonian
Coniacian
Turonian
Cenomanian
Albian
Aptian
Barremian
Hauterivian
Valanginian
Berriasian (infra-
Valanginian)

Early
Purbeckian
Portlandian
Kimmeridgian
Oxfordian
Callovian

Jurassic

Middle
Bathonian
Bajocian
Toarcian

Early
Pliensbachian
Sinemurian
Hettangian

Senonian
Neocomian

*We acknowledge advice on locality data from H. E. Wood, 2d chairman of the committee currently revising the continental time scale.
Mesozoic—Continued

\[
\begin{align*}
\text{Triassic} & \quad \begin{cases} 
\text{Late} & \{ \text{Rhaetian} \\
& \text{Norian} \\
& \text{Carnian (Karnian)} \\
\text{Middle} & \{ \text{Ladinian} \\
& \text{Anisian (Virglorian)} \\
\text{Early} & \{ \text{Scythian (Werfenian)} \\
\end{cases} \\
\end{align*}
\]

Cretaceous

The units listed below have been used or are currently in use for parts of the Cretaceous in the areas indicated.

- **North America**
- **Late Cretaceous**
  - Cordilleran system
  - Early Cretaceous
    - †Comanche system (Texas)
    - †Shastan system (California)
- **Gulf Coastal Plain**
  - **Late Cretaceous**
  - Gulf series (Texas)
  - Early and Late Cretaceous
    - Comanche series (Texas)
  - Early Cretaceous
    - Coahuila series (as Coahuila group) (Mexico)
- **California and Oregon**
  - **Early Cretaceous**
  - Shasta series (California)

Sequence of microfaunal stages proposed for the Late Cretaceous of California by Goudkoff (1945, p. 956-1007):

\[
\begin{align*}
\text{Late Cretaceous} & \quad \begin{cases} 
\text{Cheneyan stage} & (\text{"pre-Martinez Paleocene or post-Moreno Cretaceous"}; author favored Paleocene; placed here for convenient listing) \\
\text{Ciervian stage} \\
\text{Ingramian stage} \\
\text{Tracian stage} \\
\text{Weldonian stage} \\
\text{Cachenian stage} \\
\text{Elevanian stage} \\
\end{cases} \\
\end{align*}
\]

Jurassic

Triassic

No geographically derived names of time units based on faunal or physical criteria occurring in the Triassic and Jurassic rocks of North America have been recorded in the Lexicon files.

**PALEOZOIC**

A number of names have been proposed for units of great magnitude based on physical and faunal criteria occurring in the rocks of North America. Some of them were thought to be more appropriate for North America than the now standard major stratigraphic and time divisions, which are mainly of European derivation. With the exception of the Mississippian and Pennsylvanian systems, few of these units ever gained very wide acceptance, and none is in current use as a period or system. Some encompass parts or all of more than one of the Paleozoic periods or systems and are so listed below; the others are entered under the appropriate age.

- **Paleozoic**
  - Appalachian system (Pennsylvania)
  - †New York system (New York)
  - **Devonian—Mississippian**
    - †Bradfordian (Pennsylvania-New York)
    - Chattanooga series (Tennessee)
    - Erian period (New York)
    - †Waverlyan system (Ohio)
Paleozoic—Continued

Silurian-Devonian
Monroan 1 (Michigan)
Yorkian period 1 (New York)

Ordovician—Silurian
†Oswegian period 1 (New York)
†Hudson period 1 (New York)

Cambrian—Silurian
†Mohawk system 1 (New York)

Cambrian—Ordovician
Ozarkian system 1 (Missouri)
†Potsdam period 1 (New York)
†Taconic system 1 (New York-New England)

Cambrian (?)
Hudson system 1 (New York)
†Taconian 1 (New York-New England)

Permian
The Permian series commonly in use as the standard sequence in central and southwestern United States (see Longwell, 1958, AGI 5) are typically developed in Texas and New Mexico to which they are restricted in use by the U.S. Geological Survey:

[Ochos series 2 (New Mexico)]
[Guadalupe series [see Guadalupe group 1 (Texas)]]
[Leonard series [see Leonard formation 1 (Texas)]]
[Wolfcamp series [see Wolfcamp formation 1 (Texas)]]

Other units:
Central United States
Permian
Big Blue series 1 (Kansas)
Cimmaron series [see under Cimmaron group 1 (Kansas)]
Mingo division 2 (Oklahoma)
Wanette division 2 (Oklahoma)

Pennsylvanian
The type area of the Pennsylvanian system is in the northern Appalachian region in Pennsylvania, but a better standard section is in West Virginia (Moore and others, 1944, p. 665). The standard sequence for eastern North America, according to the Pennsylvanian correlation chart (Moore and others, 1944, Chart 6), given below, repeats the major stratigraphic divisions commonly used in the eastern United States, except that the Lee and the Kanawha series take the place of the division usually called Pottsville (p. 666).

[Monongahela series [see under Monongahela formation 1 (Pennsylvania)]]
[Conemaugh series [see under Conemaugh formation 1 (Pennsylvania)]]
[Allegheny series [see under Allegheny formation 1 (Pennsylvania)]]
[Kanawha series [see under Kanawha formation 1 (West Virginia)]]
[Lee series [see Lee formation 1 or group (Virginia)]]

The sequence given for central North America by Longwell (1958, AGI 5) is, with the exception of the Atoka series in place of the Lampasas series, the same sequence given by Moore and others (1944, Chart 6). They state (p. 666) that these series are used also in western North America and are thought to be applicable to the eastern United States and Canada as well. Their use as provincial series by the U.S. Geological Survey is restricted to the mid-Continent region:

[Virgil series 1 (Kansas)]
[Missouri series [see Missouri group 1 (Missouri)]]
[Des Moines series [see Des Moines group 1 (Iowa)]]
[Atoka series [see Atoka formation 1 (Oklahoma)]]
[Morrow series [see Morrow group 1 (Arkansas)]]

Age according to U.S. Geol. Survey usage

Late
Middle
Early
Pennsylvanian—Continued

Other Pennsylvanian time units:

**Eastern United States**

*Pennsylvanian*

†Pittsburg series ¹ (Pennsylvania)

**Central United States**

*Pennsylvanian*

Kansas period ¹ (Kansas)

*Late Pennsylvanian*

Kawvian series (epoch) ² (Kansas)

*Middle Pennsylvanian*

Cygian substage ² (Missouri)

Okian series (epoch) ² (Oklahoma)

Venteran substage ² (Missouri)

*Early and Middle Pennsylvanian*

†Bend series ¹ (Texas)

Tj Valley series ² (Oklahoma)

*Early Pennsylvanian*

Ardian series (epoch) ² (Oklahoma)

Lampassas series ² (Texas)

Pushmataha series ² (Oklahoma)

**Southwestern United States**

*Middle Pennsylvanian*

Derry series ² (New Mexico)

**Mississippian**

The type area of the Mississippian system is in the upper Mississippi and the lower Ohio valleys (Weller and others, 1948, Chart 6). The series listed below are given by Longwell (1958, AGI 5) for central North America and, except for the form of the names (i.e., Chesterian, etc.), the same series are given by Weller and others as the standard sequence for North America. Their use as provincial series by the U.S. Geological Survey is restricted to the type Mississippian area.

Age according to U.S. Geol. Survey usage

- **Chester series** [see Chester group ¹ (Illinois)]
- **Meramec series** [see Meramec group ¹ (Missouri)]
- **Osage series** [see Osage group ¹ (Missouri)]
- **Kinderhook series** [see Kinderhook group ¹ (Illinois)]

**Late**

**Early**

Other Mississippian time units:

**Eastern United States**

*Late Mississippian*

†Tennessean system ¹ (Tennessee)

**Central United States**

*Mississippian*

Lesie period ² (Iowa)

Louisian ¹ (Missouri)

Valmeyer series ² (Illinois)

*Early Mississippian*

Iowa series ¹ (Iowa)
Devonian

"Standard section" for North America according to the Devonian correlation chart (Cooper and others, 1942, Chart 4). Type areas, except those noted, are in the State of New York:

- Bradfordian series (part) [see Bradfordian (Pennsylvania-New York)]
- Chautauquan series [see Chautauquan group]
- Senecan series [see under Seneca limestone]
- Erian series [see Erie series]
- Ulsterian series [see Ulster group]

- Conewango stage [see Conewango series (Pennsylvania)]
- Cassadaga stage
- Chemung stage [see under Chemung formation]
- Finger Lakes stage
- Taghannic (Taughannock) stage
- Tioughnioga stage
- Cazenovia stage [see Cazenovia group]
- Onesquethaw stage
- Helderberg stage [see Helderberg group; Helderbergian]

Other Devonian time units:

- Eastern North America
  - Middle Devonian
    - †Hamilton period (New York)
    - Stroudsburgian stage (Pennsylvania)
  - Early Devonian
    - Oriskanian (New York)

Silurian

Sequence of series for North America according to the Silurian correlation chart (Swartz and others, 1942, Chart 3):

- Cayugan series [see Cayugan, Cayuga group (New York)]
- Niagaran series [see Niagaran, Niagara series, Niagara group (New York)]
- Albion series [see under Albion sandstone (New York); use of Albion by the U.S. Geol. Survey is currently restricted to Albion group; in the upper Mississippi Valley, the Survey uses Alexandrian series (Illinois)]

Other Silurian time units:

- Eastern North America
  - Silurian
    - †Ontarian (New York)
    - Late Silurian
    - Salian (New York)
  - Middle Silurian
    - Anticostiian (Quebec)
    - †Lockport group (New York)
  - Early and Middle Silurian
    - †Niagara period (New York)
  - Early Silurian
    - Medinan (New York)

- Central North America
  - Middle Silurian
    - †Chicago group (Illinois)
Ordovician

"Generalized standard section" according to the Ordovician correlation chart (Twenhofel and others, 1954, Chart 2):

Cincinnatian series 1
[see also Cincinnatic system 1 (Ohio); restricted in use by the U.S. Geol. Survey to Ohio, Indiana, Kentucky and Tennessee]

Champlainian series
[see Champlainian system 1 (New York)]

Gamachian stage [see Gamachian series 1 (Quebec)]
Richmondian stage [see Richmond group 1; Richmondian 1 (Indiana)]
Maysvillian stage [see Maysville group 1 (Kentucky)]
Edenian stage [see Eden group 1; Edenian 1 (Ohio)]
Mohawkian stage [see Mohawkian series 1 (New York); restricted in use by the U.S. Geol. Survey to New York]
Black River stage [see Black River group 1 (New York)]
Chazy stage [see Chazy group 1 (New York)]

Canadian series [see under Canadian series 1; Canadian system 1 (Quebec)]

Other Ordovician time units:

Eastern North America

Ordovician
†Champlainic system 1 (New York)
†Nashvillian 1 (Tennessee)
†Trenton period 1; Trentonian 1 (New York)

Middle Ordovician

Bolarian series 2 (Virginia)
Chazyan 1 (New York)
Lincolnshirian stage 2 (Virginia)

Early Ordovician

Beekmantownian 1 (New York)
Shenandoan 1 (Appalachian region)
Stonehengian division 2 (Pennsylvanian)

Central and eastern North America

Ordovician

Simpsonian series 2 (Oklahoma)

Cambrian

According to the Cambrian correlation chart for North America (Howell and others, 1944, Chart 1) no stages of the Early Cambrian were established and no stages in the Middle Cambrian satisfactorily defined. Dresbachian (Minnesota), Franconian (Minnesota) and Trempealeauan (Wisconsin) (ascending order), defined by the listed sequence of contained faunal zones, were given as stages covering the Late Cambrian. These are discussed and defined as stages of the Late Cambrian Croixan series by Bell, Berg, and Nelson (1956, p. 415-442).

Units listed below have been used or are currently in use:

Eastern North America

Late Cambrian
Bretonian 1 (Nova Scotia)
Johannian series 1; Johannian 1 (New Brunswick)
†Potsdamian 1 (New York)
†Saratogan epoch or series 1 (New York)

Middle Cambrian
Acadian series or epoch 1 (New Brunswick)
Coldbrookian series 2 (Nova Scotia)
Conasaugan series 2 (Georgia)
Dugaldian series 2 (Nova Scotia)
Cambrian—Continued
Eastern North America—Continued
  Early Cambrian
    Etcheminian series 1 (New Brunswick)
    †Georgian epoch or series 1 (Vermont)
    Labrador series 2 (Labrador)
    Hanfordian series 1 (New Brunswick)
    Placentia 1 (Newfoundland)
    Terra Nova 1 (Newfoundland)

Upper Mississippi Valley
  Late Cambrian
    St. Croixan series 1; Croixan 1 (Minnesota)

Western North America
  Middle Cambrian
    Albertan system 2 (Alberta)
    Bonnetian age and stage 2 (Nevada)
  Early Cambrian
    Waucoban series 1 (California)

**PRECAMBRIAN**
(See also under Time terms of nongeographic origin)

Properly, Precambrian divisions should not be listed under time units. The perennial use of terms such as era, period, and system, reflects the desire of geologists to suggest by terminology the impressive magnitude of the Precambrian sequence and the long time-span necessary for the deposition of the sediments, the emplacement of the igneous rocks, subsequent metamorphism, and the development of notable unconformities. Criteria for consistent worldwide division of this vast expanse of time are inadequate. Stratigraphically significant paleontologic criteria, used for the rest of geologic time, have thus far not been discovered in Precambrian rocks. Radiogenic methods may eventually provide means for inter-regional correlation when there are enough of them, and with reduction of the margin of error in present techniques. Numeric dating, sometimes called the absolute age as opposed to relative age based on fossils, has been determined by radiogenic methods for numerous Precambrian rocks. Whereas this has upheld some lithologic correlations, the results have more commonly shown the unreliability of physical unity as a basis for time-stratigraphic correlation. As a result, in the current period of intensified radiogenic investigations, the use of time and time-stratigraphic (time-rock) divisions in the Precambrian of North America has declined. Among the authors who have discussed the problems of correlation and time divisions within the Precambrian are Leith (1934, p. 169), Grout and others (1951, p. 1020, 1063–1064), Wilson (1952, p. 201–202), Gill (1952, p. 57–57; 1955, p. 25–25; 1955a, p. 117–124), Woodring (1953, p. 1083), Rodgers (1954, p. 658), Knopf (1955, p. 698–699), and Dunbar and Rodgers (1957, p. 298).

Units more commonly used as standard (i.e., time-stratigraphic) divisions as well as those suggesting great rank are listed below.

Greenland
  Greenlandian 2
  Ketilidian 2

Northeastern United States
  Atlantic period 1 or system 1 (New Hampshire)
  Great Lakes and Canadian Shield regions
    Algentic period 1 (Ontario)
    †Algogenic period 1 or system 1 (Lake Superior region)
    Anianian period 1 (Cloud-Cuckoo-Land)
    Animikie series 1; Animikian 1 (Ontario)
    Coutchiching series 1 (Ontario or Minnesota)
    Grenville series 1; Grenvillian 1 (Ontario)
    Haileyburian [see Haileyburnian 1 (Ontario)]
    Huronian series 1; Huronian period 1 (Ontario)
    Keewatin series 1 (Minnesota)
    Keweenawan series 1 (Michigan)
    Knife Lake series 1 (Minnesota); Knife Lake group of U.S. Geological Survey
    Labradorian 1 (Labrador)
Precambrian—Continued

Great Lakes and Canadian Shield regions—Continued
Laurentian period 1 (Quebec)
Laurentian epoch or series 1 (Quebec)
Loganian 1 (Ontario)
†Michigan period 1 (Michigan)
Ontarian 1 (Ontario)
Sudbury series 1; Sudburian 1 (Ontario)
Superian era 2 (Lake Superior region)
Superioric period 1 (Lake Superior region)
Timiskamian series 1 (Ontario)
Varennesic period 1 (Ontario)

Cordilleran North America
Belt series 1; Beltian system 1 (Montana)
Bitterroot period 1 (Montana)
Cherric period 1 (Montana)
Connaughtic 1
Grand Canyon series 1 (Arizona)
Llano series 1 (Texas)
Madisonian period 1 (Montana)
Selkirkian period 1 (British Columbia)
†Texian system 1 (Texas)
Uncompahgran system 1 (Colorado)
ROCK UNITS

The names of the rock units are listed once only—in the geographic area that contains, or is assumed to contain the type area or locality. The symbols used are explained on page 413.

<table>
<thead>
<tr>
<th>United States</th>
<th>United States—Continued</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>Alabama—Continued</td>
</tr>
<tr>
<td>Quaternary</td>
<td>Eocene, lower</td>
</tr>
<tr>
<td>Buttahatchie gravel</td>
<td>Gregg Landing marl member</td>
</tr>
<tr>
<td>Pleistocene</td>
<td>(of Tuscaloosa sand)</td>
</tr>
<tr>
<td>Coneuh sands</td>
<td>†Greggs Landing series</td>
</tr>
<tr>
<td>Mobile Bay formation</td>
<td>Gulflette Bluff beds</td>
</tr>
<tr>
<td>Mon Louis formation</td>
<td>Hatchettigbee formation</td>
</tr>
<tr>
<td>Ozark sands</td>
<td>†Nanafalia formation</td>
</tr>
<tr>
<td>Tertiary</td>
<td>United States</td>
</tr>
<tr>
<td>Alabama white limestone</td>
<td>Salt Mountain limestone</td>
</tr>
<tr>
<td>Pleistocene</td>
<td>†Tuscaloosa marl</td>
</tr>
<tr>
<td>Coneuh sands</td>
<td>Tuscaloosa sand or formation</td>
</tr>
<tr>
<td>Mobile Bay formation</td>
<td>Wilcox group or formation</td>
</tr>
<tr>
<td>Ozark sands</td>
<td>Woods Bluff group or series</td>
</tr>
<tr>
<td>Tertiary</td>
<td>Paleocene</td>
</tr>
<tr>
<td>Alabama white limestone</td>
<td>Black Bluff group, clay or series</td>
</tr>
<tr>
<td>Pliocene</td>
<td>Chattahoochee formation</td>
</tr>
<tr>
<td>Citronelle formation</td>
<td>Clayton formation</td>
</tr>
<tr>
<td>Miocene</td>
<td>Coal Bluff member (of Naheola formation)</td>
</tr>
<tr>
<td>Roberts sand</td>
<td>†Midway series or limestone</td>
</tr>
<tr>
<td>Oligocene</td>
<td>Naheola formation</td>
</tr>
<tr>
<td>Glendon limestone 1 member</td>
<td>Matthews Landing group or series</td>
</tr>
<tr>
<td>Eocene, upper</td>
<td>Midway formation or group</td>
</tr>
<tr>
<td>Tombigbee formation</td>
<td>†Midway series or limestone</td>
</tr>
<tr>
<td>Eocene, upper, and Oligocene</td>
<td>Naheola formation</td>
</tr>
<tr>
<td>St. Stephens division 1, formation, 1 group, 1 or limestone</td>
<td>†Midway series or limestone</td>
</tr>
<tr>
<td>Eocene, upper</td>
<td>Oligocene</td>
</tr>
<tr>
<td>cocoa sand member (of Yazoo clay)</td>
<td>Bashi marl member</td>
</tr>
<tr>
<td>Dellet sand member (of Moodys Branch marl)</td>
<td>†Bashi marl</td>
</tr>
<tr>
<td>North Creek member (of Yazoo clay)</td>
<td>Bells Landing marl member</td>
</tr>
<tr>
<td>Pachuta marl member (of Yazoo clay)</td>
<td>(of Tuscaloosa sand)</td>
</tr>
<tr>
<td>Shubuta member (of Yazoo clay)</td>
<td>†Bells Landing series</td>
</tr>
<tr>
<td>Shubuta Hill clay</td>
<td>†Fort Gaines (formation)</td>
</tr>
<tr>
<td>Eocene, middle</td>
<td>Grampian Hills member (of Nanafalia formation)</td>
</tr>
<tr>
<td>Chocotaw buhrstone 1</td>
<td>†Bashi marl</td>
</tr>
<tr>
<td>Claiborne group 1</td>
<td>Bells Landing marl member (of Tuscaloosa sand)</td>
</tr>
<tr>
<td>Claiborne sand 1</td>
<td>†Bells Landing series</td>
</tr>
<tr>
<td>Gosport sand 1</td>
<td>†Fort Gaines (formation)</td>
</tr>
<tr>
<td>Lisbon formation 1</td>
<td>Grampian Hills member (of Nanafalia formation)</td>
</tr>
<tr>
<td>Tallahatta formation 1</td>
<td>†Bashi marl</td>
</tr>
<tr>
<td>Eocene, lower</td>
<td>Bells Landing marl member (of Tuscaloosa sand)</td>
</tr>
<tr>
<td>Basham marl member (of Hatchettigbee formation)</td>
<td>(as formation)</td>
</tr>
<tr>
<td>Basham marl</td>
<td>†Bashi marl</td>
</tr>
<tr>
<td>Bells Landing marl member (of Tuscaloosa sand)</td>
<td>Bells Landing series</td>
</tr>
<tr>
<td>Eufaula sands</td>
<td>†Eufaula sands</td>
</tr>
<tr>
<td>Eutaw formation</td>
<td>Eutaw formation</td>
</tr>
<tr>
<td>Gordo formation</td>
<td>Gordo formation</td>
</tr>
<tr>
<td>McShan formation</td>
<td>McShan formation</td>
</tr>
<tr>
<td>Perote member (of Providence sand)</td>
<td>Perote member (of Providence sand)</td>
</tr>
<tr>
<td>Portland division (of Selma chalk)</td>
<td>Portland division (of Selma chalk)</td>
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</tbody>
</table>

429
United States—Continued
Alabama—Continued

**Upper Cretaceous**—Continued

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prairie Bluff chalk 2</td>
<td></td>
</tr>
<tr>
<td>Selma chalk 1 or group</td>
<td></td>
</tr>
<tr>
<td>†Selma division (of Selma chalk) 1</td>
<td></td>
</tr>
<tr>
<td>†Tombigbee chalk 1</td>
<td></td>
</tr>
<tr>
<td>Tuscaloosa formation, 1 gravel, or group</td>
<td></td>
</tr>
</tbody>
</table>

**Lower Cretaceous**

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tombigbee chalk</td>
<td></td>
</tr>
<tr>
<td>Tuscaloosa formation</td>
<td></td>
</tr>
</tbody>
</table>

**Paleozoic** (see also Precambrian or Paleozoic)

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dempsey marble 1 (in Talladega slate)</td>
<td></td>
</tr>
<tr>
<td>Probably Paleozoic</td>
<td></td>
</tr>
<tr>
<td>Jumbo dolomite member (of Talladega slate) 1</td>
<td></td>
</tr>
</tbody>
</table>

**Post-Carboniferous**

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>†Bluff Springs granite 1</td>
<td></td>
</tr>
<tr>
<td>Millerville green schist 1</td>
<td></td>
</tr>
<tr>
<td>Pinckneyville granite 1</td>
<td></td>
</tr>
</tbody>
</table>

**Post-Carboniferous (?)**

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hillabee chlorite schist 1</td>
<td></td>
</tr>
<tr>
<td>„Monte Sano limestone; also group *</td>
<td></td>
</tr>
</tbody>
</table>

**Carboniferous** (see Precambrian to Carboniferous; and Cambrian to Carboniferous)

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carboniferous (probably Lower Pennsylvanian)</td>
<td></td>
</tr>
<tr>
<td>Erin shale 1</td>
<td></td>
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</tbody>
</table>

**Pennsylvanian**

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Creek coal group 1</td>
<td></td>
</tr>
<tr>
<td>Brookwood coal group 1</td>
<td></td>
</tr>
<tr>
<td>Cobb coal group 1</td>
<td></td>
</tr>
<tr>
<td>Dogwood coal group 1</td>
<td></td>
</tr>
<tr>
<td>Fayette gas sand 1 (subsurface)</td>
<td></td>
</tr>
<tr>
<td>Gould coal group 1</td>
<td></td>
</tr>
<tr>
<td>Gray coal group 1</td>
<td></td>
</tr>
<tr>
<td>Horse Creek coal group (in Pottsville formation) 1</td>
<td></td>
</tr>
<tr>
<td>Mary Lee coal group 1</td>
<td></td>
</tr>
<tr>
<td>†Montevallo conglomerate 1</td>
<td></td>
</tr>
<tr>
<td>Nunnally coal group 1</td>
<td></td>
</tr>
<tr>
<td>Pratt coal group 1</td>
<td></td>
</tr>
<tr>
<td>†Sand Mountain conglomerate 1</td>
<td></td>
</tr>
<tr>
<td>Straven coal group 1</td>
<td></td>
</tr>
</tbody>
</table>

**Lower Pennsylvanian**

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boyles sandstone member (of Pottsville formation) 1</td>
<td></td>
</tr>
<tr>
<td>Bremen sandstone member (of Pottsville formation) 1</td>
<td></td>
</tr>
<tr>
<td>Camp Branch sandstone member (of Pottsville formation) 1</td>
<td></td>
</tr>
<tr>
<td>Chestnut sandstone member (of Pottsville formation) 1</td>
<td></td>
</tr>
<tr>
<td>Lick Creek sandstone member (of Pottsville formation) 1</td>
<td></td>
</tr>
<tr>
<td>Lookout sandstone 1</td>
<td></td>
</tr>
<tr>
<td>Pine sandstone member (of Pottsville formation) 1</td>
<td></td>
</tr>
</tbody>
</table>

**Lower Pennsylvanian**

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Pennsylvanian</td>
<td></td>
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</tbody>
</table>

**Upper Mississippian**

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allboro sandstone 1</td>
<td></td>
</tr>
<tr>
<td>Alsobrook member (of Pride Mountain formation); (as formation 1)</td>
<td></td>
</tr>
<tr>
<td>Bangor limestone 1</td>
<td></td>
</tr>
<tr>
<td>Floyd shale 1 (see p. 622)</td>
<td></td>
</tr>
<tr>
<td>Hartselle sandstone 1</td>
<td></td>
</tr>
<tr>
<td>Little Shades sandstone member (of Parkwood formation) 2</td>
<td></td>
</tr>
<tr>
<td>Parkwood formation 1</td>
<td></td>
</tr>
<tr>
<td>Pride Mountain formation (S.W. Welch, 1958, U.S. Geol. Survey Oil and Gas Inv. Chart OC-58)</td>
<td></td>
</tr>
<tr>
<td>Southward Bridge formation</td>
<td></td>
</tr>
<tr>
<td>Southward Pond formation 1</td>
<td></td>
</tr>
<tr>
<td>Tuscalbina limestone 1</td>
<td></td>
</tr>
</tbody>
</table>

**Lower Mississippian**

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Payne chert 1</td>
<td></td>
</tr>
<tr>
<td>Devonian (see also Cambrian—Devonian)</td>
<td></td>
</tr>
<tr>
<td>Yellow Leaf quartz schist 1</td>
<td></td>
</tr>
<tr>
<td>Middle Devonian</td>
<td></td>
</tr>
<tr>
<td>Ragland sandstone 1</td>
<td></td>
</tr>
<tr>
<td>Lower or Middle Devonian</td>
<td></td>
</tr>
<tr>
<td>Frog Mountain sandstone 1</td>
<td></td>
</tr>
<tr>
<td>Lower Devonian</td>
<td></td>
</tr>
<tr>
<td>Clear Branch sandstone 1</td>
<td></td>
</tr>
<tr>
<td>Jemison chert 1</td>
<td></td>
</tr>
</tbody>
</table>

**Ordovician** (see also Cambrian—Devonian)

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silurian (see also Cambrian—Devonian)</td>
<td></td>
</tr>
<tr>
<td>Red Mountain formation 1</td>
<td></td>
</tr>
</tbody>
</table>

**Ordovician** (see also Cambrian—Devonian)

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>†Pelham limestone 1</td>
<td></td>
</tr>
<tr>
<td>Middle Ordovician</td>
<td></td>
</tr>
<tr>
<td>Little Oak limestone 1</td>
<td></td>
</tr>
</tbody>
</table>

**Mississippian**

Burgess oolite (in Bangor limestone) 1

<table>
<thead>
<tr>
<th>Geologic Formation/Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorans Cove sandstone 1</td>
<td></td>
</tr>
<tr>
<td>†Huntsville 1 (formation)</td>
<td></td>
</tr>
<tr>
<td>†La Grange sandstone 1</td>
<td></td>
</tr>
<tr>
<td>†Lauderdale chert 1</td>
<td></td>
</tr>
<tr>
<td>†Monte Sano limestone; also group 1</td>
<td></td>
</tr>
<tr>
<td>†Oxmoor sandstone and shales 1</td>
<td></td>
</tr>
<tr>
<td>Rockwood oolite 1</td>
<td></td>
</tr>
<tr>
<td>Spout Spring oolite (in Bangor limestone) 1</td>
<td></td>
</tr>
</tbody>
</table>
United States—Continued

Alabama—Continued

Lower Ordovician

Attalla chert conglomerate member (of Chickamauga limestone) 1
†Birmingham breccia 1
Chepultepec dolomite 1
Longview limestone or dolomite
Newala limestone or formation
Odenville limestone 1
†Salem breccia 1
Cambrian to Carboniferous
Wedowee formation 1
Cambrian—Devonian
†Red Mountain group 1

Upper Cambrian

Bibb dolomite 1
Brierfield dolomite 1
Ketona dolomite 1
Middle and Upper Cambrian
†Coosa shale 1
†Flatwoods shale 1
Middle or Upper Cambrian
†Aldrich limestone 1
Lower Cambrian
†Choccolocco shale 1
Ladiga sandstone 1
†Montevallo formation 1
Weisner quartzite or formation 1
Precambrian to Carboniferous
Talladega slate 1 or formation
Precambrian or Paleozoic
Brewer phyllite (as member of Talladega slate 1)
Sawyer limestone member (of Waxahatchee slate 1)
Sylacauga marble member (of Talladega slate 1)
Wash Creek slate 1
Waxahatchee slate 1
Precambrian
Ashland mica schist 1
Chewacla marble 1
Hollis quartzite 1
Lundy Mountain type 1 (mica schist)
Age(?)
Sougahatchee granite 1

Alaska

Quaternary (see also Tertiary and Quaternary)
Arch Point basalt 2
Black Point basalt 2
Dushkin basalt 2
East Cape volcanics 2
Little Pavlof agglomerate 2
Mount Emmons volcanics 2
Mount Hague volcanics 2
Okmok volcanics 2
Pavlof volcanics 2
Pavlof Sister volcanics 2
Tanak volcanics 2
Volcano Bay basalt flow 2
Quaternary(?)
Buldir volcanics 2

United States—Continued

Alaska—Continued

Pleistocene or Recent
Crater Creek basalt 2
Pleistocene (see also Pliocene or Pleistocene)
Bristol Bay silts and gravels 1
Cook Inlet gravels 1
Copper River silts and gravels 1
Ester ash bed 1
Flaxman formation 1
Gubik formation (as sand 1)
Kenektok silts and gravels 1
Kowak clay 1
†Kuskokwim gravels and silts 1
Togiak gravels 1
Yukon silts 1
Tertiary and Quaternary
Ashishik basalt 2
Great Sitkin volcanics 2
Idak basalt 2
Tulik basalt 2
Tertiary (see also Cretaceous or Tertiary)
Andrew Bay volcanics 2
Hayes River beds 1
Holokuk basalt 2
Nenana gravel 1
Porcupine beds 1
Sand Bay volcanics 2
Twelvemile beds 1
Waterboot basalt 2
†Yentna beds 1
Zeto Point basalt porphyry 2
Tertiary (?)
Tok sandstone 1
Tertiary, upper, to Recent
Wrangell lava 1
Tertiary, upper
Belkofski tuff 2
Cathedral Valley agglomerate 2
Tertiary, lower
Sagavanirktok formation 2
Pliocene or Pleistocene
Pinnacle (system)
Pliocene
Nuwok formation 2
Pliocene(?)
Palisades conglomerate 1
Miocene or Pliocene
Nushagak formation 1
Miocene and Pliocene
Yakataga formation 1
Miocene
Unga conglomerate 1
Miocene(?)
†Eska conglomerate 1
Oligocene or Miocene
Meshik formation 1
Oligocene and Miocene
Poul Creek formation 1
Oligocene
Basin Creek member (of Katalla formation) 2
United States—Continued
Alaska—Continued

Oligocene—Continued

**Burls Creek shale member** (of Katalla formation)

**Katalla formation**

**Puffy member** (of Katalla formation); (as member of Redwood formation)

**Redwood formation**

**Oligocene, Upper**

**Point Hey member** (of Katalla formation); (as member of Redwood formation)

**Oligocene, lower and middle**

**Split Creek sandstone member** (of Katalla formation)

**Eocene**

**Getmuna rhyolite group**

**Kushataka formation**

**Stepovak series**

**Stillwater formation**

**Tokun formation**

**Tyonek formation**

**Eocene, upper**

**Gakona formation**

**Kenai formation**

**Eocene or Paleocene(?)**

**Chickafoo formation**

**Paleocene(? or Eocene, lower(?)**

**Wisbee formation**

**Mesozoic, Tertiary, and Carboniferous(?)**

†Oklune series

**Mesozoic (see Paleozoic and Mesozoic)**

**Mesozoic(?**

**Cedar Bay granite**

**Eshamy granite**

**Nellie Juan granite**

**Upper Mesozoic(?**

**Orca group**

**Valdez group**

**Cretaceous or Tertiary**

Agattu beds

**Cretaceous (see also Jurassic or Cretaceous)**

†Cape Beaufort coal measures

**Upper Cretaceous and Paleocene(?**

**Iditarod basalt**

**Upper Cretaceous**

**Cantwell formation**

**Chigik formation**

**Colville group (as series]**

†Holiknuk series

**Kaitig formation**

**Kogosukruk tongue** (of Prince Creek formation)

**Matanuska formation**

**Melozio formation**

**Niakagon tongue** (of Chandler formation)

**Nulato formation**

**Prince Creek formation**

**Schrader Bluff formation**

**Seabee formation**

**Upper Cretaceous—Continued**

**Sentinel Hill member** (of Schrader Bluff formation)

**Shaktolik group**

**Tetis group**

†Tuluga member (of Schrader Bluff formation)

**Tuluvak tongue** (of Prince Creek formation)

**Ungalik conglomerate**

**Upper(? Cretaceous**

**Bergman group**

**Yakutat group**

**Lower and Upper Cretaceous**

**Chandler formation**

**Corwin formation**

**Ignek formation**

**Kuskokwim group**

**Nanushuk group** (as formation)

**Lower Cretaceous**

**Anaktuvuk group**

†Hatbox tongue (of Chandler formation)

**Herendeen limestone**

**Kandik formation**

**Kennicott formation**

**Koyukuk group**

**Nelchina limestone**

**Opikruk formation**

**Staniukovich shale**

**Topagoruk formation**

**Tokor formation**

**Tuktu formation**

**Lower and Lower(? Cretaceous**

†Umiat formation

**Lower Cretaceous**

**Jualin diorite**

**Lower Cretaceous to Carboniferous(?**

**Gemek group**

**Cretaceous and Jurassic(?**

**Susitna slate**

**Jurassic, Cretaceous, and Tertiary**

†Matanuska series

**Jurassic or Cretaceous**

**Boundary granodiorite**

**Coast Range intrusives**

**Hyder quartz monzonite**

**Koishna conglomerate**

**Texas Creek granodiorite**

**Jurassic(?) to Lower Cretaceous(?**

**Douglas Island volcanic group**

**Treadwell slate** (or formation)

**Jurassic(?**

**Skwentna group**

**Upper Jurassic**

**Chinitna shale**, siltstone, or formation

**Chisik conglomerate member** (of Naknek formation)

†Katmai series

**Naknek formation**

**Pomeroy member** (of Naknek formation)

**Shellikof formation**
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Legend:
- † indicates formations that may be of Paleozoic age.
- ¹ indicates formations that may be of Middle Ordovician, Upper Ordovician, or Silurian age.
- ² indicates formations that may be of Lower Paleozoic age.
- ³ indicates formations that may be of Proterozoic age.
United States—Continued
Alaska—Continued

Devonian (f)
†Kasaan greenstone
Kuzitrin formation
Upper Devonian or Mississippian
West Fork formation
Upper Devonian
Stuver member (of Kanayut conglomerate); (as series 1)
Upper Devonian or older
Neurokpk formation (as schist 1)

Middle Devonian
Salmon trout limestone
Takotna formation
Valleynar formation
Woodchopper volcanics

Pre-Devonian
Mentasta schist
Silurian, Devonian, and Carboniferous
Tonzona group

Silurian
†Bettles group 1 or series 1
Skagit limestone
Tolovana limestone
Middle or Upper Silurian
Holina group 2
Post-Ordovician (f)
Hurrah slate
Puckmummie schist 1

Ordovician, Silurian, and Devonian (f)
†Kugruk group 1
Terra Cotta series 1
Ordovician and Silurian
Porcupine group 1
Ordovician and Silurian (f)
Tatina group 1
Ordovician (f)
Sowik limestone 1

Middle Ordovician
Fossil Creek volcanics 1
Lower and Upper Ordovician, Silurian, and Devonian
Port Clarence limestone 1

Pre-Ordovician to Devonian
Wales group 1

Pre-Ordovician (f)
Solomon schist

Precambrian or Paleozoic
Casadepaga schist 1

Precambrian and Paleozoic
†Fortymile group or series 1
†Kotlo series 1
†Nasina group 1 or series 1
Precambrian and Lower Cambrian (f)
Tindir group 1

United States—Continued
Alaska—Continued

Precambrian, Cambrian (f), and Lower Ordovician
†Tatalina group 1

Precambrian
Birch Creek schist 1
Fortymile granite 1
Nilkoka group 1
†Tanana schist 1
Yukon group 1

Age (f)
Coast Range diorite 1
Copper Mountain greenstone or amphibolite schist 1
St. Elias schist 1

Arizona
Cenozoic
Bonita Park formation 2
Cave Creek formation 2
Faraway Ranch formation 2
Rhyolite Canyon formation 2
Sugarloaf series (see p. 622)

Cenozoic (f)
Atacosa formation 1
Blacktail formation 2
Montana Peak formation 2

Quaternary
Blue Mountain gravel 1
Cameron beds (of Tolchaco gravels) 1
Jeddit formation 1
Naha formation 2
Robbers Roost gravel 2
Tolchaco gravel 2
Tsegi formation 3

Pleistocene
Chemehuevi formation (as gravel 1)

Pleistocene, lower
Temple Bar conglomerate 1

Pre-Pleistocene
Frazier Well gravel 2

Tertiary or Pleistocene
Cornfield series 1
Ganado series 1
Sunrise Springs series 1
White Cone series 1

Tertiary (see also Cretaceous or Tertiary)
Beehive rhyolite 2
Big Wash andesite 2
Bull Mountain andesitic series 3
Camelback formation 2
Cat Mountain rhyolite 3
Galiuro rhyolite 1
Kingman series 2
Murdock breccia 1
Rillito andesite 2
Safford dacite 2
Safford tuff 1
Shorts Ranch andesite 2
Warrens Ranch latite 1

Tertiary (f)
Antelope rhyolite 1
Whitetail conglomerate 1
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<td>Sneed andesite</td>
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GEOLOGIC NAMES OF NORTH AMERICA

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Arizona—Continued

Lower Cretaceous—Continued
Molly Gibson formation 2
Mule sandstone 1
Mural limestone 1
Muralian series 1
Outlaw formation 2
Pacheta member (of Lowell formation) 2
Patagonia group 2
Pedregosa member (of Lowell formation) 2
Perilla member (of Lowell formation) 2
Quajote member (of Lowell formation) 2
Quimbo dolomite (in Joserita member of Lowell formation) 2
Sanvedra member (of Lowell formation) 2
Sacramento Hill porphyry 2
Tusonimo limestone (in Pacheta member of Lowell formation) 2

Lower Cretaceous (?)
Contention series 1
Herschel quartzite 1
Randolph limestone 1
Toughnut series 1

Jurassic
Arido sandstone 1
Lohali sandstones 1
Nutrian series 1
Tyende sandstone 1

Jurassic and Jurassic (?)
Navajo sandstone 1
Jurassic and older (?)
†Painted Desert formation 1
Jurassic (?)
†White Mesa sandstone 1

Upper Jurassic
Cow Spring sandstone 2

Lower Jurassic (?)
Kayenta formation 1

Upper Triassic
Chinle formation 1
†Leroux formation 1
Nadzini shales 1
Newspaper Rock sandstone 2
Ventana sandstones 1

Upper Triassic (?)
Dinosaur Canyon sandstone member (of Moenave formation) 2

Moenave formation 2
Lower and Middle (?) Triassic
Moenkopi formation 1
†Moenkopian series 1

Lower Triassic
Adaman shales 1
Agathla sandstone 1
Agathla shale 1
Holbrook sandstone 1
Moqui member (of Moenkopi formation) 2

Permian (see also Pennsylvania and Permian)
†Aubrey limestone 1
†Aubrey sandstone 1
Chiquito sandstones 1
Chiwahua limestone 1
Cochinino sandstone 1
Colina limestone 2
Concha limestone 2
De Chelly sandstone member (of Cutler formation) 1; locally sandstone in Arizona

Epitaph dolomite 2
Esplanade sandstone member (of Supai formation) 1
Fort Apache limestone (in Supai formation) 1
Havasupai sandstones 1
Hermit shale 1
Kaibab limestone 1
Kinabba beds (in Supai formation) 1
†Monument Valley shale 1
Rainvalley formation 2
Scherrer formation 2
Seligman limestone 1
Shiwita shale 1
Snyder Hill formation 1
Toroweap formation 2
Wompats limestone 1
Yampai sandstone 1

Lower Permian
Pakoon limestone 2
Queantowasp sandstone 2

Carboniferous
Aubreyan series 1
Kanab limestone 1
Malagan series 2
Mescalera series 2
Supaiian series 1
Tusayan series 1
Verdan series 1

Pennsylvanian and(or) Permian
Amos Wash member (of Supai formation) 2
Corduroy member (of Supai formation) 2

Pennsylvanian and Permian
Andrada formation 2
Aubrey group 1
Naco limestone, 1 formation, or group

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United States—Continued
Arizona—Continued

*Pennsylvanian and Permian—Con.*

**Pennsylvanian**
- *Supai formation* 1
- *Pennsylvanian (see also Mississippian and Pennsylvanian)*
  - †Galiuro limestone 1
  - *Horquilla limestone* 2
  - *Oak Creek member* (of Supai formation) 2
  - *Packard Ranch member* (of Supai formation) 2

**Pennsylvanian(f)**
- *Huethawali limestone*
- *Pierce shales*
- *Earp formation* 2

**Mississippian and Pennsylvanian**
- *Tule Spring limestone* 1

**Mississippian**
- *Elden limestones* 1
- †*Gray Cliff limestone* 1
- *Simon limestone* 1
- *Truxton limestone* 1

**Upper Mississippian or Lower Pennsylvanian(f)**
- *Black Prince limestone* 2

**Upper Mississippian**
- *Paradise formation* 1

**Lower Mississippian and Lower Pennsylvanian**
- †*Tornado limestone* 1

**Lower and Upper(f) Mississippian**
- *Escabrosa limestone* 1

**Lower Mississippian**
- *Modoc limestone* 1
- *Redwall limestone* 1

**Devonian and Carboniferous**
- *Globe limestone* 1

**Devonian**
- *East Verde limestone* 2
- *Escalante limestone* 2
- *Espinal formation* 2
- †*O’Carroll member* (of Martin limestone) 2
- *Patagonia limestone* 2
- *Picacho de Calera formation* 1
- *Tombstone series* 2
- *Vecon limestone* 2

**Upper Devonian**
- *Crook formation* 2
- *Island Mesa beds* 1
- *Jerome formation* 1
- *Martin limestone* 1 in southeast Arizona; as *formation* in northeast Arizona; and as Middle(f) and *Upper Devonian formation* in central Arizona.
- *Morenci shale* 1
- *Mount Elden formation* 2
- *Sycamore Creek sandstone* 1

**Upper(f) Devonian**
- *Temple Butte limestone* 1

**Middle(f) Devonian**
- *Santa Rita limestone* 1
- *Santa Ritan series* 1

United States—Continued
Arizona—Continued

*Ordovician(f)*
- *Lucky Cuss limestone* 1

*Upper Cambrian and Lower Ordovician*
- *Longfellow limestone* 1

*Upper Cambrian*
- †*Apache sandstone* 1
- *Copper Queen limestone* 1
- *Coronado quartzite* 1
- *Peppersauce Canyon sandstone* 1
- *Rincon limestone* 1

*Middle or Upper Cambrian*
- †*Emerald limestone* 1
- †*Emerald series* 1

*Middle and Upper Cambrian*
- *Abrigo limestone* 1 or *formation*

*Middle Cambrian*
- †*Ajax quartzite* 1
- *Bright Angel shale* 1
- *Bolsa quartzite* 1
- *Chediski white sandstone member* (of *Troy quartzite*) 1
- *Cochise formation* 1
- †*Dragoon quartzite* 1
- *Havasu member* (of *Muav formation*) 2
- *Mead limestone* 3
- *Muav limestone* 1
- *Pima sandstone* 1
- *Santa Catalina formation* 1
- *Southern Belle quartzite* 1
- *Tonto group* 1
- †*Tonto limestone* 1
- †*Tonto sandstone* 1
- †*Tonto shale* 1
- *Tontoan series* 1
- *Troy quartzite* 1
- *Yaquian series* 2
- *Whetstonian series* 2

*Lower and(or)—Middle Cambrian*
- *Boucher tongue* 2
- *Elves Chasm tongue* 2
- *Flour Sack member* (of *Bright Angel shale*) 2
- *Garnet Canyon tongue* 2
- *Gateway Canyon member* (of *Muav formation*) 2
- *Kanab Canyon member* (of *Muav formation*) 2
- *Lava Falls tongue* 2
- *Meriwitta tongue* 2
- *Parashant tongue* 2
- *Peach Springs member* (of *Muav formation*) 2
- *Rampart Cave member* (of *Muav formation*) 2
- *Sanup Plateau member* (of *Muav formation*) 2
- *Spencer Canyon member* (of *Muav formation*) 2
- *Tincanbite tongue* 2

*Lower Cambrian*
- *Tapeats sandstone* 1
United States—Continued
   Arizona—Continued

*Precambrian*
- Aguja sandstone
- Alder group
- Apache group
- Arizona slates
- Barnes conglomerate
- Bass limestone
- Bradshaw granite
- Carbon Butte shales
- Cardenas lava series
- Cerbat complex
- Chuar group
- Chuarian series
- City Creek series
- Cleopatra quartz porphyry
- Chiquito sandstone
- Crooks complex
- Deadman quartzite
- Deception porphyry
- Diana granite
- Dox sandstone
- Dripping Spring quartzite
- Echo limestone or formation
- Final shales
  + Grand Canyon group
  + Grand Canyon schist
- Grand Canyon series
- Gunther dolomite
- Hakatai shale
- Hotauta conglomerate
- Katherine granite
- Jupiter shales
- Kwaguntan series
- Madera diorite
- Marble limestone
- Maverick shale
- Mazatzal quartzite
- Mescal limestone
- Mount Ord pyroxenite
- Nankoweap group
- Newberry formation
- Nunkoweap sandstone
- Oracle granite
- Oso beds
- Oveja formation
- Phantom migmatite
- Final schist
- Pine Mountain porphyry
- Pioneer shale
- Red Rock rhyolite
- Roosevelt member
- Ruin granite
- Santa Catalina gneiss
- Scanlan conglomerate
- Shea diabase
- Shinumo quartzite
- Solitude limestone
- United Verde diorite
- Unkar group
- Venus formation
- Vishnu schist
- Vishnuan series
- Walhalla formation
- Yavapai schist

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United States—Continued
   Arizona—Continued

*Precambrian—Continued*
- Yeager greenstone
- Zoroaster granite

*Precambrian (?)*
- Cardigan gneiss
- Chloride granite

*Age (?)*
- Luck-Sure series
- Mesa formation
- Ruby diorite
- Ruby Road formation
- Sliver King quartz monzonite porphyry
- Tappan lava flow

Arkansas

*Quaternary*
- Plateau gravel phase

*Pleistocene*
- Carrigan black sands
- Center Point division
- Prairie d’Ane clay
- Prairie de Roan division
- Red River loess
- White Prairie d’Ane clay

*Eocene*
- Cleveland County red lands
- L’Eau Frais shale
- Little Missouri lignites or ligneous shales
- Manchester shale

*Eocene, upper*
- Caney Point marl member (of White Bluff formation)
- Marks-Mills red beds
- Pastoria sand member (of White Bluff formation)
- Redfield formation
- Rison clay member (of White Bluff formation)
- White Bluff marl

*Cretaceous*
- Brazil Branch breccia
- Centerpoint volcanic facies (of Eagleford formation)

*Upper Cretaceous and Eocene*
- Camden series

*Upper Cretaceous*
- Arkadelphia clay
- Arkadelphia marl
- Big Decipher calcareous sands
- Big De Gray horizon
- Bingen formation or sand
- Brownstown marl or formation
- Buckrange sand lentil (of Ozan formation)
- Clark County litorals
- Columbus marl
- Crain sand (subsurface)
- Graves sand (subsurface)
- Gregory sand (subsurface)
- High Bluff blue sands
- High Bluff greensand
- Koster joint clays
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<thead>
<tr>
<th>United States—Continued</th>
<th>United States—Continued</th>
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<tr>
<td><strong>Arkansas—Continued</strong></td>
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<tr>
<td><strong>Upper Cretaceous</strong></td>
<td><strong>Pennsylvanian</strong></td>
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<tr>
<td>Louann sand 1 (subsurface)</td>
<td>Belva shale 1</td>
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<tr>
<td>Marlbrook marl 1</td>
<td>Booneville stage 1</td>
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<tr>
<td>Meakin sand 1 (subsurface)</td>
<td>Cabin Creek sandstone 1 (subsurface)</td>
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<tr>
<td>Morris Ferry greensand 1</td>
<td>Cross Plains sandstone 1</td>
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<tr>
<td>Nacatoch sand 1</td>
<td>Danville stage 1</td>
</tr>
<tr>
<td>Ozan formation 1</td>
<td>†Rocky Mountain slate 1</td>
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<tr>
<td>Primm sand 1 (subsurface)</td>
<td>†Fort Smith formation 1</td>
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<tr>
<td>†Rocky Comfort chalk 1</td>
<td>Greenwood sandstone 1</td>
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<tr>
<td>Saratoga chalk 1</td>
<td>Hartwell sandstone 1</td>
</tr>
<tr>
<td>†Tokio sand member 1 (of Bing en formation)</td>
<td>†Norristown stage 1</td>
</tr>
<tr>
<td>†Washington greensand 1</td>
<td>Ozark sandstone 1</td>
</tr>
<tr>
<td>†White Cliffs chalk 1</td>
<td>Parker Hill sandstone member (of Stanley formation) 2</td>
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<td>Probably Middle Cretaceous</td>
<td>†Polk County ash bed (in Stanley shale) 1</td>
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<tr>
<td>Opello breccia 1</td>
<td>†Poteau stage 1</td>
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<tr>
<td><strong>Lower Cretaceous</strong></td>
<td>†Sebastian stage 1</td>
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<tr>
<td>Cerro Gordo clay 1</td>
<td>†Spadra shale 1</td>
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<td>Delight sand 2</td>
<td>†Tennessee sandstone 1</td>
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<tr>
<td>DeQueen limestone (as member of Trinity formation) 1</td>
<td>†Tomlinson stage 1</td>
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<tr>
<td>Dickson limestone (as lentil of Trinity formation) 1</td>
<td>Washburn sandstone 1</td>
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<tr>
<td>Ferry Lake anhydrite 1 (subsurface)</td>
<td>†Washington shale and sandstone 4</td>
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<td>Holly Creek formation (as clay) 1</td>
<td>†Winslow formation 1</td>
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<tr>
<td>James limestone 2 (subsurface)</td>
<td><strong>Mississippian</strong></td>
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<tr>
<td>Little River 1 (limestone)</td>
<td><strong>Greenland sandstone member</strong></td>
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<tr>
<td>Mooingsport formation 2 (subsurface)</td>
<td>(of Atoka formation) 2</td>
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<td>Pike gravel (as member of Trinity formation) 1</td>
<td><strong>Pennsylvanian (Atoka)</strong></td>
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<tr>
<td>Pine Island shale 2 (subsurface); shale member (of Pearsall formation in south Texas) 2</td>
<td><strong>Greenland sandstone member</strong></td>
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<td>†Ultima Thule gravel member (of Holly Creek formation); (as lentil of Trinity formation 1)</td>
<td>(of Atoka formation) 2</td>
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<td>Upper Little River limestone 1</td>
<td><strong>Pennsylvanian (Morrow)</strong></td>
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<td><strong>Upper Jurassic</strong></td>
<td><strong>Bloyd shale</strong> 1 or formation</td>
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<tr>
<td>Buckner member (of Haynesville formation) 2 (subsurface); formation in Mississippi 2</td>
<td><strong>Brentwood limestone member</strong> (of Bloyd shale) 1</td>
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<tr>
<td>Dorcheat formation 2 (subsurface)</td>
<td><strong>Cane Hill member</strong> (of Hale formation) 2</td>
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<tr>
<td>Schuler formation 2 (subsurface)</td>
<td><strong>Gap Ridge sandstone member</strong></td>
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<tr>
<td>Smackover formation 2 (subsurface)</td>
<td>(of Stanley shale) 2</td>
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<tr>
<td>Wesson tongue 2 (of Dorcheat member of Schuler formation) (subsurface)</td>
<td><strong>Hale formation</strong> 1; †member (of Morrow formation) 1</td>
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<td><strong>Permian</strong></td>
<td><strong>Kessler limestone member</strong> (of Bloyd shale) 1</td>
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<td>Louann salt 2 (subsurface)</td>
<td><strong>Morrow series</strong> (as group or formation) 1</td>
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<td>Norphlet formation 2 (subsurface)</td>
<td><strong>Prairie Grove member</strong> (of Hale formation) 3</td>
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<tr>
<td>Werner formation 2 (subsurface)</td>
<td><strong>Woolsey member</strong> (of Bloyd shale) 2</td>
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<td><strong>Permian (?)</strong></td>
<td><strong>Mississippian and Pennsylvanian</strong></td>
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<tr>
<td>Eagle Mills formation 2 (subsurface)</td>
<td>†Boston group 1</td>
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<td><strong>Carboniferous</strong></td>
<td><strong>Mississippian</strong></td>
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<tr>
<td>Yellian series 1</td>
<td>†Carrolton limestone 1</td>
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<td><strong>Pennsylvanian</strong></td>
<td>Dotson black sheety shale 1</td>
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<tr>
<td>Appleton stage 1</td>
<td>†Hatton tuff lentil (of Stanley shale) 1</td>
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<tr>
<td>†Arkansan series 1</td>
<td><strong>Hot Springs sandstone</strong> 1</td>
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<td></td>
<td>†Marshall shale 1</td>
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<td></td>
<td><strong>St. Joe limestone member</strong> (of Boone formation) 1</td>
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<td></td>
<td>†Spring Creek limestone (in Moorefield shale) 1</td>
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</table>
United States—Continued
Arkansas—Continued

Mississippian—Continued
†Wyman sandstone 1

Upper Mississippian
Batesville sandstone 1
Fayetteville shale 1
Hindsville limestone member (of Batesville sandstone) 1
Moorefield formation (as shale) 1
Wyman sandstone 1
Woodruff shale 1
Wedington sandstone member (of Fayetteville shale) 1

Lower and Upper Mississippian
Boone formation, limestone 1
Devonian and Pennsylvanian
†Missouri Mountain formation 1
Devonian and Mississippian
Arkansas novaculite 1
Devonian (?)
Caddo Gap novaculite 1
†Eureka shale 1
†Noel shale 1
Sylamore sandstone member (of Chattanooga shale) 1

Middle Devonian
Clifty limestone 1
Lower or Middle Devonian
†Penters chert 1

Silurian
†Cason limestone 1
Lafferty limestone 1
St. Clair limestone 1
†Slatton shale 1

Upper Silurian
Missouri Mountain slate or shale 1
Lower Silurian
Blaylock sandstone 1

Ordovician
Buffalo group 1
†Key sandstone 1

Ordovician (?)
Crystal Mountain sandstone 1

Upper Ordovician
†Batesville ash bed 1
Cason shale 1
Polk Creek shale 1

Middle and Upper Ordovician
†Polk Bayou limestone 1
Middle Ordovician
Bigfork chert 1

California

Quaternary (see also Tertiary or Quaternary; and Pliocene, upper, and Quaternary)
Bay mud 2
Bodega Bay deposits 1
Boggs Mountain flows 2
Burnt Canyon breccia 2
Cabezon fanglomerate 1
China Ranch beds 2

Recent
Big Glass Mountain complex 1
Burnt Lava flow 2
Callahan flow 2

Recent (?)
Chalk Mountain dacite 1
<table>
<thead>
<tr>
<th>Geologic Name</th>
<th>Description</th>
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<td><strong>Pleistocene and Recent</strong></td>
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<tr>
<td>Dos Picachos gravels</td>
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<tr>
<td>Beehive Mesa alluvium</td>
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<tr>
<td>Paynes Creek basalt</td>
<td>1</td>
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<tr>
<td><strong>Pleistocene or Recent</strong></td>
<td></td>
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<tr>
<td>Mount Hoffmann complex</td>
<td>3</td>
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<tr>
<td><strong>Pleistocene</strong></td>
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<tr>
<td>Aeolian Buttes till</td>
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<tr>
<td>Alameda formation</td>
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<tr>
<td>Arroyo Seco gravel</td>
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<tr>
<td>Battery formation</td>
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<tr>
<td>Bautista beds</td>
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<tr>
<td>Bay Point formation</td>
<td>2</td>
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<tr>
<td>Bishop tuff</td>
<td>2</td>
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<tr>
<td>Blackhawk breccia</td>
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<tr>
<td>Brawley formation</td>
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<td><strong>Campus formation</strong></td>
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<td>Carpinteria formation</td>
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<td><strong>Casitas formation</strong></td>
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<td>Centinela gravels</td>
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<td>Clear Lake sediments</td>
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<td>Coahuila silt</td>
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<td>Deadman Island beds</td>
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<td>Dripping Springs formation</td>
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<td>Huichica formation</td>
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<td>June Lake basalt</td>
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<td>Kalorama member</td>
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<td>Las Posas formation</td>
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<td>Long Canyon member</td>
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<td>Los Cerritos beds</td>
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<td><strong>Manix lake beds</strong></td>
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<tr>
<td>Merritt sand</td>
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<td><strong>Millerton formation</strong></td>
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<td>Mono Craters obsidian</td>
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<td><strong>Montezuma formation</strong></td>
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<td>Nigger Canyon volcanics</td>
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<tr>
<td><strong>Pala conglomerate</strong></td>
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<td>Pauba formation</td>
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<td>Pie Knob andesite</td>
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<td>Pinto formation</td>
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<td>Pittsburg formation</td>
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<td>Red Shale Butte complex</td>
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<td>San Benito gravels</td>
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<td>Santa Cruz Island formation</td>
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<td>Temescal formation</td>
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<td>Tomales Bay deposit</td>
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<td><strong>Victor formation</strong></td>
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<td><strong>Pleistocene and Pliocene(?)</strong></td>
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<tr>
<td><strong>La Habra formation</strong></td>
<td>(as conglomerate)</td>
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<tr>
<td>Lake Coahuila deposits</td>
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<td>Orcutt formation</td>
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<td>Pacoima formation</td>
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<td>Peckham formation</td>
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<td>Rohnerville formation</td>
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<td>Timber Canyon fanglomerate</td>
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<td>Wilmington group</td>
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<td>Aromas red sands</td>
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<td>Barlow Ranch beds</td>
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<td>Fox Canyon member</td>
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<td>Grimes Canyon sand and gravel</td>
<td>(of Santa Barbara formation)</td>
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<td><strong>Tertiary or Quaternary</strong></td>
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<td>Black Mountain basalt flow</td>
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<td>Jacumba volcanics</td>
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<td>Table Mountain formation</td>
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<td>(Lang division)</td>
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<td>Meyer oil zone</td>
<td>(subsurface)</td>
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<td>Skoone Gulch basalt</td>
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<td>Sulphur Springs Mountain andesite</td>
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<td>Butte gravel member</td>
<td>(of Sutter formation)</td>
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<td>Grapevine conglomerates</td>
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<td><strong>Pliocene to Recent</strong></td>
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<tr>
<td>High Cascade series</td>
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<td><strong>Pliocene or Pleistocene</strong></td>
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<td><strong>Pliocene and Pleistocene</strong></td>
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<td>Carlotta formation</td>
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<td>Packwood gravels</td>
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<td>San Jacinto series</td>
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<td><strong>Santa Clara formation</strong></td>
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<td>(Santa Maria formation)</td>
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<td><strong>Ventura sands</strong></td>
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</table>
United States—Continued
California—Continued
Pliocene and later (f)
Kern River group, formation, or series
Pliocene and Pleistocene (f)
McKittrick group (as formation 1)
Merced formation 1
Tulare formation 2
Pliocene and Pleistocene, lower
Alamitos zone 1 (subsurface)
Ashton zone 1 (subsurface)
Bixby zone 1 (subsurface)
Booth zone 1 (subsurface)
Brown zone 1 (subsurface)
Fernando formation (as group 1)
Wilbur zone 1 (subsurface)
Pliocene and Pleistocene, lower (f)
Paso Robles formation 1
Pliocene (see also Miocene and Pliocene; and Miocene or Plio-
cene)
Alamo formation 2
Asphalt lake bed 1
Bald Hill agglomerate member
(of Tuscan formation) 2
Bald Peak basalt 1
Berkeley group 1
Buckbee oil zone 1 (subsurface)
Canebrake conglomerate 2
Chanac formation 1
Clarke oil zone 1 (subsurface)
†Contra Costa lake bed 1
Etchegoin formation 1
Falor formation 2
†Grizzly Peak andesite 1
Horsheff formation 2
Iron Canyon agglomerate member
(of Tuscan formation) 2
King City formation 2
Mark West andesite 1
Moraga formation 1 or tuff
Mount Eden formation 1
Nordstrom oil zone 1 (subsurface)
Northbrae rhyolite 1
O’Connell oil zone 1 (subsurface)
Orinda formation 1
Paiteines formation 1
Painted Hill formation 2
Petaluma formation 1
Pico formation 1
Pinole tuff 1
Piutean series 1
Purisima formation 1
Putnam Peak basalt 2
Sacramento tuff and sand member
(of Tuscan formation) 2
St. George formation 1
St. Helena rhyolite 1 member
(of Sonoma volcanics)
San Ardo group 2
San Diego formation 1
Santa Ana sandstone 1
Seven-Mile tuff and sand member
(of Tuscan formation) 2
Shasta lavas 2
United States—Continued
California—Continued
Pliocene—Continued
Sierra formation 1
Sonoma tuff 1
Sonoma volcanics 1
Stony Creek basalt 2
Sunshine Ranch member (of Saugus formation) 2
Supa tuff and sand member
(of Tuscan formation) 2
Tehama formation 1
Tehachapi rhyolite 1
Tuscan formation (as tuff 1)
Wildcat series 1
Wilson Ranch beds 1
Wolfskill formation 2
Pliocene (f)
Cuyama formation 1
Duarte conglomerate 2
Funeral conglomerate (as con-
glomerate) 2
Kettleman lake bed 1
Laguna formation 1
Lake basalt 2
Ridge Route formation 2
Saddleback basalt 2
San Mateo formation 1
Sweitzer formation 2
†Tassajara lake (f) bed 1
Pliocene, upper, or Pleistocene, lower
Cache formation 1
Coso formation 2
Hathaway formation 1
Ocotillo conglomerate 2
Pipes conglomerate 1
Pliocene, upper, and Quaternary
Bitterwater formation 2
Pliocene, upper
Alturas formation 1
Borrego formation 2
Careaga sand or sandstone 2
Casbaajo conglomerate member
(of San Joaquin formation) 2
Cebada fine-grained member (of Careaga sandstone) 2
Corcoran clay member (of Tulare formation) (subsurface)
(J. W. Frink and H. A. Kues, 1954, Am. Assoc. Petroleum Geol-
 ogists Bull., v. 38, no. 11, p. 2357-2371)
Ferndale sandstone 2
Graciosa coarse-grained member
(of Careaga sandstone) 2
Hungry Valley formation 2
Livermore gravel 1
Nomlaki tuff member (of Tehama and Tuscan formations) 1
San Joaquin formation 1
Santa Barbara formation (as beds 1)
San Timoteo beds 1
Scotia Bluffs sandstone 2
Pliocene, middle or upper
Camulos formation 1
United States—Continued
California—Continued

Pliocene, middle and upper
Rio Dell formation 2

Pliocene, middle (?) and upper
Foxen mudstone (as formation 1)

Pliocene, middle (see also Miocene, upper, to Pliocene, middle)
Peace Valley beds 2
Piru Gorge sandstone 2

Pliocene, lower and middle
Anaverde formation 2
Muhlolland formation 2
Oro Loma formation 2
Tinaquaic sandstone member (of Sisquoc formation) 2

Pliocene, lower (see also Miocene, upper, and Pliocene, lower)
Avawatz formation 2
Bennett formation 2
Bolsa zone 1 (subsurface)
Diablo formation 2
Eden beds 1
Eel River formation 2
Elsmere member (of Repetto formation) 2
Gosnell shale * (subsurface)
Green Valley formation 2

Jacalitos formation 1

Lawlor tuff 2
Lloyd zone 1 (subsurface)
Los Medanos formation 2
Lost Conglomerate member (of Repetto formation) 2
Napa Valley series 2
†Red Rock Canyon beds 1
†Repetto formation 1 or siltstone 1

Ricardo formation 1
Tonay volcanics 1

Pliocene and Miocene (?)

Poncho Rico formation 1

Pliocene, lower, and Miocene (?)

Santa Paula formation 1

Post-Miocene (?)

Amargosa chaos 2
Calico phase (of Amargosa chaos) 2
Jubilee phase (of Amargosa chaos) 2
Virgin Spring phase (of Amargosa chaos) 2

Miocene to Pleistocene (?)

Mud Hill series 1

Miocene, Pliocene, or Pleistocene

Wimer beds 1

Miocene or Pliocene

Furnace Creek formation 2

Greenwater volcanics 1
†Rainbow beds 1
San Pedro schist breccia and sandstone 1

Miocene and Pliocene

Bartolo conglomerate 2
†Coalinga beds 1
Crescent City beds 1

United States—Continued
California—Continued

Miocene and Pliocene—Continued

Mehrten formation 1

Pismo formation 1
Quarry conglomerate 2
Sycamore conglomerate 2

Todos Santos claystone member
(of Sisquoc formation) 2
Turnbull conglomerate 2
Violin breccia 2
Workman Hill conglomerate 2

Miocene

Alverson andesite lava 2
Bear River series 1
Bena gravels 2
Blanca tuff 1
Carpenters sandstone member 1 (of Temblor formation)
†Carrizo formation 1
Casmalia gypsiferous shale or red beds 1

castasic formation 2
Carverdale andesite 1
Cedarville series 1
Conejo volcanics 1
El Modena volcanics 2
Elsinore sand 1 (subsurface)
Fish Creek gyspsum 2
Friant formation 2
Galloway beds 2
Glendora volcanics 2
Hay Fork beds 1
Harris formation 1

Hyampom lake beds 1

Jewett sand and silt 1 (subsurface)
Jewett silt member 1 (of Temblor formation) (subsurface and surface)
Johnson gravels 1
Kirkers Pass beds 1
Meeha formation 2
Media shale 1
Olleshae 2 (subsurface)
Passadie formation 1
Poso Creek sand 1 (subsurface)
Queroan sandstone 1
Redhill sandstone 1
Round Mountain silt 1 (subsurface and surface)
Tequepis sandstone 1
Walker formation 1 (subsurface and surface)
Walker Plain basalt 2

Miocene (?)

Bouquet Canyon breccia 1
Dos Palmas rhyolite 2
†Escondido series 1
Fountain Peak rhyolite 2
Furnacean series 1

Laird sandstone 2
Millet clay 1
Negra clay 1
Pinnacles formation 2
Potato sandstone 1
**United States—Continued**

**California—Continued**

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<td>Valley Springs formation 1</td>
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<tr>
<td>Miocene, upper, and Pliocene, lower</td>
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<tr>
<td>Capistrano formation 1</td>
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<td>French Flat sandstone 2</td>
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<td>Ridge Basin group 2</td>
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<td>Towsley formation 2</td>
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<tr>
<td>Miocene, upper, to Pliocene, middle</td>
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<tr>
<td>Contra Costa group 3</td>
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<td>Sisquoc formation 1</td>
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<tr>
<td>Miocene, upper, to Pliocene, lower (f)</td>
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<td>Pullen formation 2</td>
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<tr>
<td>Miocene, upper</td>
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<tr>
<td>Antelope shale member (of Monterey formation) 3</td>
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<tr>
<td>Apache formation 2</td>
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<tr>
<td>Belridge diatomite 2</td>
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<tr>
<td>Blanco sandstone (in Puente formation) 3</td>
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<tr>
<td>Beopesta formation 1</td>
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<td>Briones sandstone 1</td>
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<tr>
<td>Central Fee unit (in Sycamore Canyon member of Puente formation) 3</td>
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<td>Cierbo sandstone 1</td>
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<td>Cubierto shale (in Puente formation) 2</td>
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<td>Hercules shale member (of Briones sandstone) 1</td>
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<td>Hoover conglomerate unit (in Sycamore Canyon member of Puente formation) 2</td>
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<td>Hunter sandstone and conglomerate (in Puente formation) 2</td>
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<td>Kramer Lake beds (in Ricardo formation) 3</td>
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<td>La Vida member (of Puente formation) 2</td>
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<td>McDonald shale member (of Monterey formation) 2</td>
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<td>McLure shale member (of Monterey formation) 1</td>
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<td>Mahala sandstone and conglomerate 2</td>
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<td>Malaga mudstone member (of Monterey formation) 1</td>
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<td>Mellenia series 1</td>
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<td>Mint Canyon formation 1</td>
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<td>Modelo formation 1</td>
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<td>Mohawk lake beds 1</td>
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<tr>
<td>Morales member (of Santa Margarita formation) 1</td>
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<tr>
<td>Neroly formation 1 or sandstone</td>
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<td>Papel Blanco shale 2</td>
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<td>Peculiar shale (in Puente formation) 2</td>
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<td>Point Arena beds 2</td>
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<td>Puente formation 1</td>
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<tr>
<td>Punchbowl formation 2</td>
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<tr>
<td>Quatal red clay member (of Santa Margarita formation) 1</td>
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<td>Red Mountain andesite 1</td>
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<table>
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<td>Red Rock Canyon sandstone member (of Santa Margarita formation) 1</td>
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<tr>
<td>Reef Ridge shale 1</td>
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<td>St. Paul sand 1 (subsurface)</td>
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<tr>
<td>San Pablo group 1 or formation 1</td>
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<tr>
<td>Santa Margarita formation (as sandstone)</td>
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<td>Soledad divisions 1</td>
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<tr>
<td>Soquel member (of Puente formation) 2</td>
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<td>Sycamore Canyon member (of Puente formation) 2</td>
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<td>Tice shale 1</td>
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<tr>
<td>Trampan formation 1</td>
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<tr>
<td>Valmonte diatomite member (of Monterey shale) 1</td>
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<tr>
<td>Yorba member (of Puente formation) 2</td>
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<tr>
<td>Whiterock Bluff shale member (of Santa Margarita formation) 1</td>
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<tr>
<td>Miocene, middle</td>
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<tr>
<td>Coachella conglomerate 1</td>
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<tr>
<td>Indio formation 1</td>
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<tr>
<td>Palm Spring formation 1</td>
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<tr>
<td>Miocene, middle and upper</td>
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<tr>
<td>Altamira shale member (of Monterey shale) 1</td>
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<tr>
<td>Alverson Canyon formation 2</td>
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<td>Barstow formation 1</td>
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<tr>
<td>Maricopa shale 1</td>
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<tr>
<td>Monterey group, formation, or shale</td>
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<td>Twisselmann sandstone member (of Monterey formation) 2</td>
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<td>Miocene, middle</td>
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<td>Alferitz formation 2</td>
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<td>Big Blue serpentinitous member (of Temblor formation) 1</td>
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<td>Buzzard Peak conglomerate member (of Topanga formation) 2</td>
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<td>Calliente formation 2</td>
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<td>Claremont shale 1</td>
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<td>Escudo sandstone 2</td>
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<td>Felix siltstone 1 (subsurface)</td>
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<td>Gould shale member (of Monterey shale) 1</td>
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<td>Hambre sandstone 1</td>
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<td>Hollycrest formation 2</td>
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<td>Kinnick formation 1</td>
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<tr>
<td>Miraleste tuff bed 1 (in Altamira shale member of Monterey shale)</td>
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<td>Oceola Creek beds 1</td>
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<td>Oursan sandstone 1</td>
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<td>Point Sal formation 2</td>
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<tr>
<td>Portuguese tuff bed 1 (in Altamira shale member of Monterey shale)</td>
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<td>Rench sand 1 (subsurface)</td>
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### United States—Continued

#### California—Continued

<table>
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<th>Miocene, middle—Continued</th>
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<tbody>
<tr>
<td><strong>Rodeo shale</strong> 1</td>
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<tr>
<td>†Salinas shale 1</td>
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<tr>
<td><strong>San Onofre breccia</strong> 1</td>
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<td><strong>Topanga formation</strong> 1</td>
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<td>Whepley shale 1 (subsurface)</td>
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<tr>
<td><strong>Miocene, middle(f)</strong></td>
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<tr>
<td>†Quien Sabe volcanics 2</td>
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<tr>
<td><strong>Miocene, middle or older</strong></td>
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<tr>
<td>Elephant Hill breccia 2</td>
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<tr>
<td>[Johnstone] Johnson Peak tuff breccia 2</td>
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<tr>
<td>Spadra felsophyre 2</td>
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</tbody>
</table>

#### Pre-middle Miocene

| Witnet formation 1       |
| **Miocene, lower and middle** |
| **Sandholdt shale** 2     |
| **Split Mountain formation** 2 |
| **Temblo formation** 1    |

#### Miocene, lower (see also Eocene to Miocene, lower)

| **Agua sandstone member (of Santos shale)** 1 |
| †Coyote Mountain clays (in Imperial formation) 1 |
| **Hannah formation** 2                        |
| **Imperial formation** 1                      |
| †**Latrania sands** 1                        |
| **Lion sandstone** 1                         |
| **Obispo tuff member (of Monte-rey formation)** 2 |
| **Painted Rock formation** 2                 |
| **Pato red member (of Vaqueros formation)** 1 |

#### Pulaiski sand 1 (subsurface)

| **Rincon shale** 1 or mudstone 1 |
| **San Juan Bautista sandstone** 1 |
| **San Lorenzo series** 1         |
| **San Lorenzo formation** 1      |

#### Eocene (see also Eocene, upper, and Oligocene; and Eocene to Oligocene)

| **Alegria formation** 2            |
| **Bealville fanglomerate** 2       |
| **Concord formation** 1            |
| **Kirker tuff** 1                  |
United States—Continued
California—Continued

Eocene—Continued
Matilija sandstone member 1 (of Tejon formation)
Metralla sandstone member (of Tejon formation) 2
Montgomery Creek formation 1
Nonada sand member (of Dom-engine formation) 2
Piru formation 2
Ragged Valley shale member (of Arroyo Hondo formation) 2
Reed Canyon silt member (of Tejon formation) 2
Rose Canyon shale 1
San Simeon formation 2
†Stewartville group *
The Rocks sandstone 2
†Topatopa formation 1
Torrey sand 1
Tres Pinos sandstone 1
Uvas conglomerate member (of Tejon formation) 2
Walkup clay 1
Weaverville formation 1
Yokut sandstone 2

Eocene (?)
Carmelo series 1
Indian conglomerate 1
†Mohave formation 2
Mono shale 1
†San Pedro shales 1

Eocene, upper, and Oligocene
Sespe formation 1

Eocene, upper
Alhambra formation 2
Bear Canyon sandstone member (of Kreyenhagen formation) 2
Castro shale member (of Alhambra formation) 2
Echo Falls shale 1
Essebar sandstone 2
Gredal formation 2
Kellogg shale 2
Markley sandstone 1 member (of Kreyenhagen formation)
Nortonville shale member (of Kreyenhagen formation) 2
Pereira shale member (of Alhambra formation) 2
Point of Rocks sandstone 2
Poway conglomerate 1
Roop sandstone member (of Alhambra formation) 2
Sidney shale member (of Markley formation) 2
Sierra Blanca limestone 1
Tejon formation 1
Welcome formation 2
Wheatland formation 2

Eocene, middle
Anita shale 2
Camino Cielo sandstone member (of Juncal formation) 2

United States—Continued
California—Continued

Eocene, middle—Continued
Capay formation 1
Domengine formation 1 or sandstone
Hawkhill formation 2
Juncal formation 2
Las Juntas shale 2
Reeds Creek andesite 2
Eocene, middle, to Oligocene, lower
Welcome formation 2
Wheatland formation 2

Eocene, lower
Las Juntas shale 2
Marysville claystone member (of Meganos formation); (as formation 1)
Meganos formation 1
Paleocene and Eocene
Cerros shale member (of Lodo formation) 2
Laguna Seca formation 2
Lodo formation 2

Paleocene
Claymont clay bed (in Silverado formation) 2
Dip Creek formation 2
Las Virgenes sandstone 1
Martinez formation 1
Serrano clay bed (in Silverado formation) 2
Silvoa formation 2
Simi conglomerate 1
Vine Hill sandstone 2

Mesozoic and Tertiary
†Chico-Tejon series 1
†Pescadero series 1
†San Francisco group 1
†San Francisco sandstone 1

Mesozoic (see also Paleozoic and Mesozoic)
Courtney granite 1
Indian Gulch 1 (formation)
Mariposa group 1
Mount Ord series 2

Mesozoic (?)
Little Chief porphyry 1
Mountain Meadows dacite porphyry 2
Ravenna plutonic series 1

Upper Mesozoic
Darwin quartz diorite 2
Cosio granodiorite 2

Upper Mesozoic (?)
Perris quartz diorite 1
United States—Continued
California—Continued

Probably lower Mesozoic
Agua Fria 1 (formation)
Hunter Valley 1 (cherts)
Penyon Blanco agglomerate 1

Mesozoic or older
Catalina schist (as facies of Franciscan series)
Post-Cretaceous
Alum Rock rhyolite 2
Probably post-Cretaceous
Rattlesnake granite 1

"Between late Cretaceous and Eocene"
Iversen basalt 2

Cretaceous or Eocene
Osila sand 2

Cretaceous and Paleocene(?)
Cima sandstone lentil (in Dos Palos shale member of Moreno formation) 2
Dos Palos shale member (of Moreno formation) 2

Cretaceous (see also Jurassic and Cretaceous; and Jurassic or Cretaceous)
Berryessa formation 2
Domenigoni Valley granodiorite 2
Escondido Creek leucogranodiorite 2
Indian Mountain leucogranodiorite 2
Lakeview Mountain tonalite 2
Lake Wolford leucogranodiorite 2
La Sierra tonalite 2
Mount Hole granodiorite 2
Roblar leucogranite 2
San Marcos gabbro 2
Shasta-Chico series 1
Trabuco formation 1
Woodson Mountain granodiorite 2

Cretaceous(?)
Cahuenga beds 2
Griffith beds 2
Holcomb quartz monzonite 2
Novate conglomerate 2
Patrick greenstone 1

Probably Cretaceous
Bridalveil granite 1
Cathedral Peak granite 1
El Capitan granite 1
Half Dome quartz monzonite 1
Johnson granite porphyry 1
Leaning Tower quartz monzonite 1
Mount Clark granite 1
Pohono granodiorite 1
Sentinel granodiorite 1
Taft granite 1
Tuolumne intrusive series 1

Upper Cretaceous or Tertiary, lower
Kingston Range monzonite porphyry 1

Upper Cretaceous and Paleocene
Moreno formation or shale 1

Upper Cretaceous
Antelope shale 2
Asuncion group 2
† Atascadero formation 1
Baker Canyon conglomerate member (of Ladd formation) 2
Big Oak Flat shale and sandstone member (of Panoche formation) 2
Bonsall tonalite 2
Butts Ranch shale member (of Panoche group) 2
Call sandstone member (of Panoche group) 2
Cantinas sandstone 2
Chico formation or group 1
Chico Creek beds 2
Debris Dam sandstone 2
Dosados sand and shale member (of Moreno formation) 2
Forbes formation 2
Funks formation 2
Gaines group 2
Garzas beds 2
Godfrey shales 2
Golden Gate formation 2
Green Valley tonalite 2
Gualala series (see † Wallala beds 1 below)
Guinda formation 2
Holz shale member (of Ladd formation) 2
Jack Creek formation 2
Jalama formation 2
Joaquin Ridge sandstone member (of Panoche formation) 2
Ladd formation 2
Los Banos Creek member (of "Quinto B" reef beds) 2
Los Gatos beds 2
Marca shale member (of Moreno formation) 2
Mercy sandstone lentil (in Tierra Loma shale member of Moreno formation) 2
Mills formation 2
Mustang Creek formation 2
Oakland conglomerate member (of Chico formation) 1
Orestimba formation 2
Pacheco group 2
Panoche formation 2
Paynes shale and sandstone member (of Panoche group) 2
Pendola shale 2
Piedras Altas formation 2
Pioneer group 2
Pleasants sandstone member (of Williams formation) 2
Quinto member (of Moreno group) 2
United States—Continued
California—Continued
Upper Cretaceous—Continued
Romero conglomerate (in Debris Dam sandstone) 2
Salt Creek conglomerate 2
Schulz Ranch sandstone member (of Williams formation) 2
Sites formation 2
Sunol series 2
Terra Loma shale member (of Moreno formation) 2
Venado formation 2
Volta formation 2
†Wallala beds 1 or group 1
[Guatala correct spelling] Williams formation 2
Yolo formation 2
Upper Cretaceous (?)
Cuyamaca gabbro (as basic intrusive) 1
Pre-Uper Cretaceous
Cucamonga complex 2
Deer diorite 2
Lower Cretaceous (see also Upper Jurassic or Lower Cretaceous)
Cottonwood beds 3
Cuesta diabase 1
†Headlight porphyry 1
Horsetown formation 1
Hulen beds 2
Marmolejo formation 2
Paskenta formation 1
Shasta series 1
†Toro formation 1
Wisenor formation 2
Pre-Cretaceous
Placerita formation 1
Rubio diorite and metadiorite 1
San Gabriel formation 1
Santa Lucia granite or quartz diorite 2
Tamarack formation 1
†Trinity formation 1
Pre-Cretaceous (?)
Felix granodiorite 3
Las quartz diorite 2
Vermont quartz diorite 2
Post-Franciscan
Rainbow series 1
Walker Ridge sandstones 1
Walker Ridge shales 1
Jurassic or Cretaceous
San Jacinto granodiorite 2
Jurassic and Cretaceous
Benita sandstone 1 member (of Franciscan formation)
Cahill sandstone 1 member (of Franciscan formation)
Calera limestone member (of Franciscan formation); (as member of Cahill sandstone 1)
Espada formation 2
Franciscan formation 1; †group 1
Ingleside chert 1 member (of Franciscan formation)
United States—Continued
California—Continued
Jurassic and Cretaceous—Continued
Marin sandstone 1 member (of Franciscan formation)
Sausalito chert 1 member (of Franciscan formation)
Yager formation 2
Jurassic
Amargo formation 2
Cove quartz monzonite 2
Elder Creek group 2
Grindstone group 2
Newville group 2
Plumas series 1
Ship Mountain granite 2
Siskiyou granodiorite 1
Jurassic (?)
Atolia quartz monzonite 1
Bolina sandstone 1
†Bully Hill rhyolite 1
Corral Hollow shales 1
Gavilan Peak gabbro 2
†Golden Gate series 1
Lebec quartz monzonite 2
Liebre quartz monzonite 2
Oakridge sandstone 1
Osoos basalt 1
Pilarcitos sandstone 1
Pinyon Ridge granodiorite 2
San Bruno sandstone 1
†San Luis formation 1
†San Miguel cherts 1
Santiago Peak volcanics 2
School Canyon granite 2
†Silver Terrace sandstone 1
Stonewall quartz diorite 1
or formation
Tejon Lookout granite 2
†Telegraph Hill sandstone 1
Temescal Wash quartz latite porphyry 2
Val Verde tonalite 2
White Tank monzonite 2
Pre-Franciscan
Bodega diorite 1
Coast complex 1
Gabilan limestone 1
Santa Lucia series 1
Upper Jurassic or Lower Cretaceous
Alpine quartz diorite 1
Descanso granodiorite 1
Harbison quartz diorite 1
La Posta quartz diorite 1
Mount Lowe granodiorite 1
Mount Wilson quartz diorite 1
Viejas gabbro-diorite 1
Upper Jurassic or Lower Cretaceous (?)
Bishop Creek granite 2
Upper Jurassic
Bicknell sandstone 1
Bradley granodiorite 2
Colfax formation 1
### United States—Continued
#### California—Continued

#### Upper Jurassic
- Combe sandstone
- Cooks Canyon agglomerate
- Fargo Canyon diorite
- Foreman argillite
- Foreman formation
- Hinrich sandstone
- Honda formation
- Hull meta-andesite
- Inyo granite
- Knoxville formation
- Lucky S argillite
- Mariposa slate or formation
- Monte de Oro formation
- North Ridge agglomerate
- Oroville beds
- Victorville quartz monzonite

#### Upper Jurassic (?)
- Bald Rock granite
- Bucks granodiorite
- Cactus granite
- Cajalco quartz monzonite
- Coxcomb granodiorite
- Estelle quartz diorite
- Isabella granodiorite
- Lakeview quartz-hornblende diorite
- Merrimac granodiorite
- Montara granite
- Parker quartz diorite
- Steele Valley granodiorite
- Temescal porphyry
- Virginia quartz hypersthene
- Virginia quartz hypersthene norite

#### Middle or Upper Jurassic
- Casumnes formation
- Dufresne slate
- Logtown Ridge formation
- Mountain Spring volcanics
- Newton Mine volcanics
- Sunnybrook volcanics

#### Middle and Upper Jurassic
- Amador group

#### Middle Jurassic
- Hardgrave tuff
- Hull agglomerate
- Moonshine conglomerate
- Mormon sandstone
- Morrison sandstone
- Thompson sandstone
- Thompson red shale

#### Lower and Middle Jurassic
- Bend formation
- Potem formation

#### Lower Jurassic
- Arverson formation
- Fant meta-andesite
- Hardgrave sandstone
- Lilac argillite

#### Lower (?) Jurassic
- Bagley andesite

#### Jurassic or older
- Kernville series
- Pampa schist

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### United States—Continued
#### California—Continued

#### Triassic and Jurassic
- Casual formation
- Probably Casual and Jurassic
- Bean Canyon formation or series
- Tuolumne group

#### Triassic
- Bedford Canyon formation
- Elsinore metamorphic series
- Genesee Valley limestone and shales
- Santa Ana limestone

#### Triassic (?) or older
- Julian schist

#### Upper Triassic and Lower Jurassic
- Sailor Canyon formation
- Probably Upper Triassic or Jurassic
- Black Mountain volcanics

#### Upper Triassic
- Brock shale
- Cedar formation
- Devils Canyon member (of Modin formation)
- Hawkins Creek member (of Modin formation)
- Hosselkus limestone
- Hosselkus series
- Kosk member (of Modin formation)
- Modin formation
- Swearinger slate
- Trail formation

#### Middle and Upper Triassic
- Pit shale or formation
- Pitt series
- Lower and Middle Triassic
- Inyo series
- Lower Triassic
- Inyoan series

#### Paleozoic and Mesozoic
- Diamond Valley complex
- Maria plutonic complex
- Pleasant View complex

#### Paleozoic (?) or Mesozoic (?)
- Sacatar quartz diorite
- Tuol Creek

#### Paleozoic
- Furnace limestone
- Laurel Canyon formation
- Palm Canyon complex
United States—Continued
California—Continued
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Tumco formation 2
Vitrefrax formation 2

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Chino Quarry quartzite 1
Jurupa series 4
Preston hornblende diorite 1
Sky Blue Quarry limestone 1
Sur series 1

Upper Paleozoic or Triassic
McCoy Mountains formation 3

Upper Paleozoic
Calaveras formation 1
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Upper Paleozoic(f)
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Hanaupah formation 1
Marvel limestone 1
Middle Park formation 1
Mountain Girl conglomerate-quartzite 1
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Sentinel dolomite 1
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Dekkas andesite 1
Fairview Valley formation 2
Garlock series 3
McClyod limestone 1
†McClyod shales 1
Mokolune formation 3
Nosoni formation 1

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Reward conglomerate 1 member (of Owens Valley formation)
Wildwood limestone 1

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Basin Ridge group 2
Bassick agglomerate 1
Black Hill rhyolite 1
Bonanza latite 1
Brewer Creek latite 1
Buffalo Peaks andesite 1
Calico Peak porphyry 1
Chalmers quartz monzonite 2
Climax porphyry 2
†Cripple Creek breccia 1
Eagle Gulch latite 1
Empire Gulch rhyolite 1
Eve porphyry 2
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Golden member (of Arapahoe-Denver formation) 2
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Hayden Peak latite 1
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Porphyry Peaks rhyolite 1
Pringle andesite 1
Red Mountain rhyolite 1
Squaw Gulch latite 1
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Twins Lakes quartz monzonite porphyry 1
Utica quartz monzonite porphyry 1
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Little Union quartz latite 2
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Alboroto rhyolite (as quartz latite) 1
Conejos formation (as andesite) 1
Creede formation 1
Fishers quartz latite (as latite-andesite) 1
Potosi volcanic series 1
Treasure Mountain rhyolite (as quartz latite) 1
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Eagle River porphyry 1
Pando porphyry 2
Sacramento porphyry 1
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Elk Mountain porphyry 1
Evans Gulch porphyry 1
Gray porphyry group 1
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White porphyry 1
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Bridge timber gravel 1
Hinedale formation 1
North Park formation 1
Nussbaum formation 1
Pliocene, upper, or Pleistocene, lower
Alamosa formation 1
Miocene or Pliocene
Cimarron Creek latite 1
Difficulty Creek latite 1
High Park lake beds 1
Miocene
American Flat latite 1
Burns quartz latite or latite tuff 1
Campbell Mountain rhyolite 1
Equity quartz latite 1
Eureka rhyolite formation
†Gap latite 1
Henson tuff 1
Huerto quartz latite (as andesite) 1
Mammoth Mountain rhyolite 1
Nelson Mountain quartz latite 1
Niagara Gulch latite 1
Outlet Tunnel quartz latite 1
†Palisade andesite 1
Phoenix Park quartz latite 1
Pikeuane quartz latite (as volcanic group) 1
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Rat Creek quartz latite 1
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Canyon Creek member (of San Juan tuff) 1
†Cropsy Peak type (latite)
Lake Fork quartz latite (as andesite) 1
Rawley andesite 1
San Juan tuff 1 or breccia
Sneffels member (of San Juan tuff) 1
†South Mountain type (latite)
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Weller horizon or sandstone 1
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Miocene, upper or Pliocene
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Miocene, upper
Governor diorite 2
Stony Mountain diorite 2
### United States—Continued

**Colorado—Continued**

**Miocene, upper—Continued**
- Wagon Tongue formation

**Miocene, middle, and Pliocene, lower**
- Pawnee Creek beds

**Oligocene**
- Antero formation
- Castle conglomerate
- Chumway rhyolite
- Guffey volcanics
- Troublesome formation
- Vista member (of White River formation)

**Oligocene (?) or Miocene (?)**
- Canby latite

**Oligocene, upper, and Miocene, lower**
- Martin Canyon beds

**Oligocene, middle**
- Cedar Creek beds

**Oligocene, lower**
- Balfour formation
- Castle Rock conglomerate
- Horseshoe Creek beds
- Thirty-nine Mile volcanic series

**Eocene or Oligocene**
- Vallejo formation

**Eocene and Oligocene**
- Monument Creek group

**Post-Eocene, pre-Miocene**
- Green Mountain conglomerate

**Eocene**
- Bazoo porphyry
- Brainerd quartz monzonite
- Bunker andesite
- Chalk Mountain nevadite
- Copper Mountain porphyry
- Cucharah formation
- Gold Hill porphyry
- Green Mountain beds
- Huerfano series
- McNulty Gulch rhyolite
- Modoc quartz monzonite
- Montezuma quartz monzonite
- Mosquito porphyry
- Mount Alto quartz monzonite
- Mount Zion porphyry
- Rosita andesite
- Ruby formation
- San Miguel conglomerate
- Silverheels porphyry
- White Raven quartz monzonite

**Eocene (?)**
- Animas River beds
- Silver Mountain monzonite porphyry

**Eocene, middle**
- Anvil Points member (of Green River formation)

### United States—Continued

**Colorado—Continued**

**Eocene, middle—Continued**
- Douglas Creek member (of Green River formation)
- Garden Gulch member (of Green River formation)
- Parachute Creek member (of Green River formation)
- Eocene, lower and middle
- Huerfano formation
- Huerfano beds
- Calumet granodiorite
- Hiawatha member (of Wasatch formation)
- Plateau Valley beds
- Paleocene and Eocene, lower
- DeBeque formation

**Paleocene**
- Coalmont formation
- Poison Canyon formation
- Ridgway till
- Tiffany beds

**Paleocene (?) to Oligocene (?)**
- Mount Aetna quartz monzonite porphyry
- Mount Pomeroy quartz monzonite (as Pomeroy quartz monzonite)
- Mount Princeton quartz monzonite
- Mount Princeton quartz monzonite; see also Princeton quartz monzonite

**Paleocene (?)**
- Ohio Creek conglomerate

**Cretaceous**
- Coloradan series
- Trinidad lignite group

**Cretaceous (?)**
- Albion monzonite
- Greenwich shale

**Upper Cretaceous or Tertiary, lower**
- Quail porphyry

**Upper Cretaceous and Paleocene**
- Animas formation
- Dawson arkose
- Denver formation
- Middle Park formation
- Morley coal group
- Raton Hills group
- Raton Pass coal group
- Wooton coal group

**Upper Cretaceous**
- American Nettie quartzite
- Anchor Mine tongue (of Mancos shale)
- Apache sandstone
- Apishapa shale
- Arapahoe formation
- Baldwin sandstone member (of Mesaverde formation)
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Colorado—Continued

Upper Cretaceous—Continued

Beecher Island shale member (of Pierre shale) 1
Black Diamond coal group 1
Bowie shale member (of Mesaverde formation) 2
Cameo member (of Price River formation) 2
Canyon City group 1
Carille shale 1
Cliff House sandstone 1
†Colorado series 1
Corcoran member (of Price River formation) 2
Cozzette member (of Price River formation) 2
Engle coal group (in Vermejo formation) 1
†Fairfield coal group 1
†Goff coal group (in Williams Fork formation) 1
†Golden formation or group 1
Greenhorn limestone 1
Haybro formation 1
Hayden Gulch sandstone member (of Haybro formation) 1
Holderness formation 1
Hunter Canyon formation 1
Hygiene sandstone member (of Pierre shale) 1
Iles formation 1
Laramian series 1
Larimer formation 1
Larimer sandstone member (of Pierre shale) 1
Lead King lime 1
Levis shale 1
Lion Canyon coal group (in Williams Fork formation) 1
†Lion Canyon sandstone member (of Williams Fork formation) 1
McDermott member (of Animas formation), (as formation) 1
Mancos sandstone 1
Mancos shale 1; where Mowry member is recognized Mancos shale is Lower and Upper Cretaceous
Mancosian series 1
Menefee formation 1
Mesaverde group or formation 1
Milliken sandstone member (of Fox Hills sandstone) 1
Milner formation 1
Morapos sandstone member (of Mancos shale) 1
Mount Garfield formation 1
Mount Harris formation 1
Paonia shale member (of Mesaverde formation) 1
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†Piedra formation 1
†Platte series 1
Point Lookout sandstone 1

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Richard sandstone member (of Pierre shale) 1
Rockvale sandstone member (of Vermejo formation) 1
Rocky Ridge sandstone member (of Pierre shale) 1
Rollins sandstone member (of Mesaverde formation 1 or of Mount Garfield formation)
Sopris coal group (in Vermejo formation) 1
Terry sandstone member (of Pierre shale) 1
Thatcher limestone member (of Graneros shale) 2
Timpas limestone 1
Tow Creek sandstone 1 member (of Iles formation)
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**Connecticut**

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†Buckingham marl 2
†Jacksonville formation 1
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†Euchee phase 1
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†Choctawhatchee formation 1
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†Alaqua phase 1
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Eocene, middle
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Oldsmar limestone 2 (subsurface)
Paleocene
Cedar Keys limestone 2 (subsurface)
Upper Cretaceous
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Penholoway formation 1
†Satilla formation 1
Piocene
Chariton formation 1
Miocene, lower
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†Parachuela marl or shale 1
Wileys Landing bed 1
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†Bainbridge residual beds 1
†Brier Creek marl 1
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†Flint River formation 1
Oligocene, middle
†Flint River lower and upper zones 1
Eocene, upper
†Bainbridge marl 1
Irvinton sand member (of Barnwell formation) 2
†Key Creek sand 1
Sandersville limestone member (of Barnwell formation) 2
†Shell Bluff marl (in Barnwell formation) 1
Tivola tongue (of Ocala limestone) 1
†Twiggs clay member (of Barnwell formation) 1
Eocene, middle
McBean formation 1
Upper Cretaceous
Atkinson formation 2 (subsurface)
Bluffton marl 1
Cusseta sand member (of Ripley formation) 1 or Cusseta sand
Providence sand (as member of Ripley formation) 1
†Renfroes marl 1
Paleozoic
Palmetto type granite 2
Paleozoic (?)
Little River series 2
Permian (?)
Stone Mountain granite 2
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<td>†Oostanaula shales or series</td>
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<td>Salem Church granite</td>
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<td>Probably Cambrian</td>
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<td>High Tower granite</td>
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<td>American Falls lake beds</td>
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**Idaho—Continued**

| Pleistocene       | | |
| Edie School rhyolites | | |
| Idaho formation   | | |
| Mink Creek conglomerate | | |
| Pliocene (?)      | | |
| Boise sandstone   | | |
| Cache Valley group | | |
| Donkey fanglomerate | | |
| Malade Valley group | | |
| Marsh Creek group  | | |
| Poison Creek formation | | |
| Pliocene, upper   | | |
| Banbury volcanics | | |
| Hagerman lake beds | | |
| Pliocene, upper (?) | | |
| Raft lake beds    | | |
| Pliocene, middle (?) | | |
| Rockland Valley basalt | | |
| (?) Pliocene, lower | | |
| Eagle Rock tuff   | | |
| Massacre volcanics | | |
| Neely lake beds   | | |
| Miocene, Pliocene, and Pleistocene | | |
| †Nampa beds       | | |
| Miocene and Pliocene (?) | | |
| Payette formation | | |
| Miocene (?)       | | |
| Medicine Lodge beds | | |
| Miocene, upper, or Pliocene, lower Owyhee rhyolite | | |
| (?) Miocene, upper | | |
| Pillar Falls mud flow | | |
| Shoshone Falls andesite | | |
| Miocene, middle, or upper Latour formation | | |
| Oligocene (?)      | | |
| Mount Bennett rhyolite | | |
| Probably Oligocene and Miocene Kamiah volcanics | | |
| Oligocene, upper, or Miocene, lower Challis volcanics | | |
| Germer tuffaceous member (of Challis volcanics) | | |
| Yankee Fork rhyolite member (of Challis volcanics) | | |
| Cretaceous         | | |
| Tygee sandstone    | | |
United States—Continued
Idaho—Continued

**Lower and Upper** Cretaceous
- *Wayan formation* 1

**Lower Cretaceous**
- Bechler conglomerate 1 or shale
- Draney limestone 1
- Ephraim conglomerate 1
- Gannett group 1
- Peterson limestone 1

**Lower** Cretaceous
- Homer limestone member (of Wayan formation) 1

**Jurassic** or **Cretaceous**
- Boise granite 1
- Probably Jurassic or Cretaceous
  - Bayview granodiorite 1
  - Granite Creek granodiorite 1
  - Packsaddle Mountain granodiorite 1

**Upper Jurassic**
- Preuss sandstone 1 or red beds
- Wolverine Canyon limestone member (of Preuss sandstone) 2

**Triassic**
- Lanes tongue (of Ankareh formation) 2
- Wood shale 1 tongue (of Ankareh formation)

**Triassic** (?)
- Higham grit 1

**Upper Triassic**
- Deadman limestone 1
- Lucille series 2
- Stump sandstone 1

**Lower Triassic**
- Portneuf limestone 1 member (of Thaynes formation)

**Pennsylvanian and Upper Triassic**
- Seven Devils volcanics 1

**Permian**
- Phosphoria formation 1
- Rex chert member or tongue (of Phosphoria formation) 1

**Permian** (?)
- Casto volcanics 1
- Snake River series 1

**Pre-Permian**
- Blacklead limestone 1

**Carboniferous**
- Pittsburg formation 2
- Upper Carboniferous (?)
- Sandpoint conglomerate 1

**Pennsylvanian**
- Wells formation 1
- Wood River formation 1

**Mississippian and Devonian** (?)
- Milligan formation 1

**Upper Devonian**
- Grand View dolomite 1

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United States—Continued
Idaho—Continued

**Silurian**
- Trail Creek formation 1

**Ordovician**
- Phi Kappa formation 1
- Upper Ordovician
  - Fish Haven dolomite 1
  - Kinnikinic quartzite 1
  - Saturday Mountain formation 1
- Lower Ordovician
  - Ramshorn slate 1

**Cambrian** (?)
- Bannock volcanic formation 1
- Bayhorse dolomite 1
- Garden Creek phyllite 1

**Upper Cambrian**
- Ovid formation 2

**Middle and Upper Cambrian**
- Nounan limestone 1

**Middle Permian**
- Bloomington limestone formation 1
- Lakeview limestone 1
- Langston limestone 1
- Rennie shale 1
- Spence shale member (of Ute limestone) 1

**Middle (?) Cambrian**
- Gold Creek quartzite 1

**Lower Cambrian (?)**
- Black Rock limestone 1

**Precambrian**
- Blacktail formation 1
- Burke formation 1
- Cataldo quartzite 1
- Coeur d’Alene series 1
- Harrison series 1
- Hoodoo quartzite 1
- Lemhi quartzite 1
- Orofino series 1
- Porcupine formation 1
- Prichard formation 1
- Revett quartzite 1
- St. Regis formation 1
- Striped Peak formation 1
- Swanger quartzite 1
- Wallace formation 1
- Yellowjacket formation 1

**Precambrian** (?)
- Albion Range group 1
- East Fork formation 1
- Hyndman formation 1

**Age** (?)
- Silver City granite 1

**Illinois**

**Pleistocene**
- Cairo till 1
- Florence gravel 1
- Florencia formation 1
- Freeport gravel 1
- Joliet conglomerate 1
- Kankakee torrential deposits 1
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## INDEX TO THE GEOLOGIC NAMES OF NORTH AMERICA

### United States—Continued

#### Illinois—Continued

### Middle and Upper Pennsylvanian—Continued

#### New Haven limestone (as member of McLeansboro formation)¹

#### Rock Creek limestone (as member of McLeansboro formation)²

#### Shoal Creek limestone (as member of McLeansboro formation)³

### Middle Pennsylvanian

**Carbondale group; formation ¹ in Kentucky**

- Grindstaff sandstone; member (of Tradewater formation ¹ in Kentucky)
- Stonefort limestone; member (of Tradewater formation ¹ in Kentucky)
- Vergennes sandstone (as member of Carbondale formation ¹)
- Vermilionville sandstone (as lentil in Carbondale formation ¹)

### Mississippian (see also Devonian and Mississippian)

- †Brewerville sandstone ¹
- Chartresian series ¹
- Elko gravel ²
- Hartline chert ²
- Hoffer member (of Ste. Genevieve limestone)²
- Jonesboro limestone ¹
- †Kaskaskia limestone, formation, or group ¹
- Kaskaskian series ¹
- McClosky sand ¹ (subsurface)
- McKerney limestone member (of Hannibal shale)¹
- Marigold oolite ¹
- Martinsville sand ¹ (subsurface)
- †Plum Creek beds ¹
- Rockwood sandstone ¹
- †Ruma formation ¹
- Shetlerville formation ¹
- Sonora sandstone ¹
- Spar Mountain sandstone (in Fredonia member of Ste. Genevieve formation)²
- Springville shale ¹
- Swan Creek sandstone ¹
- Valmeyer series ¹
- Westfield lime ¹ (subsurface)

#### Upper Mississippian or Pennsylvanian

- Bellair sands ¹ (subsurface)
- Buchanan sands ¹ (subsurface)

### United States—Continued

#### Illinois—Continued

### Upper Mississippian—Continued

- †Chester sandstone ¹
- Chester series (as group ¹)
- Clore limestone ¹
- Cypress sandstone ¹
- Denny sand ¹ (subsurface)
- Downeys Bluff member (of Renault formation)²
- Elvira group ²
- Fraley's shale ²
- Golconda formation ¹
- Haney limestone ²
- Homberg group ²
- Kinkaid limestone ¹
- Klein sand ¹ (subsurface)
- Lindley sand ¹ (subsurface)
- Lusk ¹ (limestone)
- Menard limestone ¹
- New Design group ²
- Okaw formation ¹
- Paint Creek formation ¹ or shale
- Palestine sandstone ¹
- Renault formation ¹
- Ridenhower shale ¹
- Rosicolor sandstone member (of Ste. Genevieve limestone)¹
- St. Francisville sand ¹ (subsurface)
- Sparta sand ¹ (subsurface)
- Stein sand ¹ (subsurface)
- Tracey sand ¹ (subsurface)
- Vienna limestone ¹
- Waltersburg sandstone ¹
- Warsaw shale, limestone ¹ or formation

**Yankeetown chert ¹**

### Lower Mississippian

- Darty limestone ²
- †Hamburg oolite ¹
- Kinderhook series (as group ¹)
- McCraney limestone ²
- Oshawan series ¹

### Devonian and Mississippian

- Carper sand ¹ (subsurface)
- Kaskaikia sequence ²

### Devonian

- Backbone limestone ¹
- Hoing sand ¹ (subsurface)

#### Upper Devonian

- Alto formation ¹
- Mountain Glen shale ¹

#### Middle Devonian

- Dutch Creek sandstone ¹
- Grand Tower limestone ¹
- Lingle limestone ¹
- Misenheimer shale ¹

#### Lower or Middle Devonian

- Clear Creek limestone ¹ or chert

### Lower Devonian

- Grassy Knob chert ¹

### Silurian

- Athens marble ¹
- Essex limestone ¹
- Winston dolomite ¹
United States—Continued
Illinois—Continued

**Middle Silurian**
- Bellwood dolomite
- Chicago formation
- Coe group
- Cordova dolomite
- Joliet limestone
- Markgraf member (of Joliet formation)
- Port Byron limestone
- Rockdale dolomite
- Romeo member (of Joliet formation)
- Thorn group

**Lower Silurian**
- Alexandrian series
- Channahon limestone
- Gyrene member (of Edgewood limestone)
- Kankakee limestone
- Orchard Creek shale
- Sexton Creek limestone

**Upper Ordovician**
- Aux Sable limestone
- Cape limestone
- Divine limestone
- Du Page limestone
- Millsdale limestone
- Rock Run limestone
- Thebes sandstone
- Treat limestone
- Wilmington limestone

**Middle Ordovician**
- Ancell group
- Bescher member (of Dunleith formation)
- Bosman member (of Mifflin formation)
- Brickeys member (of Mifflin formation)
- Briton member (of Mifflin formation)
- Buckhorn member (of Dunleith formation)
- Chana member (of Pecatonica formation)
- Clement member (of Grand Detour formation)
- Dane member (of Pecatonica formation)
- Daysville formation
- Dement member (of Grand Detour formation)
- Dunleith formation
- Eagle Point member (of Dunleith formation)
- Eldena member (of Nachusa formation)
- Elm member (of Nachusa formation)
- Establishment member (of Mifflin formation)
- Everett member (of Nachusa formation)

United States—Continued
Illinois—Continued

**Middle Ordovician**—Continued
- Fairplay member (of Dunleith formation)
- Foreston member (of Grand Detour formation)
- Galena dolomite
- Garnavillo member (of Guttenberg formation)
- Glenhaven member (of Guttenberg formation)
- Grand Detour formation
- Harmony Hill formation
- Hazel Green member (of Quimbys Mill formation)
- Hazelwood member (of Mifflin formation)
- Hely member (of Grand Detour formation)
- Hennepin member (of Pecatonica formation)
- Kingdom formation
- Loughridge formation
- Lowell Park member (of Platteville limestone)
- Medusa member (of Pecatonica formation)
- Mortimer member (of Dunleith formation)
- Nachusa formation
- New Glarus member (of Pecatonica formation)
- Oglesby member (of Pecatonica formation)
- Pecatonica dolomite member
  - (of Platteville formation)
- Rivoli member (of Dunleith formation)
- St. James member (of Dunleith formation)
- Sherwood member (of Dunleith formation)
- Shullsburg member (of Quimbys Mill formation)
- Sinsinawa member (of Wise Lake formation)
- Stillman member (of Grand Detour formation)
- Strawbridge member (of Quimbys Mill formation)
- Victory member (of Grand Detour formation)
- Walgreen member (of Grand Detour formation)
- Wall member (of Dunleith formation)
- Wise Lake formation
- Wyota member (of Dunleith formation)

**Lower Ordovician**
- Cap au Gres sandstone

**Upper Cambrian**
- Charter member (of Mt. Simon formation)(subsurface)
United States—Continued

**Illinois—Continued**

**Upper Cambrian—Continued**

- Crane member (of Mt. Simon formation) 2 (subsurface)
- Gunn member (of Mt. Simon formation) 2 (subsurface)
- Kenyon member (of Mt. Simon formation) 2 (subsurface)
- Lacey member (of Mt. Simon formation) 2 (subsurface)
- Lovell member (of Mt. Simon formation) 2 (subsurface)
- Mayfield member (of Mt. Simon formation) 2 (subsurface)

**Indiana**

**Pleistocene**

- Hawpacth glacial gravel and sand 1
- Indianan till 1
- Wabash beds 1

**Post-Carboniferous**

- Ohio River formation 1

**Pennsylvanian (see also Mississippian or Pennsylvanian)**

- Arthur limestone (in Carbondale formation) 1
- Buffkin formation 1
- Cannelton sandstone 1
- Claypole Hills sandstone (in McLeansboro formation) 2
- Covxville sandstone 1
- Double Horseshoe cyclothem 2
- Ferdinand limestone 2
- Fort Knox sandstone 1
- Friendsville formation 1
- Fulda limestone 2
- Grandview limestone 2
- Grayville formation 1
- Hanging Rock sandstone 1
- High Rock sandstone 1
- Hindostan whetstone 1
- Holland limestone 2
- Lady Washington sandstone 1
- McClearys Bluff formation 1
- McRoberts sand 1 (subsurface)
- Martha Washington sandstone 1
- Merom group 1
- Millsburg formation 1
- Mumford formation 2
- Mumford Hills sandstone (in McLeansboro formation) 2
- New Harmony sandstone (in McLeansboro formation) 2
- Parker formation 1
- Rockport sandstone 1
- St. Wendells limestone (in McLeansboro formation) 2
- St. Wendell sandstone 1
- Shenkclif sandstone 1
- Silverwood cyclothem (including Silverwood limestone) 2
- Somerville limestone 1
- Velpen limestone 1
- Wabash formation 1
- Wabash group 1

**United States—Continued**

**Indiana—Continued**

**Pennsylvanian—Continued**

- West Princeton sand 1 (subsurface)

**Upper Pennsylvanian**

- Busseron sandstone member 1 (of Shelburn formation)
- Dicksburg Hills sandstone 2
- Ditney formation 1
- Hayden Branch formation 2
- Hazelton Bridge formation 3
- Inglefield sandstone 1
- Maria Creek limestone member (of Shelburn formation) 2
- Merom sandstone 1
- Rabens Branch bed (in Parker formation) 2
- Shelburn formation 1
- Staunton formation 1
- Vigo limestone member (of Shelburn formation) 2

**West Franklin limestone 1**

**Middle Pennsylvanian**

- Alum Cave 1 limestone member (of Petersburg formation)
- Brazil formation 1
- Dugger formation 2
- Linton formation 2
- Petersburg formation 1
- Universal limestone member (of Dugger formation) 2

**Lower Pennsylvanian**

- Mansfield formation (as sandstone 1)
- Mississippian or Pennsylvanian

- Davidson sands 1 (subsurface)

**Mississippian**

- Beaver Bend limestone 1
- Bedford limestone 1
- Beech Creek limestone 1
- Beech Creek shale 1
- Bristow shale and sandstone 1
- Brown oil sand 1 (subsurface)
- Brownstown Hills sandstone member 1 (of Edwardsville formation)
- Bryantsville breccia (in Levias member of Ste. Genevieve limestone) 2
- Cataract Falls sandstone (in Ste. Genevieve formation) 2
- Cutright sandstone member 1 (of Edwardsville formation)
- Dry Creek sandstone member 1 (of Edwardsville formation)
- Ewelren sandstone 1
- Finley Knob shale member 1 (of Carwood formation)
- Frenchlick sandstone 1
- Gennet Creek formation 1
- Guthrie Creek member (of Harrodsburg limestone) 1
- Harrodsburg limestone 1
- Huron group 1
- Indiana oolitic limestone 1
### United States—Continued

**Indiana—Continued**

#### Mississippian—Continued

- **Indian Springs shale**
- **Lampkins sandstone member** (of Carwood formation)
- **Leesville limestone member** (of Harrodsburg limestone)
- **Lost River chert**
- **Mitchell limestone**
- **Mooretown sandstone**
- **Mount Ebel sandstone member** (of Edwardsville formation)
- **Mount Pleasant shales and sandstones**
- **Negli Creek limestone**
- **Nixon sand** (subsurface)
- **Oakland City sand** (subsurface)
- **Orange-Martin limestone**
- **Paoli limestone**
- **Petersburg sand** (subsurface)
- **Ramp Creek member** (of Harrodsburg limestone)
- **St. Joseph formation**
- **Siberia limestone**
- **Solsberry formation**
- **Stevens Creek limestone**
- **Stobo limestone lens** (in Borden group)
- **Weed Patch member** (of Edwardsville formation)
- **Wiekliif sandstone**
- **Williamsport sandstone**

#### Upper Mississippian

- **Barker sand** (subsurface)
- **Brandy Run sandstone**
- **Colvin sand** (subsurface)
- **Cunningham sand** (subsurface)
- **Gibson sand** (subsurface)
- **Hightower sands** (subsurface)
- **Hoover gas sand** (subsurface)
- **Hunt sand** (subsurface)
- **Hyneman sand** (subsurface)
- **Kirkwood sand** (subsurface)
- **Loveless sand** (subsurface)
- **Mount Olympus sand** (subsurface)
- **Reedsdale limestone**
- **Salem limestone**
- **Snyder sands** (subsurface)
- **Spergen limestone**
- **Tracy sand** (subsurface)
- **Vierling sand** (subsurface)
- **West Baden** (in Chester group)
- **Willis sand** (subsurface)
- **Zimmerman sand** (subsurface)

#### Lower Mississippian

- **Allens Creek facies** (of Edwardsville formation)
- **Bearwallow facies** (of Edwardsville formation)
- **Belmont facies** (of Locust Point formation)
- **Bennettsville facies** (of Carwood formation)
- **Borden group**

### United States—Continued

**Indiana—Continued**

#### Lower Mississippian—Continued

- **Broomhill facies** (of New Providence formation)
- **Carwood formation**
- **Cisco Branch facies** (of Floyds Knob formation)
- **Delaneys Creek facies** (of Carwood formation)
- **Dowell Hill facies** (of New Providence formation)
- **Edwardsville formation**
- **Evans Landing facies** (of Carwood formation)
- **Falling Run member** (of Sanderson formation)
- **Fleener facies** (of Carwood formation)
- **Floyds Knob formation**
- **Fordyce Knob sandstone facies** (of Floyds Knob formation)
- **Gent facies** (of Carwood formation)
- **Goss Mill limestone facies** (of Floyds Knob formation)
- **Henryville formation**
- **Jacobs Chapel shale**
- **Kelly Hill facies** (of Carwood formation)
- **Knob Creek facies** (of Carwood formation)
- **Locust Point formation**
- **Medora Knob facies** (of Edwardsville formation)
- **Nelson Hill facies** (of Locust Point formation)
- **New Providence shale**
- **Riverside sandstone**
- **Rockford limestone**
- **Rosewood shale**
- **Sanderson formation**
- **Schooner Hill facies** (of Locust Point formation)
- **Silver Hill facies** (of New Providence formation)
- **Sparksville facies** (of Carwood formation)
- **Spieker Knob facies** (of Locust Point formation)
- **Springler Knob facies** (of Edwardsville formation)
- **Stewarts Landing facies** (of Edwardsville formation)
- **Underwood formation**

#### Devonian

- **Little Rock Creek limestone**

#### Upper Devonian

- **Blackiston formation**
- **Delphi black shale**
- **New Albany shale**

#### Middle Devonian

- **Blod formation**
- **Deputy formation**

#### Geneva limestone or dolomite

- **Jeffersonville limestone**
United States—Continued
Indiana—Continued
Middle Devonian—Continued
Logansport limestone  
New Chapel chert bed (in Silver Creek limestone) 1
North Vernon limestone 1
Pendleton sandstone 1
Rocky Branch bone bed (in Jeffersonville limestone) 1
Sellersburg limestone 1
Shelby limestone 1
Silver Creek limestone member (of Sellersburg limestone) 1
Speeds limestone member (of Sellersburg limestone) 2
Swanville formation 2
Silurian
Flat Rock stone 1
Grandad limestone 1
Utica limestone 1
Upper Silurian
Kenneth limestone 1
Kokomo limestone 1
Middle Silurian
Hartsville limestone 1
Huntington dolomite 1
Laurel limestone or dolomite 1
limestone member (of Wayne formation in Tennessee)
Liston Creek formation 1
Liston Creek limestone member (of Liston Creek formation) 1
Mississinewa shale 1
New Corydon limestone 1
Noblesville dolomite 1
Osgood shale 1; as formation 1 in Kentucky and Tennessee
Red Bridge limestone member (of Liston Creek formation) 1
Waldron shale; as clay member (of Wayne formation in Tennessee)
Upper Ordovician
Elkhorn formation 1
Harmon formation 1
Hitz limestone member (of Saluda limestone) 1
Lake Huron shale 1
Laughery formation 1
Liberty formation; limestone in Ohio 1
Madison beds 1
Madison water limestone 1
Marble Hill marble 1
Richmond group 1
Saluda limestone 1
Versailles bed (in Richmond group) 1
Whitewater formation 1
Middle Ordovician
Tippecanoe sequence 2
Iowa
Quaternary
Dubuque terrane 1

United States—Continued
Iowa—Continued
Pleistocene
Afton terrane 1
Albion gravel 1
Ashawa till 1
Blackhawkian till 1
Boyer till 1
Dallas deposits 1
East lowan formation 1
Gregorian series 1
lowan loess 1
Loveland loess 1
Malaskan till 1
Moiogona till 1
Pleistocene (Wisconsin)
lowan drift 1
Pleistocene (pre-Wisconsin)
Wapellan series 1
Pleistocene (Kansan)
Buchanan gravel 1
Miocene (?)
Riverside sand 1
Cretaceous or Tertiary
Rockville conglomerate 1
Cretaceous
Benonian series 1
Yanktonian series 2
Cretaceous (?)
Pine Creek conglomerate 1
Upper Cretaceous or Miocene (?)
Dodge gravel 1
Dodge shale 1
Upper Cretaceous
Crill terrane 1
Dibon chalk or limestone 1
Hawarden shale 1
Niulnabotna sandstone 1
Saxian series 1
Sergeant shale 1
Wcodbury formation 1
Permian (?)
Fort Dodge gravel 1
Pennsylvanian
Appanoose beds 1
Eldora sandstone 1
Haynies limestone 1
Mcroe beds 1
Munterville cyclothem (including Munterville limestone) 2
Muscatine sandstone 3
Platte shale 1
Raasoo River beds 1
Red Rock channel sandstone 1
Truro limestone 1
Pennsylvanian (Virgil)
Brdddyville limestone (in Shawnee formation) 1
Burroak shale 1
McKissick Grove shale 1
Stnnett limestone (in Shawnee formation) 1
Pennsylvanian (Missouri)
Chariton conglomerate member (of Pleasanton formation) 1
**United States—Continued**

**Iowa—Continued**

**Pennsylvanian (Missouri)—Con.**

- DeKalb limestone member (of Kansas City formation) 1
- Earham limestone (in Kansas City formation) 1
- Westerville limestone member (of Kansas City formation) 1
- Winterset limestone member (of Kansas City formation) 1
- Earham limestone (in Kansas City formation) 2
- Westerville limestone member (of Kansas City formation) 1
- Winterset limestone member (of Kansas City formation) 1
- limestone 1 in Kansas

**Pennsylvania (Des Moines)**

- Coal City limestone 2
- Cooper Creek limestone 2
- Des Moines series (as group 1)
- Exline cyclothem (including Exline limestone) 2

**Mississippian**

- Alden limestone 1
- Belfast beds 1
- Bonaparte marble 1
- Chapin beds 1
- Croton limestone (in St. Louis limestone) 1
- Eagle City beds 1
- English River sandstone member (of Hannibal shale) 1
- Hampton formation 1
- Humboldt oolite 1
- Iowa marble 1
- Iowa series 1
- Iowa Falls dolomite 1
- Keosauqua sandstone 1
- Le Grand beds 1
- Maple Mill shale 1
- Marshalltown shale 1
- Mayne Creek formation 1
- Montrose chert 1
- North Hill member 1 (of Hampton formation)
- Pella beds 1
- Prospect Hill sandstone member (of Hannibal shale) 1
- St. Louis marls 1
- Springvale beds 1
- Verdi beds (in St. Louis limestone) 1
- Wassonville limestone 1

**Lower Mississippian**

- Aplington formation 2
- Burlington limestone 1
- Gilmore City limestone 1
- Keokuk limestone 1

**Devonian**

- Amana beds 2
- Hutchinson limestone 1
- Linnian series 2
- Raymond Quarry beds 1

**Upper Devonian or Mississippian**

- Sweetland Creek shale 1

**Upper Devonian**

- Bloody Run zone 1
- Cedarian series 1

**United States—Continued**

**Iowa—Continued**

**Upper Devonian—Continued**

- Coralville limestone 1
- Floyd limestone 1
- Haackeley shale 1
- Juniper Hill formation 1
- Lime Creek shale 1
- Linwood member (of Cedar Valley limestone) 1
- Littleton member (of Cedar Valley limestone) 1
- Mason City limestone or dolomite 1
- Nora limestone 1
- Owen substage or beds 1
- Rockfordian series 1
- Rockford shale 1
- Rock Grove substage 1
- Sheffield formation 1
- Shell Rock limestone 1
- State Quarry limestone 1

**Middle and Upper Devonian**

- Cedar limestone 1
- Davenport beds 1

**Middle Devonian**

- Cedar Rapids phase (of Otis limestone) 1
- Cedar Valley limestone 1
- Coggon limestone 1
- Fayette breccia 1
- Independence shale (as member of Wapsipinicon limestone) 1
- Kenwood beds 1
- Lucas limestone 1
- Otis limestone 1
- Rapid limestone 1
- Spring Grove member (of Wapsipinicon limestone) 1
- Vinton phase (of Otis limestone) 1
- Wapsipinicon limestone 2
- Westfield phase (of Otis limestone) 1

**Middle(f) Devonian**

- Montpelier sandstone 1
- Solon limestone 1

**Silurian**

- Hoing sandstone 1 (subsurface)

**Silurian(f)**

- Bertram dolomite 1

**Upper Silurian**

- Goweran series 1

**Middle Silurian**

- Anamosa dolomite 1
- Colesburg dolomite 1
- Delaware limestone 1
- Gower dolomite 1
- Hartwick dolomite 1
- Hopkinton dolomite 1
- LeClaire dolomite 1
- Monticello dolomite 1
- Mount Vernon beds 1
- Sabula dolomite 1
- Waucoma limestone 1
**United States—Continued**

**Iowa—Continued**

**Ordovician**
- Maquoketa series
  - Murray Iron Works member (of Platteville formation) ² (sub-surface)
- Platteville stage

**Upper Ordovician**
- Brainard member (of the Maquoketa shale) (as shale ¹)
- Fort Atkinson limestone ¹
- Maquoketa shale
- Maquoketan series
- Volga shales

**Middle or Upper Ordovician**
- Dubuque shaley member (of Galena dolomite); (as formation ²)

**Middle Ordovician**
- Decorah shale ¹ or formation
- Glenwood shale member (of Platteville formation) ¹; shale or formation in Michigan
- Guttenberg limestone member ¹ (of Decorah formation)
- Ion dolomite member ¹ (of Decorah formation)
- Julian limestone ¹
- Julian series ¹
- McGregor limestone member (of Platteville formation) ¹
- Spechts Ferry shale member ¹ (of Decorah formation)

**Lower Ordovician**
- Oneota dolomite ¹
- Winnesheik limestone ¹

**Cambrian**
- Hanoverian series ¹

**Upper Cambrian**
- Albin shale ¹
- Allamakee dolomite ¹
- Hull porphyry ¹
- Waukon sandstone ¹

**Precambrian**
- Raggs quartzite ²
- Siouan series ¹
- Split-Rock slate ¹

**Kansas—Continued**

**Quaternary**
- Gerlane formation ¹
- Pleistocene and Recent
  - Sanborn group (as formation ¹)
- Pleistocene
- Belleville formation ¹
  - Chase Channel formation ²
  - Crooked Creek formation ²

**Pleistocene—Continued**
- Emma Creek formation ²
- Jones Ranch beds ²
- Kansan drift ¹
- Kingsdown silt (as marl ¹)
- McPherson formation ¹
- Meade formation (as gravel ¹)
- Missler member (of Ballard formation); (as member of Meade formation ³)
- Odee formation ²
- Pearlette ash ¹ member (of Sappa formation)
- Peoria silt member (of Sanborn formation) ³
- Salt Creek gravel beds ¹
- Stump Arroyo member (of Crooked Creek formation) ²
- Vanhem formation ²

**Tertiary**
- Abilene conglomerate ¹
- Pliocene (see also Miocene, Pliocene and Pleistocene; and Miocene or Pliocene)
- Calvert ash bed (in Ash Hollow member of Ogallala formation) ²
- Dellvale ash bed (in Ash Hollow member of Ogallala formation) ²
- Fort Wallace ash bed (in Ash Hollow member of Ogallala formation) ²
- Rawlins ash bed (in Ash Hollow member of Ogallala formation) ²
- Reager ash bed (in Ash Hollow member of Ogallala formation) ²
- Reamsville ash bed (in Ash Hollow member of Ogallala formation) ²
- XI member (of Rexroad formation) ²

**Pliocene, upper**
- Rexroad formation ³
- Pliocene, middle
- Delmore formation ³

**Pliocene, lower**
- Edson beds (in Ogallala formation) ¹
- Rhinoceros Hill beds (in Ogallala formation) ¹

**Miocene, Pliocene, and Pleistocene**
- Plains marl ³

**Miocene or Pliocene**
- Woodhouse clay (in Ogallala formation) ¹

**Cretaceous**
- Brookville terrane ³
- Buckskinian series ³
- Cawker terrane ¹
- Gove chalk ³
- Medicine beds ¹
- Pete terrane ¹
- Rawlinsian series ²
- Terra Cotta clay member (of Dakota formation) ²
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- Wallace shale
- Wiskanian series

**Upper Cretaceous**
- \(^\dagger\)Arickaree shale
- Blue Hill shale member (of Carlile shale)
- Bridge Creek limestone member (of Greenhorn limestone)
- Codell sandstone member (of Carlile shale)
- \(^\dagger\)Downs limestone (in Greenhorn limestone)
- Ellsworth formation
- Fairport chalky shale member (of Carlile shale)
- \(^\dagger\)Fence-post limestone
- \(^\dagger\)Fort Hays division or group
- Fort Hays limestone member (of Niobrara formation)
- \(^\dagger\)Graham jasper (in Niobrara formation)
- Hartland shale member (of Greenhorn limestone)
- Janssen clay member (of Dakota formation)
- Jetmore chalky shale member (of Greenhorn limestone)
- Lake Creek shale member (of Pierre shale)
- Lincoln limestone member (of Greenhorn limestone)
- \(^\dagger\)Lisbon shale
- Norton zone (in Niobrara formation)
- \(^\dagger\)Osborne limestone
- Pfeiffer shale member (of Greenhorn limestone)
- \(^\dagger\)Reeder sandstone
- Rocktown channel sandstone member (of Dakota sandstone)
- \(^\dagger\)Russell formation
- Salt Grass shale member (of Pierre shale)
- Sharon Springs member (of Pierre shale)
- Smoky Hill chalk or marl member (of Niobrara formation)
- Solomon formation
- \(^\dagger\)Trego zone (in Niobrara formation)
- \(^\dagger\)Victoria formation, clays, or shale
- Weskan shale member (of Pierre shale)

**Lower Cretaceous**
- \(^\dagger\)Belvidere shale
- Black Hill shale
- Blue Cut shale
- Champion shell bed (in Kiowa shale)
- Cheyenne sandstone; member (of Purgatoire formation in Oklahoma)
- \(^\dagger\)Corral sandstone (in Cheyenne sandstone)
- \(^\dagger\)Elk Creek beds (in Cheyenne sandstone)
- Fullington shale
- \(^\dagger\)Greenleaf sandstone
- Kent bed
- Kiowa shale
- \(^\dagger\)Kirby clay
- \(^\dagger\)Lanphier beds (in Cheyenne sandstone)
- Marquette member (of Belvidere formation)
- Mentor formation
- Natural Corral member (of Belvidere formation)
- \(^\dagger\)Spring Creek clays
- \(^\dagger\)Stokes sandstone (in Cheyenne sandstone)
- \(^\dagger\)Walker beds
- Windom member (of Belvidere formation)

**Permian**
- Admire group (as shale)
- Afton limestone member (of Wellington formation)
- Alma limestone
- Americus limestone member (of Foraker limestone)
- \(^\text{id}\)Annelly gypsum member (of Wellington formation)
- Bader limestone (as formation)
- Beatie limestone (as formation)
- Big Basin sandstone
- Big Blue group or series
- Bigelow formation
- Blue Rapids shale
- Blue Springs shale; member (of Matfield shale)
- Bruno limestone
- Buckeye shale
- Carlton limestone
- Cave Creek formation
- Cedar Hills anhydrite
- Cedar Hills sandstone
- \(^\dagger\)Cedar Point shales and shaly limestones
- Chase group
- Chicago Mound formation
- Chikaskia member (of Harper sandstone)
- Chisholm Creek shale member (of Wellington formation)
- Cimarron group
- \(^\dagger\)Cottonwood formation
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†Crusher Hill alternating shales and limestone
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†Elmdale shale or formation
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**Breezy Hill limestone member**
(of Cherokee shale) of Senora formation in Oklahoma²

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†Columbus sandstone (in Cherokee shale)¹

**Croweburg cyclothem or formation²**

**Englevale channel sandstone¹**
Fleming cyclothem or formation²
†Fort Scott coal series¹

**Fort Scott limestone¹**: limestone member (of Henrietta formation)¹
†Fort Scott marble series (in Cherokee shale)¹

**Idenbro cyclothem (including Idenbro limestone)²**
Knifeton cyclothem or formation²

**Laberdie cyclothem (including Laberdie limestone)²**

**Labette shale;¹ shale member (of Henrietta formation)¹**
Lake Neosho shale member (of Altamont limestone)²

**Little Osage shale member (of Fort Scott limestone)²**

**Marmaton group¹**: †Marmaton formation¹
Memorial shale¹
Mineral cyclothem or formation²
Mine Creek cyclothem (including Mine Creek shale)²

**Mulky cyclothem or formation²**
Neutral cyclothem or formation²
Norfleet cyclothem (including Norfleet limestone)²

**Pawnee limestone; member (of Oologah limestone in Oklahoma)¹**
Perry Farm cyclothem (including Perry Farm shale)²

**Pilottown cyclothem or formation²**
Riverton cyclothem or formation²

**Rowe formation or coal cycle²**
Scammon cyclothem or formation²

**Stice cyclothem²**

**Walter Johnson sandstone member (of Nowata shale)²**
Weir cyclothem or formation²

**Pennsylvanian (Morrow)**

**Kearney formation² (subsurface)**

**Mississippian (†)**

**Stanhope sand¹ (subsurface)**

**Lower Mississippian**
†Cherokee limestone¹

**Cowley formation² (subsurface)**

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**Short Creek oolite member (of Boone limestone)¹ or (of Kecskemét limestone)**
Skelton shale¹ (subsurface)

**Watchorn formation² (subsurface)**

**Devonian or Silurian (†)**
Younkin formation¹ (subsurface)

**Middle Devonian**
Ediger limestone¹ (subsurface)

**Silurian**
Hollow dolomite¹ (subsurface)

**Ordovician**
Smock sand¹ (subsurface)
Sluss sand¹ (subsurface)
Stapleton zone¹ (subsurface)
Urschel lime¹ (subsurface)

**Ordovician (†)**
Engle shale¹ (subsurface)

Kentucky

**Pleistocene**
Fulton loam¹
Graves Creek formation¹
Hickman group¹
Paducah formation¹
Tennessee River gravels¹
Union formation¹

**Tertiary or older**
Tip Top sand¹

**Pliocene or Pleistocene**

**Irvine formation¹**

**Pennsylvanian**
Aberdeen sandstone (in Potts-ville formation)¹
Baker sand¹ (subsurface)
Battery Rock cyclothem (including Battery Rock sandstone or conglomerate)²
Beattyville shale¹
†Beaver sandstone¹
Bee Spring sandstone¹
Bee Tree shale²
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Corbin conglomerate lentil¹ (in Lee formation)
†Curlew sandstone (in Tradework formation)¹

**Deanfield shale (in Pottsville formation)¹**
DeKoven formation¹

**Dingus limestone (in Pottsville formation)¹**
†Dixon formation¹
†Dixon sandstone (in Henshaw formation)¹

**Dwale shale¹**
Elkins Fork shale¹
Epperson sand¹ (subsurface)

**Finnie sandstone (in Tradewater formation)¹**
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    - Chapman sandstone 1
      - Fort Kent shale 1
    - *Square Lake limestone* 1
  - *Silurian and Devonian*
    - *Cobscook series* 1
      - *Leightons Cove series* 1
    - *Cobscook Bay series* 1
  - *Silurian*
    - *Aroostook limestone* 1
    - *Ashland limestone* 1
    - *Ashland shale* 1
      - *Campobello group* 1
    - *Chesuncook limestone* 1
    - *Dennys formation* 1
    - *Frenchmans Bay series* 1
      - *Leightons Cove series* 1
    - *Mars Hill conglomerate* 1
      - *Moose Island shale* 2
    - *Pembroke formation* 1
    - Ripogenous series 1
    - Sheridan sandstone 1
    - Vassalboro sandstone 1
    - Vinalhaven rhyolite 1
    - Waterville shale (also slate) 1
    - Winthrop phyllite 1
  - *Silurian* (?)
    - Hope limestone 1
  - *Upper Silurian and Lower Devonian*
    - Ireson felsite 1
    - *Penobscot Bay granite* 1
  - *Upper Silurian*
    - *Eastport formation* 1
      - *Hersey red shale member* (of Pembroke formation) 1
    - *Leighton gray shale member* (of Pembroke formation) 1
    - *Seigas sandstone* 2
    - *Thorofare andesite* 1
United States—Continued

Maine—Continued

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<th>Geological Period</th>
<th>Formation/Member</th>
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Maryland

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<td>†Baltimorean formation</td>
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United States—Continued
Maryland—Continued

**Lower Cretaceous—Continued**

- Federal Hill beds (in Patapsco formation)¹
- Hawkins Point clays¹
- **Patuxent formation**¹

**Upper Triassic**

- Buck Lodge diabase¹
- Emmitsburg facies¹
- †Potomac marble¹
- Taneytown facies¹

**Upper Paleozoic (f)**

- **Ellicott City granite** ¹
- "Post-Grenvillian"
  - Guilford granite ²
  - **Gunpowder granite** ¹
- Laurel migmatite ²
- Port Deposit gneiss ¹ or granite
- **Sykesville granite** ¹

**Lower Paleozoic (f)**

- **Cockeysville marble** ¹
- Glenarm series ²
- Ijamsville phyllite ²
- **Setters formation** ¹
- Silver Run limestone ²
- Urbana phyllite ²
- **Wakefield marble** ²

**Permian**

- †Frostburg formation ¹

**Carboniferous (f)**

- **Woodstock granite** ¹

**Pennsylvanian**

- Barton limestone (in Conemaugh formation)¹
- Barton red shale (in Conemaugh formation)¹
- Barton sandstone (in Conemaugh formation)¹
- Bluelick limestone (in Conemaugh formation)¹
- Borden sandstone (in Monongahela formation)¹
- Clarysville sandstone (in Conemaugh formation)¹
- Ellerslie fire clay (in Allegheny formation)¹
- Ellerslie sandstone (in Allegheny formation)¹
- Friendsville black shale (in Conemaugh formation)¹
- Hoffman limestone (in Conemaugh formation)¹
- Hoffman sandstone (in Conemaugh formation)¹
- Lonaconing sandstone (in Conemaugh formation)¹
- Luke clay (in Allegheny formation)¹
- Meyersdale limestone (in Conemaugh formation)¹
- Montell sandstone (in Allegheny formation)¹
- Mount Savage fire clay (in Pottsville formation)¹

**United States—Continued**

**Pennsylvanian—Continued**

**Mount Savage sandstone** (in Allegheny formation)¹
- Redstone sandstone (in Monongahela formation)¹
- Sampson Rock sandstone (in Pottsville formation)¹
- Savage formation¹
- Thomas limestone (in Conemaugh formation)¹
- Thomas sandstone (in Conemaugh formation)¹
- Wellsburg limestone (in Conemaugh formation)¹
- Westernport sandstone (in Allegheny formation)¹
- Woods Run shale (in Conemaugh formation)¹

**Upper Devonian**

- Avilton conglomerate¹
- **Parkhead sandstone member** (of Jennings formation)¹

**Lower Devonian**

- **Corrigan formation**¹
- **Shriver chert**¹

**Silurian**

- Cedar Cliff limestone lens (in Wills Creek shale)¹
- Cressaptown iron sandstone¹
- Indian Spring red shales or sandstone (in Tonoloway limestone)¹
- Rabble Run sandstone member (of McKenzie formation)¹
- **Tonoloway limestone**¹
- **Wills Creek shale**¹

**Middle Silurian**

- Cumberland facies (of Clinton formation)²
- **McKenzie formation or limestone**¹
- Rose Hill formation¹

**Ordovician (f)**

- **Cardiff conglomerate**¹
- **Post-Lower Ordovician**
  - Baltimore gabbro²

**Middle Ordovician**

- **Row Park limestone**²
- **St. Paul group**²

**Lower Ordovician**

- Grove limestone¹
- †Le Gore limestone¹

**Cambrian (f)**

- **Sugarloaf Mountain quartzite**²

**Upper Cambrian**

- **Big Spring Station member** (of Conococheague limestone)²
- **Frederick limestone**¹

**Lower Cambrian**

- Sugarloaf sandstone¹
- **Weverton quartzite or formation** (as sandstone)¹

**Precambrian**

- Baltimore gneiss¹
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<th>Maryland—Continued</th>
<th>Massachusetts—Continued</th>
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<td>†Saugus granodiorite or quartz diorite</td>
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<td>†State line serpentine</td>
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<td>†Susquehanna mica schist</td>
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<tr>
<td><strong>Middle Paleozoic</strong></td>
<td>Dighton conglomerate</td>
</tr>
<tr>
<td>Dry Hill granite gneiss</td>
<td>Mansfield beds</td>
</tr>
<tr>
<td>Poplar Mountain gneiss</td>
<td>Pondville conglomerate</td>
</tr>
<tr>
<td>504835—59—-6</td>
<td>Seekonk beds</td>
</tr>
</tbody>
</table>
United States—Continued
Massachusetts—Continued

Pennsylvanian—Continued
Seekonk conglomerate
Tenmile River beds
Wamsutta formation
Westville shale
Mississippian (?)
Quincy shale
Mississippian (?) or older
Monson gneiss (as granodiorite)

Devonian or Carboniferous
Blue Hill granite porphyry
Boston Bay group
Brighton melanphrye
Brookline conglomerate member
(Cambridge slate)
Cape Ann granite
Dorchester slate member
(Boston Bay group)
Cambridge slate
Cape Ann granite
Dorchester slate member
(Roxbury conglomerate)
Lynn volcanic complex
Mattapan volcanic complex
Neponset conglomerate
Peabody granite
Roxbury conglomerate
Shawmut group
Squamata slates
Squational tillite member
(Roxbury conglomerate)
Tufts quartzite member
(Cambridge slate)
West Roxbury slate

Devonian (?)
Ironstone quartz diorite
Stein Rock granite
Milford granite
Sharon syenite
Wolfden tonalite

Upper Devonian (?)
Ayer granodiorite (as granite)

Probably Lower Devonian
Newbury volcanic complex
Silurian and Devonian (?)

Bernardston formation
Silurian
Granville enstatite serpentine
Greylock limestone
Silurian (?)
Goshen schist
Leyden argillite

Lower Silurian
Russell serpentine

Ordovician and Silurian

Merrimack quartzite
Ordovician and Silurian (?)

Conway formation (as schist)
Ordovician
Bellowspipe limestone
Bellowspipe quartzite
Chester amphibolite
Everett schist
Greylock schist
Hawley schist
Plainsfield schist

United States—Continued
Massachusetts—Continued

Ordovician—Continued
Savoy schist

Westfield serpentine

Middle Ordovician
Berkshire schist
Cheshire schist
Cambrid and Ordovician
egunomont limestone
Mount Washington series
Stockbridge limestone or group
Cambridge and younger and older
Blue Hills complex

Cambrid (?)
Milton quartzite

Upper Cambrian
Green Lodge formation
Middle Cambrian
Brantree slate
Lower Cambrian to Lower Ordovician
Berkshire limestone
Lower Cambrian
Cheshire quartzite
Dalton formation
Hoppin slate
Nahant limestone
Nahant schist
Shutesbury serpentine
Weymouth formation
Lower Cambrian (?)
Hoosac schist
Rowe schist

Precambrian or Upper Ordovician
Newburyport quartz diorite

Precambrian or Cambrian
Lynnfield serpentine

Precambrian
Becket granite gneiss
Berkshire County series
Blanchardford limestone
Coles Brook limestone
East Lee gneiss
East Lee limestone
Goose Pond limestone
Grafton quartzite
Greylock series
Hinsdale gneiss
Hinsdale limestone
Hop Brook limestone
Kendall Green slate
Lee quartz diorite
Lincoln slate
Marble formation
Northbridge granite gneiss
Otis limestone
Quincy syenite
Stonybrook quartzite
Sutton gneiss
Tyringham gneiss
Washington gneiss
Woburn formation

Precambrian (?)
Westboro quartzite
United States—Continued

Massachusetts—Continued

Age(f)

Blandford serpentine and pyroxene

†Naugus Head series

†Pelham serpentine

†Sheburne gneiss

†Worcester County gneiss

Michigan

Pennsylvanian

Eaton sandstone member (of Saginaw formation)

Grand Ledge cyclothem (in Saginaw formation)

Grand River formation

Ionia sandstone 1 member (of Saginaw formation)

†Jackson formation

Parma sandstone

Saginaw formation

Woodville member (of Saginaw formation); (as sandstone)

Lower Pennsylvanian

Verne cyclical formation (including Verne limestone or shale member)

Mississippian (see also Upper Devonian and Mississippian; and Upper Devonian and Lower Mississippian)

Bayport limestone

Coldwater shale

Forestville shale

Grand Rapids group

†Grand Rapids limestone

Huron gritstone

Manistee limestone

Marshall sandstone or formation

Michigan formation

Napoleon member (of Marshall sandstone); (as sandstone)

Point aux Barques sandstone

Point aux Barques lighthouse (sandstone)

Point aux Gres limestone

Port Austin sandstone

Richmondville sandstone

Rock Falls series

Lower Mississippian

Hardwood Point shales and flags

Huron City sandstones and shales

Lighthouse conglomerate

Upper Devonian and Lower Mississippian

Antrim shale

Ellsworth shale

†Huron group

Upper Devonian

†St. Clair shale

Squaw Bay limestone

Middle and Upper Devonian

Traverse formation or group

United States—Continued

Michigan—Continued

Middle and Upper(f) Devonian

Potter Farm formation

Thunder Bay limestone

Middle Devonian

Afton bed

Alpena limestone

Amherstburg formation (as member of Detroit River dolomite)

Beebe School formation

Bell shale

Black Lake lagunal facies

Bois Blanc formation

Charlevoix stage

Detroit River group (as dolomite)

Dock Street clays

Dundee limestone or formation

Flat Rock dolomite member (of Lucas formation); (as member of Detroit River dolomite)

Four Mile Dam formation

Ferron Point formation

Filer sandstone lentil (in Amherstburg formation) (subsurface)

Genshaw formation

Grand Lake member (of Presque Isle series)

Gravel Point stage

Gorbut member (of Gravel Point formation)

Killians member (of Genshaw formation); (as limestone)

Koehler limestone

Little Traverse Bay limestone

Long Lake series

Mackinac breccia (as limestone); contains discrete blocks of rocks of Silurian to Middle Devonian ages

Mackinaw limestone

Marvin Quarry bed

Newton Creek limestone

Norway Point formation

Norwood shale

Partridge Point formation

Petroskey limestone

Presque Isle series

Richfield member (of Lucas formation) (subsurface)

Rockport limestone

Rockport Quarry limestone

Rogers City limestone or formation

Saginaw sand (subsurface)

Thunder Bay series

Whitefish Bay member (of Alpena limestone stage)

Lower Devonian

Garden Island formation

Silurian and Lower Devonian

†Monroe beds, formation, or group
United States—Continued  
**Michigan—Continued**

### Silurian
- Manitoulin limestone
- Raber bed
- Toll Pit beds

### Upper Silurian
- Point aux Chenes formation
- **Raisin River dolomite member** (of Bass Islands dolomite)
- St. Ignace formation

### Middle Silurian
- **Burnt Bluff formation**
- Cordell member (of Manistique formation)
- Engadine dolomite
- Fiborn limestone
- Hendricks series
- **Manistique series**
- Schoolcraft member (of Manistique formation)

### Upper Ordovician
- Bay de Noc member (of Stonington beds)
- Big Hill beds
- Bills Creek beds
- Ogontz member (of Stonington beds)
- Stonington beds

### Middle Ordovician
- Bony Falls member (of Black River formation)
- Chandler Falls member (of Trenton formation)
- Escanaba limestone
- Escanaba River group
- Haymeadow Creek member (of Trenton formation)
- Groos Quarry member (of Trenton formation)
- Sheridan formation

### Upper Cambrian and Lower Ordovician
- Hermansville limestone

### Upper Cambrian
- **Eben Lake conglomerate**
- Lake Superior sandstone
- Munising sandstone
- Ste. Marie sandstone
- St. Marys sandstone

### Precambrian or Cambrian
- **Jacobsville sandstone**

### Precambrian
- Aijibik quartzite
- Albany conglomerate
- Albany and Boston amygadaloid
- **Atlantic amygadaloid**
- Albany and Boston flow
- Algomah amygadaloid
- Algomah flow
- Allouez conglomerate
- Amasa formation
- **Antoine dolomite**
- Anvil ferruginous chert member (of Ironwood iron-formation)

### Precambrian—Continued
- **Arcadian amygadaloid**
- **Arnold amygadaloid**
- **Arnold flow**
- **Ashbed amygadaloid**
- **Ashbed flow**
- **Ashbed group**
- **Atlantic amygadaloid**
- **Atlantic flow**
- **Baltic amygadaloid**
- **Baltic conglomerate**
- **Baltic flow**
- **Baltic sandstone**
- **Baltic West amygadaloid**
- **Baltic West flow**
- **Bessemer sandstone or quartzite**
- **Bijiki iron-formation member** (of Michigamme slate)
- **Bohemia conglomerate**
- **Bohemia porphyrite**
- **Bohemian Range group**
- **Bone Lake crystalline schist**
- **Boston conglomerate**
- **Brier slate member** (of Vulcan iron-formation)
- **Brule schists and volcanics**
- **Butler amygadaloid**
- **Butler flow**
- **Caledonia conglomerate**
- **Calico amygadaloid**
- **Calico flow**
- **Calumet amygadaloid**
- **Calumet conglomerate**
- **Calumet flow**
- **Calumet and Hecla conglomerate**
- **Cascade formation**
- **Central group**
- **Central Mine conglomerate**
- **Central Mine group**
- **Central Valley beds**
- **Chippewa felsite**
- **Chippewa porphyry**
- **Clarksburg volcanics** member (of Michigamme slate)
- **Copper City flow** (in Portage Lake lava series)
- **Copper Harbor conglomerate** (as group)
- **Copps group**
- **Corning Creek zone** (in Negaunee formation)
- **Crystal Falls formation**
- **Crystal Falls series**
- **Curry iron-bearing member** (of Vulcan iron-formation)
- **Deer Lake conglomerates**
- **Douglas amygadaloid**
- **Douglas flow**
- **Eagle River group**
- **Evergreen amygadaloid**
- **Evergreen flow**
- **Felch formation** (as schist)
United States—Continued
Michigan—Continued
Precambrian—Continued
†Felch Mountain iron-bearing series
Fern Creek formation
Ford River granite
Forest amygdaloid
Forest conglomerate
Forest flow
Freda sandstone
†Goebic series
Goodrich quartzite
Goose Lake slate
†Grand Portage amygdaloid
†Grand Portage flow
Gratiot flow (in Portage Lake lava series)
†Graveland formation
Great conglomerate
†Great Copper Harbor conglomerate
Greenstone flow
Greenwood iron-formation member (of Michigamme slate)
Gwinn series
†Hanbury slate
Hancock amygdaloid
Hancock conglomerate
Hancock flow
Hancock West conglomerate
Hemlock formation (as greenstone)
Holyoke conglomerate
Holyoke formation
Houghton conglomerate
Huginnin porphyrite
Iron River iron-formation member (of Michigamme slate)
Ironwood iron-formation
Iroquois flow (in Portage Lake Lava series)
† Ishpeming formation
Island Mine conglomerate
Isle Royale amygdaloid
Isle Royale flow
Isle Royale trap
Jasper Knob zone (in Negaunee formation)
†Johnson Creek conglomerate
Kearsarge amygdaloid
Kearsarge conglomerate
Kearsarge flow
Kearsarge trap
Kearsarge West amygdaloid
Kearsarge West flow
Keweenawan series
Kingston conglomerate
Kitche schist
Knowlton amygdaloid
Knowlton flow
Kona dolomite
Lake La Belle conglomerate
Lake amygdaloid
Lake flow
Lake Enchantment sediments
United States—Continued
Michigan—Continued
Precambrian—Continued
Lake Hanbury slate group
Lake Shore trap
† Lake Superior group
Loretto slate member (of Vulcan iron-formation)
Mabb amygdaloid
Mabb flow
Makasin Hill zone (in Negaunee formation)
Mandan amygdaloid
Mandan flow
Manitou amygdaloid
Manitou flow
Mansfield iron-bearing slate member (of Hemlock formation); (as formation or slate)
†Marconian series
†Marquette series
Mass amygdaloid
Mass flow
Mayflower amygdaoids
Mayflower flows
Medora amygdaoids
Medora flow
Menominee group (as series)
Merchants amygdaloid
Merchants flow
†Mesnard epidote
†Mesnard formation
Mesnard quartzite
Michigan conglomerate
Michigamme slate
†Michiganian jasper
Minnesota conglomerate
Minnesota trap
Minong breccia
Minong porphyrite
Minong trap
Mona schist
Montreal amygdaloid
Montreal flow
†Mount Bohemia conglomerate
Mount Houghton felsite or quartz porphyry
Mount Mesnard quartzite
National sandstone
†Nebraska conglomerate
Negaunee iron-formation
New Arcadian amygdaloid
New Arcadian flow
New Mass amygdaloid
New Mass flow
New Mayflower amygdaloid
Nonesuch shale
Norrie ferruginous chert member (of Ironwood iron-formation)
North amygdaloid
North flow
North Butler amygdaloid
North Butler flow
North Lake zone (in Negaunee formation)
United States—Continued
Michigan—Continued

Precambrian—Continued

North Star conglomerate
Norway limestone
Norwich conglomerate
Norwich trap
Ogima amygdaloid
Ogima flow
Ohio Trap Rock traps
Old Colony amygdaloid
Old Colony flow
Old Colony sandstone
Old Pewabic amygdaloid
Old Pewabic flow
Oneco amygdaloid
Oneco flow
†Onieda conglomerate
Osceola amygdaloid
Osceola flow
Outer conglomerate
Pabst member (of Tyler slate)
Paint slate
Paint River greenstones
Palmer gneiss
Palms quartzite
Pentoga greenstones
Pewabic amygdaloid
Pewabic flow
Pewabic West conglomerate
†Phoenix Mine group
Portage Lake lava series
Praysville porphyry
Presque Isle granite
Princeton series
Quincy amygdaloid
Quincy flow
Quincy Pewabic amygdaloid
Quincy Pewabic flow
Quinnesec formation (as greenstone)
Quinnesec ore-formation
Randville dolomite
†Republic formation
Republic granite
Republic quartzite
†Rockland sandstone
†St. Louis amygdaloid
St. Louis conglomerate
†St. Louis flow
†St. Marys epidote
Saunders formation
Scales Creek flow (in Portage Lake lava series)
Shawmut amygdaloid
Shawmut conglomerate
Shawmut flow
Siamo slate
South Butler amygdaloid
South Butler flow
South Pewabic amygdaloid
South Pewabic flow
†State Road conglomerate
Sturgeon quartzite
Superior amygdaloid

United States—Continued
Michigan—Continued

Precambrian—Continued

Superior flow
Superior West amygdaloid
Superior West flow
Toltec trap
Tomahawk amygdaloid
Torch Lake amygdaloid
Torch Lake flow
Traders iron-bearing member (of Vulcan iron-formation)
†Tyler slate
†Victoria amygdaloid
†Victoria flow
Vulcan iron-formation
West Minnesota conglomerate
West Minnesota trap
Wewe slate
Winona amygdaloid
Winona conglomerate
Winona flow
Wolf Lake granite
Wolf Lake schist
Wolverine amygdaloid
Wolverine sandstone
Wyandot amygdaloid
Wyandot flow
Wyandot No. 8 amygdaloid
Wyandot No. 8 flow
Yale member (of Ironwood iron-formation)

Age(?)
Commonwealth ore formation
Huron Bay slates
L'Anse series

Minnesota

Pleistocene
Itascan till
Lake Agassiz clay
Lake Agassiz silt
Mankato drift (see Mankato substage)
Pauilian till
West Union gravel

Upper Cretaceous
Big Cottonwood formation
Coleraine shale or formation

Lower Cretaceous
Ostrander member (of Dakota formation)

Ordovician
Minnesotan series
†Shakopee group

Upper Ordovician
Wykoff beds

Middle Ordovician
Carimona member (of Platteville formation)
Cummingsville member (of Galena formation)
Minneapolis limestone
Prosser member (of Galena dolomite); (as limestone)
St. Peter sandstone
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United States—Continued
Minnesota—Continued

Middle Ordovician—Continued
  Stewartville massive member
    (of Galena dolomite); (as dolo-
   omite *)
  Lower Ordovician
    Blue Earth siltstone
    Elevator B sandstone (sub-
surface)
    Kasota sandstone
    Root Valley sandstone
    Shakopee dolomite
  Cambrian
    Lansingian series
    New Ulm conglomerate
  Upper Cambrian
    Bad Axe member (of Franconia
    sandstone)
    Dresbach sandstone
    Dresbach shale
    Franconia sandstone
    Galesville member (of Dresbach
    formation)
    Jordan sandstone; sandstone
    member (of Trempealeau for-
    mation) in Michigan.
    Judson member (of St. Lawrence
    formation)
    Mill Street conglomerate (in
    Woodhill member of Franconia
    formation)
    Minneiska member (of Franconia
    formation)
    Nicollet Creek member (of St.
    Lawrence formation)
    Reno member (of Franconia for-
    mation)
    St. Croix formation
    St. Croixan series
    St. Lawrence limestone or dolo-
   omite member (of Trempealeau
    formation)
    St. Lawrence member (of Trem-
    pealeau formation); (as forma-
    tion)
    Taylors Falls member (of Fran-
    conia formation)
    Van Oser member (of Jordan
    sandstone)

Precambrian
  Agamok sediments
  Agate Bay group
  Aitkin formation
  Amoeba Lake graywackes, slates,
    and tuffs
    Bassimenan Lake granite
    Basswood granite
    Beaver Bay diabase
    Biwabik iron-formation
    Burnside granite gneiss
    Cabotian (lava, red rock, and
    gabbro)
    Carltonian formation
    Carlton slate
  United States—Continued
  Minnesota—Continued

Precambrian—Continued
  Chengwatana series
  Coutuiching series
  Cloquet slate
  Courtland quartzite
  Crooked Lake granite pebble
    conglomerate
  Crow Wing formation
  Crystal gray quartz monzonite
    Cuyuna member (of Crow Wing
    formation)
    Cuyuna series
    Dam Lake quartzite
  Deerwood iron-formation mem-
    ber (of Virginia slate)
  Dike Lake slate
  Disappointment Mountain con-
   glomerate
  Duluth gabbro
  Duluth group
  Embarrass granite
  Ely greenstone
    Emily member (of Crow Wing
    formation)
    Ensign Lake green slates, tuffs,
    and graywackes
    Ensign-Snowbank Lake agglom-
    erate
    Ester Lake graywackes, slates,
    and tuffs
    Fond du Lac sandstone
    Freedhem tonalite
    Giants Range granite
    Grand Portage graywacke
    Grant conglomerate
    Gunflint iron-formation
    Hillman gneissoid tonalite
    Hinckley sandstone
    Hunters Island iron-bearing
    series
    Jasper conglomerate
    Jasper Lake greenstone conglom-
    erate or agglomerate
    Kawishiwin agglomerate, green-
    stones, or series
    Keewatin series
    Keekukabic granite
    Keekukabic tuffs, agglomerates,
    slates, and andesite porphyry
    Kettle River sandstone
    Keweenaw Point volcanic series
    Knife Lake group (as series)
    Knife Lake slate
    Koochiching granite
    Lester River group
    McGrath gneiss
    Manitou series
    Marquetian system
    Mesabi gabbro
    Mesabi series
    Mississippi slate series
    Moose Lake conglomerate
    Morton granite gneiss
    New Ulm quartzite
United States—Continued
Mississippi—Continued

**Miocene—Continued**

†Grand Gulf sandstone 1
**Homochitto member** (of Passapa-
**goula formation) 2
**Knoxville member** (of Passapa-
**goula formation) 2
†Mississippi clays 1
**Pascagoula clay** 1
**Miocene(?)**
†Bayou Pierre phase 1
**Catahoula sandstone** 1
formation or tuff
**Miocene, lower and middle**
Hattiesburg clay 1
**Miocene and Oligocene(?)**
†Grand Gulf group 1
**Oligocene and Miocene(?)**
**Catahoula group** 1
**Oligocene**
Limestone Creek beds 1
Limestone Creek group 1
**Oligocene, upper**
Chickasaway limestone (as marl
member of Byram marl) 1
**Oligocene, middle**
Bucatunna clay member (of By-
ram formation) 1
**Byram formation** (as marl 1)
Hennessey Bayou member (of
Bucatunna marl and clay) 2
**Mint Spring marl member** (of
Marianna limestone) 2
**Vicksburg group** 1 or formation
**Oligocene, lower**
**Forest Hill sand** 1
†Madison sand 1
**Red Bluff clay** 1
**Eocene**
†Chickasaw formation or group 1
**Eocene, upper**
**Jackson formation** 1 or group
**Moodys Branch marl** 1 or forma-
tion
**Yazoo clay** (as member of Jack-
son formation) 1
**Eocene, middle**
**Archusa shale member** (of Cook
Mountain formation) 2
†Basic claystone 1
**Basic City shale member** (of Tal-
lahatta formation) 2
†Decatur sand 1
†Enterprise green marl 1
**Gordon Creek shale member** (of
Cook Mountain formation) 2
†Grenada formation 1
**Holly Springs sand** 1 member (of
Tallahatta formation)
†Koskuskosandstone member (of
Lisbon formation) 1
†Meridian formation 1
**Meridian sand member** (of Talla-
hatta formation) 2

**Eocene**

†Chickasaw formation or group 1
**Eocene, upper**
**Jackson formation** 1 or group
**Moodys Branch marl** 1 or forma-
tion
**Yazoo clay** (as member of Jack-
son formation) 1
**Eocene, middle**
**Archusa shale member** (of Cook
Mountain formation) 2
†Basic claystone 1
**Basic City shale member** (of Tal-
lahatta formation) 2
†Decatur sand 1
†Enterprise green marl 1
**Gordon Creek shale member** (of
Cook Mountain formation) 2
†Grenada formation 1
**Holly Springs sand** 1 member (of
Tallahatta formation)
†Koskuskosandstone member (of
Lisbon formation) 1
†Meridian formation 1
**Meridian sand member** (of Talla-
hatta formation) 2

**Miocene**

†Davion rock 1
**Fort Adams member** (of Passa-
paoula clay); (as Fort Adams or
Ellisville phase 1; see also G. F.
Brown, 1943, Mississippi Geol.
Survey Bull. 56, p. 47-48)
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Eocene, middle—Continued
Neshoba sand member (of Tallahatta formation) 2
Potterchitto sand member (of Cook Mountain formation) 2
Shipps Creek shale member (of Wautubbee formation) 2
Shongalo greensand 1
†Wautubbee marl 1
Winona sand (as member of Lisbon formation) 1
Zilpha clay 2

Eocene, lower
†Ackerman formation 1
Fearn Springs sand member (of Wilcox formation) 2
†Flatwoods clay 1
Noxubee sand 2

Paleocene or Eocene
†Betheden formation 2

Paleocene
†Chalybeate limestone member (of Porters Creek formation) 2
Tippah sand lentil (of Porters Creek clay) 1

Cretaceous, Tertiary, and Pleistocene
†Lafayette formation 1

Upper Cretaceous
†Coulter's Ferry sands 1
Houston marl 1
Mooreville chalk (as tongue of Selma chalk) 1
†Oktibbeha tongue (of Selma chalk) 1

Owl Creek formation 1
Prairie Rock limestone 1
Ripley formation 1
Ripleyan series 1
Tombigbee sand member (of Eutaw formation) 1
Tupelo tongue (of Coffee sand) 1

Lower Cretaceous
Dantzler formation 2 (subsurface)
Little Bear formation or residuum 2

Upper Mississippian
Cripple Deer sandstone member (of Alsobrook formation) 1
Forest Grove formation 1
Hargett sandstone 1
Highland Church sandstone member (of Forest Grove formation) 1
Pond limestone 1
Southward Spring sandstone 1
member (of Pride Mountain formation)

Lower Mississippian
Carmack limestone 1
Iuka formation 1

Devonian and Lower Mississippian
†Yellow Creek beds 1
United States—Continued
Missouri—Continued

Pennsylvanian (Virgil)—Continued

Heumader shale member (of Topeka limestone)¹

Holt shale member (of Topeka limestone)¹

Langdon shale ²

Nodaway limestone (in Shawnee formation)¹

†Quintman limestone ¹

†St. Joe limestone (in Shawnee formation)¹

†Waldron sandstone (in Douglas formation)¹

Pennsylvanian (Missouri)

Belton sandstone member (of Chanute formation)²

Bethany Falls limestone ¹

Cement City limestone bed (in Chanute shale member of Kansas City formation)¹

Farley limestone bed (in Lansing formation)¹

†Iatan limestone; †member (of Douglas formation)¹

Kansas City formation; group in Kansas

†Kansas City limestone ¹

†Kansas City oolite ¹

Knobtown sand ¹

Liberty Memorial shale member (of Chanute formation)²

Missouri series (as group)¹

†Parkville limestone (in Kansas City formation)¹

†Parkville shale ¹

Plattsburg limestone; †member (of Lansing formation)¹

Raytown limestone bed (in Kansas City formation); limestone in Kansas

Sniabar limestone ¹

Sugar Creek shale (in Bethany Falls limestone)¹

Swope limestone or formation ¹

Union Station shale member (of Chanute formation)²

Weston limestone ¹

Weston shale; †member (of Douglas formation)¹

Pennsylvanian (Des Moines)

Amoret limestone member (of Altamont formation)²

Ardmore limestone member (of Cherokee shale)¹

Bevier cyclothem or formation (including Bevier clay)²

Bevier fire clay ¹

Blackjack Creek cyclothem (including Blackjack Creek limestone)²

Blackwater Creek shale member (of Fort Scott formation)²

†Cheltenham fire clay (formation)¹

United States—Continued
Missouri—Continued

Pennsylvanian (Des Moines)—Con.

†Clear Creek sandstone (in Cherokee shale)¹

†Clear Fork group ¹

Dederick shale member (of Cherokee formation)²

Drywood Formation or coal cycle ²

Excello formation ²

†Flint Hill sandstone member (of Fort Scott formation)²

†Henrietta formation or group ¹

Higginsville cyclothem (including Higginsville limestone)²

Houx cyclothem (including Houx limestone)²

†Lagonda sandstone member (of Cherokee shale)¹

†Lexington group ¹

Loutre formation ²

Macon City shale ¹

Miller fire clay ¹

Myrick Station cyclothem (including Myrick Station limestone)²

Republic chert ¹

Rich Hill limestone member (of Cherokee shale)¹

Robinson Branch formation or coal cycle ²

Summit limestone (in Cherokee shale)¹

†Tebo formation ²

Thomas Hill fire clay ¹

Thomas Hill shale ¹

Tina cyclothem (including Tina limestone)²

†Warrensburg group ¹

Worland limestone ¹

Mississippian

†Ste. Genevieve group ¹

†Seneca chert ¹

Upper Mississippian

Aux Vases sandstone ¹

Carterville formation ¹

Carthage limestone ¹

†Gabouri limestone ¹

†Genevieve group ¹

Meramec series (as group)¹

Ste. Genevieve limestone ¹

†Ste. Genevieve marble ¹

‡Ste. Genevieve sandstone ¹

†St. Louis group ¹

St. Louis limestone ¹

Lower Mississippian

Bushberg sandstone member (of Sulphur Springs formation)¹

†Chouteau group ¹

Chouteau limestone ¹

Compton limestone ¹

Easley group ²

Fern Glen limestone ¹

Glen Park limestone member (of Sulphur Springs formation); formation ¹ in Illinois
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  Fly Creek limestone 1
  Groat sandstone bed (in Pierre shale) 1
  Hell Creek formation 1
  Horsethief sandstone 1
  †Judithian series 1
  Judith River formation 1
  Lennep sandstone 1
  Martin sandy zone 1 (subsurface)
  Montana group 1 or formation
  †Montana series 1
  Montanan series 1
  Mosby sandstone member (of Colorado shale); (as member of Warm Creek shale 1)
  Sage Hen limestone member (of Colorado shale) 1

Soap Creek bentonite bed (in Frontier formation) 2
Stoneville Flats limestone (in Belle Fourche shale) 2
Telegraph Creek formation 1 or member (of Cody shale)
Tombstone sandstone 1
Two Medicine formation 1
Virgelle sandstone or sandstone member (of Eagle sandstone) 1
Warm Creek shale 1
Whitlash sands 1

Upper Cretaceous
  Benton shale 1 or formation
  Cat Creek sands 1
  Lower and Upper Cretaceous and Jurassic (?)
  †Yellowstone formation 1

Lower Cretaceous
  †Cascade formation 1
  Cosmos sand 1 (subsurface)
  Cutbank sand 1
  Darling sand 1 (subsurface)
  Douglass 1 (shales)
  Farland 1 (limestone)
  Gird 1 (shales)
  †Great Falls coal series or group 1
  Lupton sand 1 (subsurface)
  Moulton sand 1 (subsurface)
  Olson 1 (limestone)
  Pryor conglomerate member (of Cloverly formation) 1
  Stewart sand 1 (subsurface)
  Sunburst sand 1 (subsurface)
  Warm 1 (formation)
  Wyman 1 (formation)

Middle Jurassic
  Picard shale member (of Nesson formation) 2 (subsurface)
  Vernal 1 (shale)

Upper Jurassic
  Emrick sand 1 (subsurface)
  Rierdon formation 2

Sawtooth formation 2

Middle and Upper Jurassic
  Ellis formation 1 or group

Bowes member (of Piper formation) 2 (subsurface and surface)
Firemoon limestone member (of Piper formation) 2 (subsurface and surface)

Piper formation 2

Sawtooth formation 2

Tampico shale member (of Piper formation) 2 (subsurface and surface)

Permian and Triassic

Bowler formation 1
Montana Continued

Carboniferous
Melrose (quartzite)
Missoula (limestone)

Pennsylvanian
Tyler sandstone member (of Quadrant formation)
Mississippian or Pennsylvanian
Missoula (limestone)
Mississippian to Pennsylvanian
Absaroka sequence
Mississippian and (or) Pennsylvanian

Big Snowy group (or formation)
Charles formation (subsurface)
Dean Lake Chert member (of Madison limestone)
Hannan limestone
Monitor Mountain limestone member (of Madison limestone)
Saypo limestone member (of Madison limestone)
Silvertip conglomerate member (of Madison limestone)
Van Dusen sand (subsurface)

Upper Mississippian
Health formation
Kibbee sandstone (as member of Quadrant formation)
Otter formation or shale (as member of Quadrant formation)
Sun River dolomite
Yakinikak limestone

Lower Mississippian
†Castle limestone member (of Madison limestone)
Little Chief Canyon member (of Lodgepole limestone)
Lodgepole limestone
Madison limestone, formation, or group
Mission Canyon limestone
Paine shale member (of Madison limestone)
Trident (formation)
Woodhurst limestone member (of Madison limestone)

Devonian
Ermont formation

Upper Devonian and Mississippian
Sappington sandstone member (of Three Forks shale)
Three Forks shale, limestone, or formation

Upper Devonian
Jefferson limestone, dolomite, or formation; group in subsurface
Maywood formation

Middle and Upper Devonian

Potlatch anhydrite (or member (of Three forks formation)
Union shale
Middle and Upper Devonian
†Monarch formation

Middle Devonian
Coopers Lake limestone member (of Jefferson limestone)
Glenn Creek shale member (of Jefferson limestone)
Lone Butte limestone member (of Jefferson limestone)
Spotted Bear limestone member (of Jefferson limestone)
White Ridge limestone member (of Jefferson limestone)

Post-Cambrian
Bandbox Mountain type (analcite basalt)
Barker syenite
Big Baldy Mountain type (analcite basalt)
Eureka Divide type (analcite basalt)
Steamboat Mountain type (diorite porphyry)
Wolf Butte type (granite porphyry)
Yogo Peak type (granite porphyry)

Cambrian
Barkerian series
Tilden formation
Upper Cambrian and Middle Devonian
Keene limestone

Upper Cambrian
Cemetery limestone
Devils Glen dolomite
Dry Creek shale
Elkhorn shale or hornstone
Gallatin limestone, or formation
Grove Creek formation
Hasmann formation
Murice formation
Pilgrim limestone (or dolomite
Red Lion formation
†Republican reef
Sage pebble-conglomerate member (of Snowy Range formation)

Snowy Range formation
Yogo limestone

Middle and Upper Cambrian
†Barker formation
Gordon Mountain limestone
Middle or Upper Cambrian
Switchback shale (as limestone)
Middle Cambrian
Alpreston quartzite
Dearborn limestone
Flathead quartzite or sandstone
United States—Continued
Montana—Continued

**Middle Cambrian—Continued**

†Flathead formation or shales
Gordon shale
Hobo Gulch formation
Meagher limestone
Pagoda oolite
Park shale
Pentagon shale
Silver Hill formation
Steamboat limestone
Wolsey shale

**Middle (?) Cambrian**

Damnation limestone
Nannie Basin limestone

**Precambrian**

Altna limestone
Appekunny argillite or formation
Appistoki member (of Appekunny argillite)
Ahorn quartzite
Axes Creek phase (of Cherry Creek series)
Belt series
Bitterroot period
Blackfoot formation
Blackfootian series
Black Point dolomite member (of Cherry Creek series)
Blacktail granite gneiss
Boulder Pass formation
Camp Creek group
Cayuse limestone
Chamberlain shale
Cherric period
Cherry Creek group
Cooke granite
Dillon granite gneiss
Donaher sandstones
Donald quartzites
East Gallatin group
Empire shale
Gallatinian series
Garnet Range formation or quartzite
Gateway formation
Goathanunt member (of Siyeh limestone)
Goose Creek granite
Granite Park member (of Siyeh limestone)
Greenhorn Mountain quartzite
Greyson shale
Grinnel argillite
Hefty formation
Helena limestone
Helenan series
Holland quartzite member (of Miller Peak argillite); (as formation)

**Hoadley formation**

Hole-in-the-Wall member (of Boulder Pass formation)

United States—Continued

Montana—Continued

**Precambrian—Continued**

Kinta argillite
Libby formation
†Lolo series
McNamara formation or argillite
Madisonian period
Marsh shale
Miller Peak formation or argillite
Missoula group
Neihart quartzite
Newland limestone or formation
North Boulder group or formation
Piegan group
Pony series
Prickly Pear member (of Spokane formation)
Ravalli group or argillite
Ravallian series
Red Gap member (of Grinnell argillite)
Rising Bull member (of Grinnell argillite)
Rising Wolf member (of Appekunny argillite)
Rogersian series
Ruby limestone and gneiss
Scenic Point member (of Appekunny formation)
Sheep Mountain quartzite
Shepard formation
Singleshot member (of Appekunny argillite)
Siyeh limestone
Spokane shale or formation
Stillwater complex
Turnley hornstone or shale

**Nebraska**

**Pleistocene and Recent**

Bignell loess
†Plains series
Sand Hills formation

**Pleistocene**

†Platte series
†Sheridan beds
**Pleistocene (Wisconsin)**
Brady soil
Todd Valley sand (as formation)
**Pleistocene (Illinoian)**
Crete formation
**Pleistocene (Yarmouth)**
Sappa formation
†Upland formation
**Pleistocene (Kansan)**
Grand Island formation
Red Cloud sand and gravel
**Pleistocene (Aftonian)**
Fullerton formation
**Pleistocene (Nebraskan)**
David City formation
Holdrege formation
Nebraskan drift
United States—Continued
Nebraska—Continued

**Pleistocene, lower**
- Broadwater formation 2
- Lisco member (of Broadwater formation) 2

**Tertiary, middle**
- Loupian 1 (series)
- Whitian series 1

**Pliocene**
- Ash Hollow formation 2
- Feldt Ranch beds (in Ash Hollow formation) 2
- Kimball formation 2
- Minnechaduza beds (in Ash Hollow formation) 2
- Ogallala formation 1
- Seward formation 2
- Sidney gravel 2
- Snake River stage 1

**Pliocene(f)**
- Devils Gulch beds 1
- Valentine beds 1

**Pliocene, lower**
- Republican River formation 1

**Miocene, Pliocene, and Pleistocene(?)**
- Loup Fork beds or group *
- Niobrara group 1

**Miocene to Pliocene**
- Nebra beds 1
- Sand Canyon member (of Sheep Creek formation) 2

**Miocene**
- Arikaree group (as sandstone 1); formation in Colorado and Wyoming; formation or sandstone in South Dakota
- Box Butte member (of Sheep Creek formation) 2
- Gering sandstone (as formation 1)
- Hemingford group 2
- Marsland formation 2
- Nebraska beds 1
- Sand Canyon member (of Sheep Creek formation) 2
- Scotts Bluff formation 1
- Sheep Creek formation (as beds 1)
- Spottedtail member (of Sheep Creek formation) 2

**Miocene, upper, or Pliocene, lower**
- Burge sands member (of Ogallala formation) 1
- Fort Niobrara formation 1
- Snake Creek beds 1

**Miocene, lower**
- Harrison sandstone (as beds 1)
- Monroe Creek beds 1

**Oligocene**
- Oreila member (of Brule formation) 2
- Whitney member (of Brule formation) 2

**Oligocene, upper, to Miocene**
- Bayard paleosol complex 2

**Oligocene, lower**
- Chadron formation 1

**Permian**
- Aspinwall limestone member (of Onaga shale); (as limestone or shale in Admire shale 1)
- Barneston limestone (as formation 1)
- Bennett shale 1 member (of Red Eagle limestone)
- Burr limestone member 1 (of Grenola limestone)
- Eiss limestone 1 member (of Bader limestone)
- Falls City limestone 1
- Five Point limestone member (of Janesville shale); (as limestone in Admire shale 1)
- Fourmile limestone (in Wreford limestone) 1
- Glenrock limestone 1 member (of Red Eagle limestone)
- Hamlin shale 1 member (of Janesville shale)
- Hawxy shale 1 member (of Onaga shale)
- Holmesville shale 1 member (of Doyle shale)
- Houchen Creek limestone 1 bed (in Hamlin member of Janesville shale)
- Howe limestone 1 member (of Red Eagle limestone)
- Hughes Creek shale 1 member (of Foraker limestone)
- Indian Cave channel sandstone bed (in Towle member of Onaga shale); (as sandstone 1)
- Johnson shale 1
- Kinney limestone 1 member (of Matfield shale)
- Krider limestone 1 member (of Nolans limestone)
- Long Creek limestone 1 member (of Foraker limestone)
- Middleburg limestone 1 member (of Bader limestone)
- Oaks shale 1 bed (in Hamlin member of Janesville shale)
- Odell shale 1
United States—Continued
Nebraska—Continued

Permian—Continued

Paddock shale 1 member (of Nolans limestone)
Roca shale 1
Salem Point shale member 1 (of Grenola limestone)
Speiser shale 1
Sine shale 1 bed (in Hamlin shale member of Janesville shale)
West Branch shale 1 member (of Janesville shale)
Wymore shale 1 member (of Matfield shale)

Pennsylvanian

Ashland limestone 1
Cedar Creek limestone 1
Cullom limestone 1
Fargo limestone 1
Lehmer limestone member (in Admire shale) 1
Louisville limestone 1
Meadow limestone 1
Miles limestone member 1 (of Falls City formation)
Nehawka limestone 1
Oreapolis limestone 1
Preston limestone 1
Union limestone 1

Pennsylvanian (Virgil)

Avoca limestone (in Lecompton limestone) 1
Beil limestone (in Lecompton limestone) 1
Brownville limestone 1 member
(of Wood Siding formation)
Cass limestone 1
Circh limestone 1 member (of Howard limestone)
Ervine Creek limestone (in Deer Creek limestone) 1
Heebner shale 1 member (of Oread limestone)
Jones Point shale (in Calhoun shale) 1
Kenosha shale (in Tecumseh shale) 1
King Hill shale (in Lecompton limestone) 1
Lehmer limestone (in Deer Creek limestone) 1
Little Pawnee shale member (of Cass formation) 1
Minersville shale member (of Friedrich formation) 2
Morton shale 2
Nebraska City limestone 1 member (of Wood Siding formation)
Nemaha formation, member, or subgroup 1
Ost limestone (in Tecumseh shale) 1

Pennsylvanian (Virgil)—Continued

Otoe shale member (of Friedrich formation) 2
Palmyra limestone member (of Friedrich formation) 2
Pierson Point shale 1
Plattford shale (in Scranton shale) 1
Plattsburg limestone 1 member (of Oread limestone)
Pony Creek shale 1 member (of Wood Siding formation)
Queen Hill shale (in Lecompton limestone) 1
Rakes Creek shale (in Tecumseh shale) 1
Richardson subgroup 1
Rock Bluff limestone (in Deer Creek limestone) 1
Rulo limestone 1 member (of Scranton shale)
Sheldon limestone (in Calhoun shale) 1
Shelmster limestone 1
Snyderville shale 1 member (of Oread limestone)
South Fork limestone 1
Sturm limestone (in Lawrence shale) 1
Table Creek shale 1
Taylor Branch limestone 1
Turner Creek shale (in Topeka limestone) 1
Weeping Water limestone (in Oread limestone) 1
Winnebago shale 1

Wood Siding formation 2

Pennsylvanian (Missouri)

Dyson Hollow limestone zone or member (of Stoner member of Stanton formation) 2
Kiewitz shale (in Stanton limestone) 1
P. W. A. Quarry limestone member (of Drum formation) 2
Richfield Quarry shale member (of Drum formation) 2
Rock Lake shale 1 member (of Stanton limestone)
Sarpy formation 2
South Bend limestone 1 member (of Stanton limestone)
Stoner limestone 1 member (of Stanton limestone)

Mississippian

Boice shale 2 (subsurface)

Nevada

Quaternary

American Flat basalt 2
Carsonian series 1
Pleistocene (see also Pliocene, upper, or Pleistocene)
Lake Lahontan beds 1
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<th>Location</th>
<th>Geological Unit</th>
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<td>Nevada Continued</td>
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<td>Chipsa andesite 1</td>
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<td>Elko Prince rhyolite 1</td>
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<td>Extension breccia 1</td>
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<td>Scossa slates 1</td>
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<tr>
<td></td>
<td></td>
<td>Jurassic (?)</td>
</tr>
<tr>
<td></td>
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<td>Aztec sandstone 1</td>
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<tr>
<td></td>
<td></td>
<td>Lower Jurassic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dunlap formation 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lovelockian series 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mittleberry limestone 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sunrise formation 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Triassic</td>
</tr>
<tr>
<td></td>
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<td>Red Rock limestone 2</td>
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<tr>
<td></td>
<td></td>
<td>Rochester rhyolite 1</td>
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<td>United States—Continued</td>
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<tr>
<td>Nevada—Continued</td>
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<tr>
<td><em>Upper Triassic</em></td>
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<tr>
<td>Cane Spring formation  2</td>
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<td></td>
</tr>
<tr>
<td>Dun Glen formation      2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gabbs formation         1</td>
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</tr>
<tr>
<td>Grass Valley formation  2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luning formation        1</td>
<td></td>
<td></td>
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<tr>
<td>Osobb formation         2</td>
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<tr>
<td>Raspberry formation     2</td>
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</tr>
<tr>
<td>Winemucca formation     2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Upper</em> Triassic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>†Staran series          1</td>
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<tr>
<td>Middle and <em>Upper Triassic</em></td>
<td></td>
<td></td>
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<tr>
<td>Natchez Pass formation  2</td>
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<tr>
<td>Star Peak group         1</td>
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<tr>
<td><em>Middle Triassic</em></td>
<td></td>
<td></td>
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<tr>
<td>Augusta Mountain formation 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Favret formation        2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grantsville formation   2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>†Koipatoan series       1</td>
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</tr>
<tr>
<td>Nenzel rhyolite breccia 2</td>
<td></td>
<td></td>
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<tr>
<td>Panther Canyon formation 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prida formation         3</td>
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<tr>
<td>Simon quartz keratophyre 1</td>
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<tr>
<td><em>Middle</em> (?) Triassic</td>
<td></td>
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<tr>
<td>Excelsior formation     1</td>
<td></td>
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<tr>
<td>Limerick keratophyre    1</td>
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<tr>
<td><em>Lower and Middle</em> (?) Triassic</td>
<td></td>
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<tr>
<td>China Mountain formation 2</td>
<td></td>
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</tr>
<tr>
<td><em>Lower Triassic</em></td>
<td></td>
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<tr>
<td>Candelaria formation    1</td>
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<tr>
<td>Dixie Valley formation  2</td>
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<tr>
<td>Tobin formation         2</td>
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<tr>
<td><em>Lower Triassic and Permian</em> (?)</td>
<td></td>
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<tr>
<td>Weaver rhyolite         1</td>
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<tr>
<td><em>Permian and Triassic</em></td>
<td></td>
<td></td>
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<tr>
<td>Koipato formation       1 or group</td>
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<td></td>
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<tr>
<td><em>Permian</em></td>
<td></td>
<td></td>
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<tr>
<td>Arcturus limestone      1</td>
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<tr>
<td>Diablo formation        2</td>
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<tr>
<td>Edna Mountain formation 2</td>
<td></td>
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<tr>
<td>Rochester trachyte      1</td>
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<tr>
<td>Tallman fanglomerate    2</td>
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<tr>
<td><em>Permian</em> (?)</td>
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<tr>
<td>Darrough felsite        2</td>
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<tr>
<td>Pablo formation         2</td>
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<tr>
<td>Carboniferous</td>
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<tr>
<td>Diamondian series       1</td>
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<tr>
<td><em>Pennsylvanian and Permian</em></td>
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<tr>
<td>Callville limestone     1</td>
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<tr>
<td>Havallah formation      2</td>
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<tr>
<td><em>Pennsylvanian</em></td>
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<td></td>
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<tr>
<td>Rib Hill formation      2</td>
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<tr>
<td>†Ruth limestone         1</td>
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<tr>
<td><em>Upper Pennsylvanian and Permian</em></td>
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<tr>
<td>Antler Peak limestone   3</td>
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<tr>
<td>Strathearn formation    2</td>
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<tr>
<td><em>Middle Pennsylvanian</em></td>
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<tr>
<td>Battle formation        2</td>
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<tr>
<td>Highway limestone       2</td>
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<tr>
<td>Tomera formation        2</td>
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</tr>
<tr>
<td><em>Lower Pennsylvanian</em></td>
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<tr>
<td>Moleen formation        2</td>
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<tr>
<td><em>Post-Mississippian</em></td>
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<tr>
<td>Whistler Mountain alaskite 2</td>
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<tr>
<td>Nevada—Continued</td>
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<tr>
<td>Mississippian and Pennsylvanian</td>
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<tr>
<td><em>Tonka formation</em>       2</td>
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<td>Mississippian (see also Devonian and Mississippian)</td>
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<tr>
<td>Indian Springs member (of Bird Spring formation) 1</td>
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<tr>
<td>†Robinson shale         1</td>
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<tr>
<td>Rogers Spring limestone 1</td>
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<tr>
<td>San Simon limestone     1</td>
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<tr>
<td><em>Mississippian</em> (?)</td>
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<tr>
<td>Inskip formation        3</td>
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<td><em>Upper Mississippian to Permian</em></td>
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<tr>
<td>Bird Spring formation   1</td>
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<td><em>Upper Mississippian and Lower Pennsylvanian</em></td>
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<tr>
<td>Bailey Spring limestone 1</td>
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<tr>
<td>Ely limestone           1</td>
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<tr>
<td><em>Upper Mississippian</em></td>
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<tr>
<td>Arrowhead limestone member (of Monte Cristo limestone) 1</td>
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<td>Bluepoint limestone     1</td>
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<tr>
<td>Chainman shale          1</td>
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<tr>
<td>Diamond Peak formation  (as quartzite) 1</td>
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<tr>
<td>Illipah formation       2</td>
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<td>Scotty Wash quartzite   1</td>
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<td>Yellowpine limestone member (of Monte Cristo limestone) 1</td>
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<td><em>Lower and Upper Mississippian</em></td>
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<tr>
<td>Monte Cristo limestone 1 or dolomite</td>
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<tr>
<td><em>Peers Spring formation</em> 1</td>
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<tr>
<td>†White Pine shale       1</td>
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<tr>
<td><em>Lower Mississippian</em></td>
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<tr>
<td>Anchor limestone member (of Monte Cristo limestone) 1 or member (of Monte Cristo dolomite)</td>
</tr>
<tr>
<td>Bristol Pass limestone  1</td>
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<tr>
<td>Bullion dolomite member (of Monte Cristo limestone) 1 or member (of Monte Cristo dolomite)</td>
</tr>
<tr>
<td>Dawn limestone member (of Monte Cristo limestone) 1 or member (of Monte Cristo dolomite)</td>
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<tr>
<td>Joana limestone         1</td>
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<tr>
<td>Mississippian or older</td>
</tr>
<tr>
<td>Leach formation         2</td>
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<td><em>Pumpernickel formation</em> 2</td>
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<tr>
<td>Devonian and Mississippian</td>
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<tr>
<td>Pilot shale             1</td>
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<tr>
<td><em>Devonian</em></td>
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<tr>
<td>Lamoureux or Lamoureaux shale 1</td>
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<tr>
<td>Pinean series           1</td>
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<tr>
<td>Woodpecker limestone    1</td>
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<tr>
<td><em>Upper Devonian</em></td>
</tr>
<tr>
<td>Attyra limestone        1</td>
</tr>
<tr>
<td>Combust limestone       1</td>
</tr>
<tr>
<td><em>West Range limestone</em>  1</td>
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<tr>
<td><em>Middle and Upper Devonian</em></td>
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<tr>
<td>Crystal Pass limestone member (of Sultan limestone) 1</td>
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</tbody>
</table>
United States—Continued
Nevada—Continued

Middle and Upper Devonian—Con.

Middle Devonian

Devils Gate limestone 2
Ironside dolomite member (of Sultan limestone) 1
†Nevadan series 1
Sultan limestone 1
Valentine limestone or dolomite member (of Sultan limestone) 1
Middle Devonian
Silverhorn dolomite 1
Slaven chert 2

Middle Devonian and possibly older
Muddy Peak limestone 1

Lower and Middle Devonian
Nevada limestone 1 or formation

Lower Devonian
Cooper Peak dolomite 2

Silurian

Lone Mountain dolomite (as limestone 1)
Roberts Mountains formation 2

Upper Silurian
†Lone limestone 1
Middle Silurian
Timpanahutean series 1

Ordovician

Pahranagat limestone 1
Pinyon series 1
Ordovician(?)
Coaldale chert 2
Mayflower schist 1
Sonoma Range formation 2
Zanzibar limestone 1

Upper Ordovician

Ely Springs dolomite 1
Hanson Creek formation 2

Middle Ordovician

Eureka quartzite 1

Lower—Upper Ordovician

Valmy formation 2

Lower, Middle, and Upper(?) Ordovician

Toquima formation 1

Lower and Middle Ordovician

Pogonip group (as limestone 1)
Vinini formation 2

Lower and Middle(?) Ordovician

Palmetto formation 1

Lower Ordovician

Cherry shale 1
Comus formation 2
Egan limestone 1

Goodwin limestone (as formation 1)
Goodwinian series 1
Lehman formation 2
†Pogonipan series 1
Schell shale 1
Steptoean series 1
Tank Hill limestone 1
Willow limestone 1
Yellow Hill limestone 1

United States—Continued
Nevada—Continued

Cambrian

Gold Hill formation 1
Morning Glory limestone member (of Gold Hill formation) 1
Pine Nut limestone member (of Gold Hill formation) 1
†Prospectan series 1
Swarbick formation 1
Tybo shale 1
White Caps limestone member (of Gold Hill formation) 1

Upper Cambrian to Devonian(?)

Goodsprings dolomite 1

Probably Upper Cambrian

Hales limestone 1

Upper Cambrian

Dunderberg shale 1
Dunderbergian series 1
†Hambergian series 1
Hamburg limestone 1 or dolomite
†Hamburg shale 1
Harmony formation 2
Middle limestone 1

Middle or Upper Cambrian

Preble formation 2

Middle and Upper Cambrian

Highland Peak limestone 1

Middle(?) and Upper Cambrian

Emigrant formation 1

Middle Cambrian

Burnt Canyon limestone 2
Burrows dolomite 2
Burrows shale 2
Chisholm shale 1
Comet shale 3
Condor member (of Swasey limestone) 2
Eldoradan series 1
Eldorado dolomite (as limestone 1)
Geddes limestone 2
Lyndon limestone 1
Peasley limestone 2
†Prospect Mountain limestone 1
Rubyan series 1
†Secretan series 1

Secret Canyon shale 1

Middle(?) Cambrian

Scott Canyon formation 2

Lower and Middle Cambrian

Combined Metals member (of Pioche shale); (as bed 1)
Pioche shale 1

Lower Cambrian

Forlorn Hope shale 2
Johnnie formation 1
Miller Mountain formation 2
Prospect Mountain quartzite 1
Silver Peak group 1
Stirling quartzite 1

Wood Canyon formation 1

Lower Cambrian(?)

Osgood Mountain quartzite 2
United States—Continued

New Hampshire—Continued

Devonian or Carboniferous—Con.

- Pond Hill granite
- Priest Hill granite
- Randolph granite
- Rowes vent-agglomerate
- Sawyer quartz syenite
- Scrag granite
- Gold Butte quartz monzonite

Devonian(?)

- Albany porphyritic nordmarkite
- Durham quartz diorite
- Hampton granodiorite
- Mount Moat conglomerate
- Pequawket breccia
- Rochester biotite granite
- South Moat flow

Upper Devonian

- Smarts Mountain granite

Upper Devonian(?)

- Baker Pond gneiss
- Bethlehem gneiss
- Bickford granite
- Conway granite
- Croydon group
- Exeter diorite
- French Pond granite
- Haverhill granodiorite

- Kinsman quartz monzonite (as granodiorite)
- Long Mountain granite
- Mascoma group
- Meredith granite
- New Hampshire plutonic series (as magma series)
- Norway quartz monzonite
- Remick tonalite
- Spaulding quartz diorite
- Tamworth granite
- Unity group

Middle or Upper Devonian

- Lebanon granite

Middle or Upper Devonian(?)

- Oliverian plutonic series (as magma series)

- Whitefield gneiss

Post-Lower Devonian

- Pine Mountain complex

Lower Devonian

- Boott member (of Littleton formation)
- Dakin Hill member (of Littleton formation)
- Durgin Brook member (of Littleton formation)
- Hubbard Hill member (of Littleton formation)
- Jenness Pond member (of Littleton formation)

Littleton formation

- May Pond member (of Littleton formation)
- Pittsfield member (of Littleton formation)
United States—Continued  
New Hampshire—Continued  
Lower Devonian (?)  
Blueberry Mountain argillite  
Talford schist  
Pre-Devonian (?)  
Parker Hill schist  
Silurian and Devonian  
Blueberry Mountain series  
Silurian (?)  
Fitch Hill granite gneiss  
Intervale clay slate  
Lyman formation  
Middle Silurian  
Pitch formation  
Pitch Hill arkose  
Lower and Middle Silurian  
Clough quartzite or formation (as conglomerate ?)  
Pre-Silurian  
West Bath slate  
Ordovician to Lower Devonian  
New Hampshire sequence  
Probably Ordovician and Silurian  
Calef member (of Eliot formation)  
Gove member (of Berwick formation)  
Rye formation  
Ordovician  
Albee formation  
Piermont member (of Albee formation)  
Ordovician (?)  
Ammonosuc volcanics  
Partridge formation (as slate ?)  
Upper Ordovician  
Highlandcroft granodiorite  
Highlandcroft plutonic series (as magma series ?)  
Lisbon quartzite  
Lost Nation quartz diorite  
Middle Ordovician (?)  
Hardy Hill quartzite member (of Orfordville formation)  
Orfordville formation  
Post Pond volcanic member (of Orfordville formation)  
Sunday Mountain volcanic member (of Orfordville formation)  
Cambrian and Ordovician  
Lisbon formation  
Probably Cambrian  
Swift Water formation  
Precambrian and Pennsylvanian (?)  
Rockingham schist  
Precambrian (?)  
Montalban (formation)  
Mount Deception granite  
Rye gneiss  
Winnipesaukee quartz diorite (as gneiss ?)  
Precambrian (?) and later  
White Mountain series  

United States—Continued  
New Hampshire—Continued  
Age  
Gunstock gneiss  
South Hampton granite  
New Jersey  
Quaternary (probably Recent)  
Lalor sands  
Ordovician  
Bridgeton formation  
Cape May formation  
Fish House beds  
Fish House clay  
Glassboro gravel  
Jamesburg formation  
Jerseyan drift  
Pensauken formation  
Trenton gravel  
Woodmansie phase (of Bridgeton formation)  
Eocene  
Long Branch sand  
Squankum marl  
Timber Creek beds  
Eocene, middle  
Shiloh marl member (of Kirkwood formation)  
Breckenridge sand  
Manasquan marl  
Rancocas group or formation  
Sewell formation  
Paleocene  
Horners town marl  
Vin centown sand  
Cretaceous  
Sand Hill (series)  
Upper Cretaceous  
Amboy clays  
Bay View Avenue sand  
Cliffwood clays  
Columbus sand  
Crosswicks clay  
Englishtown sand  
Farrington sand member (of Raritan formation)  
Hazlet sands  
Marshalltown formation  
Matawan group or formation  
Merchantville clay  
Monmouth group or formation  
Mount Laurel sand  
Navesink marl  
Old Bridge sand member (of Raritan formation)  

United States—Continued  
New Jersey—Continued  
**Upper Cretaceous—Continued**  
†Raritan clay 1  
Raritan formation 1  
Red Bank sand 1  
Sayreville sand member (of Raritan formation) 1  
South Amboy fire clay 1  
Tinton sand member (of Red Bank sand) 1  
Trenton clays 1  
Wenonah sand 1  
Woodbury fire clay 1  
**Triassic**  
†Rocky Hill trap 1  
**Upper Triassic**  
†Arlington traps 1  
Brunswick shale 1 or formation  
Granton trap 1  
Lockatong formation 1  
Manassas sandstone 1  
Newark group 1  
†New Germantown trap 1  
†Sand Brook trap 1  
†Snake Hill trap 1  
Stockton formation 1  
†Sourland Mountain trap 1  
Watchung basalt 1  
**Devonian**  
†Green Pond Mountain group 1  
**Middle Devonian**  
Kanouse sandstone 1  
†Pequanoc shale 1  
**Silurian**  
Decker Ferry shales 1  
Green Pond conglomerate 1  
†Green Pond quartzite 1  
†Kittatinny sandstone 1  
†Shawangunk group 1  
**Upper Silurian**  
Decker limestone 1  
Langwood shale 1  
**Middle Ordovician**  
Jacksonburg limestone 1  
**Cambrian and Lower Ordovician**  
Kittatinny limestone 1  
**Upper Cambrian and Lower Ordovician**  
†Wallkill limestone 1  
**Lower Cambrian**  
Hardyston quartzite 1  
**Precambrian**  
Byram granite gneiss 1  
†Edison gneiss 1  
Franklin limestone 1  
†Franklin type 1 (gneiss)  
Franklin Furnace band 1  
†Hamburg Mountain gneiss 1  
Losee diorite gneiss 1  
†Losee Pond granite 1  
Montville type 1 (limestone)  
†Mount Hope type 1 (gneiss)  
†Oxford gneiss 1  
Pochuck gabbro gneiss 1  

United States—Continued  
New Jersey—Continued  
**Precambrian—Continued**  
†Sand Pond gneiss 1  
Stockholm band 1  
†Van Nest Gap gneiss 1  
**Age(?)**  
†New Vernon trap 1  
**New Mexico**  
Recent  
Capulin basalts 2  
Carrizo sand lava flow 2  
Gananoke formation 2  
Nakaibito formation 2  
Tularosa Malpais lava 2  
**Quaternary (see also Tertiary or Quaternary)**  
Bandelier rhyolite tuff 2  
Blue Water basalt flow 1  
Canjilon till 2  
Cañones andesite 2  
Chico phonolites 2  
Clayton basalts 2  
Gilan series 1  
Jornadan series 1  
Lobato basaltic lavas 2  
McCarty’s basaltic flow 1  
Mescalero sands 1  
Palomasan series 1  
Puye gravel 2  
Raton basalts 2  
Red Mountain dacites 2  
Sandia clay 1  
Santa Clara basalt 2  
Slagle trachytes 2  
Tuerto gravel 2  
Turkey Mountain andesite 2  
University beds 3  
Vallecano basalt 2  
**Pleistocene**  
Clovis beds 3  
Cuerbio basalt 2  
Laguna basalt flow 1  
Palomas gravel 1  
Suwanee basalt flow 1  
Wheatland formation 2  
**Pleistocene (?)**  
Gatuia formation 2  
**Pleistocene**, upper  
Sand Canyon formation 2  
San Jon formation 2  
**Tertiary or Quaternary**  
Las Feveras formation 2  
**Tertiary or Quaternary (?)**  
Tulrosa formation 1  
**Tertiary**  
Arriban series 1  
Caballo Blanco rhyolite tuff 2  
Cieneguilla limburgite 2  
Cooney quartz latite 1  
Cranston sandstone 1  
Deadwood Gulch rhyolite tuff 1  
United States—Continued  
New Mexico—Continued  
Tertiary—Continued  

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<tr>
<th>Formation</th>
<th>Description</th>
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<tbody>
<tr>
<td>Dog Gulch formation</td>
<td>Espinaso volcanics</td>
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<tr>
<td>Panney rhyolite</td>
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<td>Houston andesite</td>
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<td>Last Chance andesite</td>
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<td>Latir Peak latite</td>
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<td>Llano Estacadan series</td>
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<td>Lufkin rhyolite</td>
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<tr>
<td>Maya conglomerate</td>
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<td>Abiquiu tuff</td>
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<td>Chama clays</td>
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<td>Datil formation</td>
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<td>Lucky Bill formation</td>
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<td>Pedernal chert member (of Abiquiu tuff)</td>
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<td>Miocene, upper</td>
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<td>Popotosa formation</td>
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<td>Miocene, pre-upper</td>
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<td>El Rito formation</td>
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<td>(?) Miocene, upper</td>
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<td>Spears member (of Datil formation)</td>
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<td>Santa Fe group (as formation)</td>
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<td>Bishops Lodge member (of Tesuque formation)</td>
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<td>Oligocene and Miocene</td>
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<td>Thurman formation</td>
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<td>Houten sandstone</td>
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<td>Ratonan series</td>
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<td>Eocene (?)</td>
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<td>Zia marl</td>
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<td>Eocene, lower</td>
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<td>Almagre beds</td>
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<td>Largo beds</td>
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<td>Hanover granodiorite porphyry</td>
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<td>Santa Rita granodiorite porphyry</td>
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<td>Cretaceous and Paleocene</td>
<td>Raton formation</td>
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<td>Gallinas shale</td>
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<td>Mora sandstone</td>
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<td>Pueblo series</td>
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<tr>
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<td>Whim Hill breccia</td>
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<td>Allison member</td>
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<td>Barker Dome tongue</td>
<td>(of Cliff House sandstone)</td>
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<td>(of Crevasse Canyon formation); (as barren member of Mesaverde formation)</td>
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<td>Beechatuda tongue</td>
<td>(of Cliff House sandstone)</td>
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<td>†Bell Mountain sandstone member</td>
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<td>Cano member</td>
<td>(of Mesaverde formation)</td>
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<td>†Chacra sandstone member</td>
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<td>†Chamiso formation</td>
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<td><strong>Cholla Canyon tongue</strong></td>
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<td><strong>Crevasse Canyon formation</strong></td>
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<td>Dalton sandstone member</td>
<td>(of Crevasse Canyon formation); (as member of Mesaverde formation)</td>
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<td>Dileo coal member</td>
<td>(of Crevasse Canyon formation); (as member of Mesaverde formation)</td>
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<td>Farmington sandstone member</td>
<td>(of Kirtland shale)</td>
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<td>Fort Stanton shale</td>
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<td>Fruitarian formation</td>
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<td>Hosta tongue</td>
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**New Mexico—Continued**  
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<td>La Cruz Peak formation</td>
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<td>La Jara shale</td>
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<td>La Ventana tongue</td>
<td>(of Cliff House sandstone); (as sandstone member of Mesaverde formation)</td>
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<td>†Madrid formation</td>
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<td>†Miguel formation</td>
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<td>Ojo Alamo sandstone</td>
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<td>Pina Vittios sandstone</td>
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<td>†Placerr Mountain group</td>
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<td>†Prieta sandstone</td>
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<td>Puerca series</td>
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<td>†Punta de la Mesa sandstone member</td>
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<td>Pyramid conglomerate</td>
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<td>Sierra Blanca series or coal measures</td>
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<td><strong>Vermejo formation</strong></td>
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Tucumcari shale (as beds) ¹
Tucumcarian series ²

Jurassic

Chavez member (of Morrison formation) ²
†Ocate sandstone ²
Prewitt sandstone member (of Morrison formation) ²
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Triassic

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Triassic (?) ¹

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Pico sandstone ¹ lentil (of Chinle formation)
Redonda formation (as member of Chinle formation) ²
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†Senorito sandstone lentil (in Chinle formation) ¹

Wingate sandstone ¹

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†Pecos Valley red beds ¹

Permian

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†Bernalilano series ¹
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†Nogal formation ¹
†Pecos formation ¹
Pecos Canyon sandstone ¹
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Permian (?) ¹

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†Fletcher anhydrite member (of Salado formation) ² (subsurface)
La Huerta siltstone member (of Salado formation) ² (subsurface)
Magenta member (of Rustler formation) ²
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Vaca Triste sandstone member (of Salado formation) ² (subsurface)

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Cañas gypsum member (of Yeso formation) ²
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Joyita sandstone member (of Yeso formation) ²
Los Vallos member (of Yeso formation) ²
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San Ysidro member (of Yeso formation) 2
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Arcente member (of Lake Valley formation) 2
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Bella shale 1
Box member (of Percha shale formation) 2
Contadero formation 2
Percha shale 1
Ready Pay member (of Percha shale) 2
Silver shales 1
Volusia shale 1

Middle Devonian
Onate formation 2
Percha series 1

Silurian
Santa Rita limestone 1
Silurian (?)
Cibola limestone 1
Naiad limestone 1

Middle Silurian
Mesillan series 2

Ordovician and Silurian
†Mimbres limestone 1

Ordovician
Armendaris limestone 1
Cristobal limestone 1
Frondosa limestone 1
Mimbresian series 1
†Pinos Altos limestones 1

Upper Ordovician
Aleman formation 2
Cable Canyon sandstone 2
Cutter formation 2
Jornada limestone 2
Par value member (of Montoya dolomite) 2
Raven member (of Montoya dolomite) 2
Second Value member (of Montoya dolomite) 2
Upham dolomite 2
Valmont dolomite 2

Lower Ordovician
Bat Cave limestone 2
Sierrite limestone 2

Cambrian
Chiricahuan series 1
Hawkins limestone 1

Cambrian (?)
Burro quartzite 1

Upper Cambrian
Chloridian series 1
Long quartzite 1
Mañas quartzite 1
†Shandon quartzite 1

United States—Continued
New Mexico—Continued

Upper Cambrian (?)
Carrasco limestone 1

Middle Cambrian
Dragooan series 1

Precambrian
Agua Caliente gabbro 3
Albuquerquean series 1
Antonio slate 1
Badito quartzite member (of Hopewell series) 2
Blue Springs muscovite schist 2
Cabrera metaquartzite 2
Cleveland Gulch quartzite member (of Hopewell series) 2
Dixon granite 2
Embudo granite 2
Garnuan series 1
Graphic lavas 1
Hondo slate 2
Hopewell series 2
Lacorocah meta-andesite tuff member (of greenstone complex) 2
Los Pinos granite 2
Ninos schist 1
Ortega quartzite 2
Penasco quartzite 1
Picuerian series 1
Petaea schist phase (of Ortega quartzite) 2
Picuris basalts 2
Pilar phyllite member (of Ortega formation) 2
Priest granite 2
†Pueblo quartzite 1
Rinconada schist member (of Ortega formation) 2
Rociada limestone 1
Sals quartzite 2
Sandoval granite 1
Sapello quartzite 1
Serna schist 1
Sevilleta rhyolite 2
Solitario slate 1
Taosan series 1
Tijeras quartzite 1
Truchas slate 2
Tusas granite 2
Vadito formation 2
Valencian series 1
Vallestitos rhyolites 2
White Ridge quartzite 2
Ysidro shale 1

Age (?)
Incarnacion granite 1

New York

Pleistocene
Albany clay 1
Cowaselon clay 1
Gardiners clay 1

Hempstead gravel member (of Manhasset formation) 1
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Upper Devonian—Continued

Gardeau shale member (of West Falls formation); (as member of Portage formation)

Genesee formation (as group)

Genesee shale

Genundewa limestone lentil (of Genesee shale)

Gilboa formation

Gowanda shale member (of Perrysburg formation)

Grimes siltstone member (of West Falls formation); (as sandstone)

Hanover shale

Hatch shale member (of West Falls formation)

Hinsdale sandstone

Hume shale member (of Perrysburg formation)

Ithaca facies sub-group

Ithaca shale member (of Portage formation)

Jamestown conglomerate

Julian member (of Enfield formation)

Kaaterskill formation

Kaaterskillian series

Kattel shale

Laona sandstone

Laurens member (of Tully limestone)

Letchworth shale

Lillibrige sandstone member (of Chadakoin stage)

Little Genesee conglomerate

Long Beards Riffs sandstone

Machias shale

Marathon sandstone member (in Ithaca facies subgroup)

Middlesex shale member (of Sonyea formation)

Milo tongue (of West River shale)

Naples shale or group

New Lisbon member (of Tully formation)

Northeast shale

Nunda sandstone member (of West Falls formation)

Oneonta sandstone

Oneteora formation (as red beds)

Otsego shale and sandstone

Parrish limestone bed (as lentil)

Penn Yan tongue (of West River shale)

Perrysburg formation

Pipe Creek shale member (of Hanover shale); (as member of Wiscoy sandstone)

Portage group, formation, or shale

Portage sandstone

Portland shale

Prattsburg sandstone and shale

Renwick shale member (of Middlesex shale)

Rhinestreet shale member (of West Falls formation)

Rock Stream siltstone member (of Sonyea formation); (as member of Cashaqua shale)

Rushford sandstone

Senean group

Sherburne flagstone member (of Portage formation)

Shumia sandstone

Silver Creek shale

Six Mile shale member (of Middlesex shale)

Skunnemunk conglomerate

Slide Mountain conglomerate

Sonyea formation

South Wales member (of Perrysburg formation)

Standish flagstone

Starkey tongue (of Sherburne formation)

Stony Clove sandstone member (of Katsberg red beds)

Table Rock sandstone

Tinkers Falls member (of Tully formation)

Triphammer shale member (of Ithaca facies subgroup)

Twilight Park conglomerate

Unadilla formation

Van Etten (zone)

Wellsburg sandstone member (of Chemung formation)

Wellsville formation

West Brook member (of Tully formation)

Westfield shale

West Hill member (of West Falls formation); (as formation)

West River shale (see p. 621)

White Church zone

Whitesville formation

Williams Brook coquinite member (of Ithaca facies subgroup)

Wiscoy shale or sandstone

Wittenberg conglomerate
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**Hamilton group**; formation in Pennsylvania

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**Middle Devonian**

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**Lower or Middle Devonian—Con.**

- **Schoharie grit**
- **Sharon Springs formation**

**Lower Devonian**

- **Alsen** (cherty) limestone
- **Becraft limestone**
- **Bishop Brook limestone**
- **Catskill or Delthyris shaly limestone**
- **Coeymans limestone**
- **Connely conglomerate**
- **Deansboro member** (of Coeymans limestone)
- **Glenerie limestone**
- **Helderberg group or limestone**
- **Kingston beds**
- **New Scotland limestone**
- **Oriskany formation, group**, or sandstone
- **Oriskany Falls member** (of Oriskany sandstone)
- **Port Ewen limestone**
- **Port Jervis limestone**
- **Schoharie stage**
- **Thacher limestone member** (of Manlius formation)

**Lower (?) Devonian**

- **Saugerties limy shale**
- **Silurian and Devonian**

- **Cornwall limestones**
- **Onondaga saliferous group**

**Silurian**

- **Bear Creek shale** (in Clinton formation)
- **Binnewater sandstone** (in Salina formation)
- **Brewerton shale**
- **Bridgeburg horizon**
- **Buffalo cement bed**
- **Chrysler waterlime**
- **Clinton quartzites**
- **Donnelly iron ore**
- **Elmwood beds**
- **Esopus millstone**
- **Fiddlers Green limestone**
- **Furnaceville iron ore**
- **Furnaceville shale**
- **Gasport shaly channel**
- **Gates limestone**
- **Green Pond Mountain formation**
- **Guyward quartzite** (W. L. Bryant, 1926, Am. Philos. Soc. Proc., v. 65, no. 4, p. 259)
- **Herkimer sandstone**

**High Falls shale**

- **in New Jersey**
- **Jamesville limestone**
- **Kirkland formation**
- **Kirkland limestone and iron ore**
- **Kodak white sandstone**
- **Lakeport limestone**
- **Lockport group**

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United States—Continued
New York—Continued

**Silurian—Continued**

- **Lockport marble**
- **Maplewood shale**
- **Martville sandstone**
- **Niagara limestone**
- **Niagara sandstone**
- **Niagara shale**
- **O-atka beds**
- **Onley limestone**
- **Oneida conglomerate**
- **Onondaga group**
- **Ontario group**
- **Ontario series**
- **Otsィvile shale member** (of Shawangunk formation)
- **Otsquago sandstone**
- **Phoenix or Schroeppel shale**
- **Pine Hill quartzite**
- **Reynales limestone** (as member of Clinton formation)
- **Sauquoit beds**
- **Scajaquada limy shale**
- **Shawangunk conglomerate**
- **Sterling Station iron ore**
- **Verona iron ore**
- **Wolcott Furnace iron ore**

**Silurian (?)**

- **Clark Reservation limestone**
- **Pools Brook limestone**

**Upper Silurian**

- **Akron dolomite**
- **Bertie limestone** (as member of Salina formation)
- **Camillus shale** (as member of Salina formation)
- **Cayuga group, dolomite, or series**
- **Cobleskill limestone or dolomite**
- **Falkirk dolomite**
- **Forge Hollow member** (of Bertie formation)
- **Fuyk sandstone member** (of Rondout waterlime)
- **Glasco limestone lentil** (of Rondout waterlime)
- **Le Fever limestone**
- **Lyndon gypsum bed**
- **Manlius limestone**
- **Onondaga salt group**
- **Pittsford shale** (as member of Salina formation)
- **Rondout limestone**
- **Rosendale limestone member** (of Salina formation)
- **Salina formation or group**
- **Syracuse salt** (as member of Salina formation) (subsurface)
- **Vernon shale** (as member of Salina formation)
- **Wilbur limestone member** (of Salina formation)
United States—Continued
New York—Continued

Upper Silurian—Continued

Williamsville waterlime and shale 1

Middle Silurian

Brewer Dock member 1 (of Clinton formation)

Clinton formation 1 or group

Dawes sandstone 2

Gasport limestone member (of Lockport dolomite) 1

Goat Island member (of Lockport formation) 2

Irondequoit limestone (as member of Clinton formation 1)

Lockport dolomite 1

Neahga shale 1

Niagara group 1, limestone, dolomite, or series

Oak Orchard member (of Lockport formation) 2

Rochester shale (as member of Clinton formation 1)

†Shelby dolomite 1

Sodus shale (as member of Clinton formation 1)

Vanhornsville sandstone 1

Westmoreland member (of Clinton formation 2)

Williamson shale member (of Clinton formation 1)

Willowvale shale 2

Wolcott limestone (as member of Clinton formation 1)

Lower Silurian

Albion group (as sandstone 1)

Fish Creek shale 2

Rumsy Ridge sandstone member (of Fish Creek formation) 2

Whirlpool sandstone (as member of Albion sandstone 1)

Ordovician

Burden conglomerate 1

†Dudley limestone 1 or series 1

†Hudson schist 1

Marlboro member (of Hudson River formation) 2

Peekskill phyllite 1

Poenestin fault breccia 1

†Taconic slate 1

†Trenton conglomerate 1

Trenton Falls series 1

Ordovician and Cambrian (?) 1

†Champlain division 1

Upper Ordovician and Silurian

Brayman shale 1

†Medina group 1

†Oswegan period or group 1

Upper Ordovician

Atwater Creek shale 1

Bennett Bridge beds 1

Deer River shale 1

Fairfield slate 1

Frankfort shale 1
United States—Continued
New York—Continued

Middle Ordovician—Continued

Normanskill shale
Pamela limestone
Poland limestone member (of
Denmark formation)
Rathbun limestone member (of
Denmark formation)
Rust limestone member (of Co-
bourg formation)
Russia limestone member (of
Denmark formation)
Rysedorph conglomerate
Schenectady formation
Sherman Fall formation
Snake Hill formation
Sprakers (zone)
Steuben limestone member (of
Cobourg formation)
Tackawasick limestone
Trenton limestone or group
Van Schack (zone)
Watertown limestone
Middle (?) Ordovician
Stony Point shale
Lower and Middle Ordovician
Mohawk group
Lower Ordovician
Bald Mountain limestone
Baldwin Corner formation (R. H.
Flower, 1952, in Geol. Soc.
America Guidebook for field
trips in New England, p. 35)
Beekmantown group or limestone
Benson dolomite member (of
Tribes Hill formation)
Bucks Bridge mixed beds
Chukenunda Creek dolomite
Copake limestone
Craneville dolomite
Day Point limestone
Deepkill shale
Depauville waterlime
Fonda limestone member (of
Tribes Hill formation)
Fort Ann limestone member (of
Tribes Hill formation)
Fort Johnson member (of Tribes
Hill formation)
Gailor dolomite
Great Meadows formation (R. H.
Flower, ibid.)
Halsey Lake calc-dolomite
Hewittsville calcilutites or beds
Mosherville sandstone member
(of Gailor dolomite)
Norton limestone member (of
Tribes Hill formation)
Ogdensburg formation
Palatine Bridge limestone mem-
er (of Tribes Hill formation)
Rochdale limestone
Schaghticoke shale
Smith Basin formation (R. H.
Flower, ibid.)

United States—Continued
New York—Continued

Lower Ordovician—Continued

Tribes Hill limestone
Valour limestone
Warwick limestone
Whitehall formation
Wolf Hollow limestone member
(of Tribes Hill formation)
Cambrian, Ordovician and probably
Silurian
Champlain group
Cambrian and Ordovician
Fishkill limestone
Poughquag limestone
Cambrian
Ashley Hill limestone
Claverack conglomerate (in
Schodack formation)
Saratoga formation, group, or
series
Cambrian (?)
Stissing quartzite
Upper Cambrian or Ordovician
Broadalbin passage beds
Hudson formation
Hudson River group
Ritchie limestone
Upper Cambrian to Lower Ordovician
Moses Hill beds
Upper Cambrian
Adirondack-Border series
Ausable sandstone
Briarcliff dolomite
Dewey Bridge dolomite (R. H.
Flower, ibid.)
Galway formation
Greenfield limestone
Heuvelton sandstone
Hoyt limestone member (of
Theresa dolomite) or dolo-
mite
Little Falls dolomite
Neelytown limestone
Pine Plains formation
Potsdam limestone
Potsdam sandstone
Skene dolomite member (of
Whitehall formation)
Theresa dolomite
Upper Cambrian (?)
Keeesville sandstone
Lower Cambrian to Middle
Ordovician
Barnegat limestone
Newburgh limestone
Peekskill Creek limestone
Wappinger limestone
Lower and Middle Cambrian
Stissing dolomite
Lower Cambrian
Diamond Rock quartzite
Eagle Bridge quartzite
Eddy Hill grit
Greenwich formation
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<td><strong>Precambrian—Continued</strong></td>
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<td>Jayville granite 2</td>
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<td>Johnsburg limestone 1</td>
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<td>Keeseville granite 1</td>
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<td><strong>Schodack formation</strong> 1</td>
<td>Kingsbridge marble 1</td>
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<td>Troy shales 1</td>
<td>Keene gneiss 1</td>
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<td><strong>Lower Cambrian (?)</strong></td>
<td>Long Lake gneiss 1</td>
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<td>Rensselaer graywacke 1</td>
<td>Lloon Lake quartz-syenitic complex 2</td>
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<td><strong>Precambrian</strong></td>
<td><strong>Lowerre quartzite</strong> 1</td>
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<td><strong>Hudson schist</strong></td>
<td><strong>Lyon Mountain granite 1 gneiss</strong></td>
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<td><strong>Precambrian</strong></td>
<td>Macomb granite 1</td>
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<td><strong>Adirondack anorthosyte</strong> 1</td>
<td>Mahopac granite 1</td>
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<td><strong>Adirondack gneiss</strong> 1</td>
<td>Manhattan group 1</td>
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<td><strong>Alexandria syenite</strong> 1</td>
<td>Manhattan schist 1</td>
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<td><strong>Alexandria type 1 (granite)</strong></td>
<td>Marcy anorthosite 1</td>
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<td><strong>Allens Falls fanglomerate 2</strong></td>
<td>Matteawan granite 1</td>
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<tr>
<td><strong>Antwerp type granite</strong> 2</td>
<td>Mohegan granite 1</td>
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<td><strong>Ausable granite</strong></td>
<td>Moon Lake diorite 1</td>
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<td><strong>Ausable syenite</strong></td>
<td>Morris granite 1</td>
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<td><strong>Bald Hill granite gneiss 1</strong></td>
<td>Mott Haven limestone 1</td>
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<td><strong>Barton gneiss</strong></td>
<td>New Bremen granite 2</td>
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<td><strong>Beach Mountain paramphibolite 1</strong></td>
<td>New Rochelle serpentine 1</td>
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<td><strong>Bear Pond schist</strong></td>
<td>Orchard gneiss 1</td>
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<td><strong>Beech Mountain amphibolite 1</strong></td>
<td>Oswegatchie series 1</td>
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<td><strong>Brooklyn gneiss</strong></td>
<td>Peckskill diorite gneiss 1</td>
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<td><strong>Bryant Lake limestone 1</strong></td>
<td>Peckskill granite 1</td>
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<td><strong>California granite</strong> 1</td>
<td>Piercefield gneiss 1</td>
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<td><strong>Canada Hill granite</strong> 1</td>
<td>Picton granite 1</td>
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<td><strong>Canton phacolithic complex 1</strong></td>
<td>Pitcairn gneiss complex 2</td>
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<td><strong>Catamount schist</strong></td>
<td>Pleasant Lake gabbro 2</td>
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<td><strong>Cat Hill gneissoid granite 1</strong></td>
<td>Pochuck diorite 1</td>
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<td><strong>Chesterfield limestone 1</strong></td>
<td>Pyrites granite 1</td>
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<td><strong>Chippewa granite 1</strong></td>
<td>Ravenswood granodiorite 1</td>
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<td><strong>Croghan syenite granite complex 1</strong></td>
<td>Reservoir granite 1</td>
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<td><strong>Dannemora formation 1</strong></td>
<td>Reservoir Hill granite 1</td>
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<td><strong>DeKalb granite</strong></td>
<td>Rossie intrusive complex 1</td>
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<td><strong>Diana syenite complex 1</strong></td>
<td>Russel feldspathic gabbro 2</td>
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<td><strong>Dixon schist 1</strong></td>
<td>Sacandaga quartzite 1</td>
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<td><strong>Dresden amphibolite 1</strong></td>
<td>St. Regis granite 2</td>
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<td><strong>Elizabeth gabbro 1</strong></td>
<td>Santa Clara complex 2</td>
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<td><strong>Elizabethtown gabbro 1</strong></td>
<td>Saranac formation 1</td>
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<td><strong>Faxon limestone 1</strong></td>
<td>Shenandoah Mountain granite 1</td>
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<td><strong>Fordham gneiss 1</strong></td>
<td>Simons syenite 1</td>
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<td><strong>Fort Washington gneiss 1</strong></td>
<td>Sing Sing marble 1</td>
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<td><strong>Geers Corners gabbro 2</strong></td>
<td>Split Rock 1 (type granite)</td>
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<td><strong>Glenham gneiss 1</strong></td>
<td>Sprout Brook limestone 1</td>
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<td><strong>Gore Mountain gabbro 2</strong></td>
<td><strong>Stark complex (as quartz syenitic complex 2)</strong></td>
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<tr>
<td><strong>Gouverneur granite 1</strong></td>
<td>Storm King granite 1</td>
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<tr>
<td><strong>Gouverneur limestone 1</strong></td>
<td>Swede Pond quartzite 1</td>
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<td><strong>Grampus gneiss 1</strong></td>
<td>Theresa syenite 1</td>
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<td><strong>Hague gneiss 1</strong></td>
<td>Trout Pond limestone 1</td>
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<td><strong>Hammondville gneiss 1</strong></td>
<td>Tumbull gneiss 1</td>
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<td><strong>Harlem gneiss 1</strong></td>
<td>Tuckahoe marble 1</td>
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<td><strong>Hawkeye granite 1 gneiss</strong></td>
<td>Tupper syenite 1</td>
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<tr>
<td><strong>Hermon granite gneiss (as type 1)</strong></td>
<td>Union Corners granite 1</td>
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<td><strong>High Bridge gneiss 1</strong></td>
<td>Westchester gneisses and granites 1</td>
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<td><strong>Highland gneiss 1</strong></td>
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<tr>
<td><strong>Hudson Highlands complex 2</strong></td>
<td>Whiteface anorthosite 1</td>
</tr>
</tbody>
</table>
United States—Continued  

New York—Continued  

**Precambrian**  

- Harrison diorite 1  
- Hoboken serpentine 1  
- Staten Island serpentine 1  

**Age**  

- Bedford “augen” gneiss 1  
- Bethel pyroxene diorite 1  
- Bull Pond limestone 1  

**Cortland series**  

- Croton Falls hornblendite 1  
- Hortontown basic eruptives 1  
- Macombs Dam gneiss 1  
- Natural Bridge limestone 1  
- Peach Lake diorite 1  
- Peekskill norite 1  
- Poundridge granite 1  
- Randels Island gneiss 1  
- Syracuse serpentine 1  

North Carolina  

**Pleistocene**  

- Cape Fear coquina 2  
- Castalia sand 2  
- Chowan formation 1  
- Coharie formation 1  
- Kure sandstone 2  
- Pamlico formation 1 or sand 2  

**Miocene, lower**  

- Croatan sand 1  

**Miocene, upper**  

- Duplin marl 1  
- Miocene, middle(?) and upper 1  
- Murfreesboro stage 1  

**Miocene, lower**  

- Trent marl 1  

**Eocene, upper, and Miocene, lower**  

- Wilmington beds 1  

**Eocene, middle and upper**  

- Castle Hayne limestone (as marl 1)  

**Upper Cretaceous**  

- Bladen formation 1  
- Cape Fear formation 1  
- Snow Hill marl member (of Black Creek formation) 1  

**Triassic**  

- Lowes Grove beds 2  
- Nelson beds 2  

**Triassic (?)**  

- Bakersville gabbro 1  

**Upper Triassic**  

- Chatham series 1  
- Cumnock formation 1  
- Dan River series 1  
- Deep River formation 1 or series 1  

**Permian**  

- Fekin formation 1  
- Sanford formation 1  

**Carboniferous (?)**  

- Whiteside granite 1  

**Devonian (?)**  

- Cherryville quartz monzonite 2  

**Ordovician**  

- Toluca quartz monzonite 2  

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United States—Continued  

North Carolina—Continued  

**Cambrian**  

- Draytonville conglomerate member (of Kings Mountain quartzite) 1  
- Kings Mountain quartzite 1  

**Lower Cambrian**  

- Andrews schist 1  
- Brasstown schist 1  
- Brevard schist 1  
- Cherokee slates 1  
- Clingman conglomerate 1  
- Hazel slate 1  
- Murphy marble 1  
- Nottely quartzite 1  
- Tusquitee quartzite 1  
- Valleytown formation 1  
- Vann quartzite 2  

**Precambrian and Cambrian**  

- Kings Mountain group, 1 series, 1  
- Linville slates 1  
- Piedmont group 1  

**Precambrian and Cambrian (?)**  

- Buncombe group 1  

**Precambrian**  

- Aaron slate 1  
- Beech granite 1  
- Bessemer schist 1  
- Big Butt quartzite 2  
- Blowing Rock gneiss 1  
- Carolina gneiss 1  
- Cranberry granite 1  
- Flattop schist 1  
- Great Smoky group (as conglomerate 1)  
- Henderson granite 1  
- Humpback gneiss 2  
- Hurricane graywacke 2  
- Max Patch granite 1  
- Montezuma schist 1  
- Raleigh graphite 4  
- Snowbird group (as formation 1)  
- Thunderhead sandstone (as conglomerate 1)  

**Precambrian (?)**  

- Monroe beds or slates 1  

**Nantahala slate 1**  

**Age**  

- Bearwallow schist 2  
- Buck Ridge schist 2  
- Purefoys Mill series 1  
- Spruce Pine alaskite 2  
- Tempo schist 2  

North Dakota  

**Pleistocene**  

- Lake Agassiz clays 1  
- Lake Agassiz silt 1  

**Tertiary (?)**  

- Mandan series 1  

**Eocene**  

- Beaver Creek coal group 1  
- Golden Valley formation 1  
- Yule coal group 1  

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United States—Continued
North Dakota—Continued

**Paleocene**
- Almont sandstone (in Tongue River member of Fort Union formation) ²
- Cannonball marine member (of Fort Union formation); (as member of Lance formation) ¹

**Fort Union formation** ¹
- Great Bend coal group ¹
- Medora coal group ¹ (in Tongue River member of Fort Union formation)
- Sentinel Butte shale member (of Fort Union formation) ¹

**Cretaceous**
- Breien member (of Hell Creek formation) ²

**Jurassic**
- Kline member (of Nesson formation) ² (subsurface)
- Nesson formation ² (subsurface)
- Poe evaporite member (of Nesson formation) ² (subsurface)

**Mississippian and Devonian?**
- Bakken formation ² (subsurface)
- Middle (?) and Upper Devonian Souris River formation ² (subsurface)

**Middle Devonian**
- Prairie formation (as evaporite ²) (subsurface)

**Ohio**
- Pleistocene
  - Springfield clay ¹
  - Pleistocene (Wisconsin)
    - Chillicothe till ¹
  - Pleistocene (pre-Illinoian)
    - Minford silt ¹

**Permian**
- Hostetter limestone ²
- Marietta sandstone ¹
- Muskingum conglomerate (in Washington formation) ¹

**Pennsylvanian**
- Anderson clay ¹
- Athens group ¹
- Anthony cyclothem (including Anthony shale and sandstone) ²
- Ballou clay (in Allegheny formation) ¹
- Barton clay (in Conemaugh formation) ¹
- Bear Run member (of Pottsville formation) ¹
- Bedford clay (in Pottsville formation) ¹
- Bellaire sandstone (in Conemaugh formation) ¹
- Big Run sandstone ²
- Bloomfield limestone (in Conemaugh formation) ¹
- Boggs member (of Pottsville formation) ¹

**Ohio—Continued**

**Pennsylvanian—Continued**
- Brill sand ¹ (subsurface)
- Buell Run sand ¹ (subsurface)
- Cow Run sandstone (in Conemaugh formation) ¹
- Door Run shale member (of Allegheny formation) ²
- Dresden sandstone (in Pottsville formation) ¹
- Fishpot sandstone (in Monogahela formation) ¹
- Flag Spring limestone (in Conemaugh formation) ¹
- Flint Ridge clay (in Pottsville formation) ¹
- Flint Ridge flint (in Allegheny formation) ¹
- Flint Ridge limestone ¹
- Flint Ridge shale (in Pottsville formation) ¹
- Fly sandstone ²
- Gaysport member (of Conemaugh formation) ¹
- Germantown sand ¹ (subsurface)
- Goose Run sand ¹ (subsurface)
- Gore limestone (in Pottsville formation) ¹
- Hamden limestone or member (in Allegheny formation) ¹
- Hanging Rock limestone (in Allegheny formation) ¹
- Harlem clay (in Conemaugh formation) ¹
- Harrison member (of Pottsville formation) ¹
- Hedia sandstone (in Allegheny formation) ¹
- Hewetts Branch sandstone (in Allegheny formation) ¹
- Hockingport sandstone ³
- †Howenstein limestone (in Allegheny formation) ¹
- Huckleberry clay (in Pottsville formation) ¹
- Kittanning limestone (in Allegheny formation) ¹
- Lawrence clay (in Allegheny formation) ¹
- Logan fire clay (in Pottsville formation) ¹
- Lowell limestone (in Allegheny formation) ¹
- Lowellville limestone (in Pottsville formation) ¹
- McArthur member (in Pottsville formation) ¹
- Macksburg sandstone ¹
- Mason clay (in Conemaugh formation) ¹
- †Massillon sandstone (in Pottsville formation) ¹
- Maxville block ore (in Pottsville formation) ¹
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<td>†Meigs Creek white limestone (in Monongahela formation) 1</td>
<td><em>Zaleski flint (in Allegheny formation)</em> 1</td>
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<td>Mitchell sand 1 (subsurface)</td>
<td><em>Zoar limestone (in Pottsville formation)</em> 1</td>
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<td>Moxahala clay (in Allegheny formation) 1</td>
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<td>Nagle sand 1 (subsurface)</td>
<td><em>Ames limestone member</em> (of Conemaugh formation) 1</td>
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<td>Norris limestone (in Allegheny formation) 1</td>
<td><em>Cambridge limestone member</em> (of Conemaugh formation) 1</td>
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<td><em>Ewing limestone member</em> (of Conemaugh formation) 1</td>
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<td>Ogan clay (in Allegheny formation) 1</td>
<td><strong>Middle Pennsylvanian</strong></td>
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<td>†Ohio conglomerate 1</td>
<td><em>Putnam Hill limestone member</em> (of Allegheny formation) 1</td>
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<td>Patriot limestone (in Conemaugh formation) 1</td>
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<td>Peeker sand 1 (subsurface)</td>
<td><em>Allensville member</em> (of Logan formation) 1</td>
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<td>Pomeroy sandstone (in Monongahela formation) 1</td>
<td><em>Armstrong member</em> (of Cuyahoga formation) 1</td>
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<td>Porterville fossiliferous horizon or limestone (in Conemaugh formation) 1</td>
<td><em>Aurora siltstone member</em> (of Orangeville shale) 1</td>
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<td>Poverty Run limestone (in Potts ville formation) 1</td>
<td><strong>Bedford shale</strong> 1 or formation</td>
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<td>Redstone clay (in Monongahela formation) 1</td>
<td><em>Berea sandstone</em> 1 or formation</td>
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<tr>
<td><em>Round Knob horizon or shale member</em> (in Conemaugh formation) 1</td>
<td>†Berea shale 1</td>
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<td>Salem limestone (in Allegheny formation) 1</td>
<td><em>Berne member</em> (of Cuyahoga formation) 1</td>
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<tr>
<td>Schramm sand 1 (subsurface)</td>
<td><strong>Black Hand formation</strong> 1 or sandstone</td>
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<td>Scioto freestone (in Allegheny formation) 1</td>
<td>†Brecks ville shale member (of Orangeville shale) 1</td>
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<td>†Scioto ville fire clay (in Pottsville formation) 1</td>
<td><strong>Buena Vista sandstone member</strong> (of Cuyahoga formation) 1</td>
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<td>Sharon clay 1</td>
<td><em>Burbank member</em> (of Cuyahoga formation) 1</td>
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<td><em>Byer member</em> (of Logan formation) 1</td>
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<td>Skellely limestone (in Conemaugh formation) 1</td>
<td>*Canter limestone 1</td>
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<td><strong>Chardon siltstone member</strong> (of Orangeville shale); (as sandstone) 1</td>
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<td><em>Churn Creek member</em> (of Cuyahoga formation) 1</td>
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<td>Strasburg cyclothem (including Strasburg shale and/or sandstone) 2</td>
<td>†City Ledge sandstone (in Cuyahoga formation) 1</td>
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<td>†Summerfield limestone (in Conemaugh formation) 1</td>
<td><strong>Cuyahoga formation, group</strong> 1 or shale</td>
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<td>Vandusen cyclothem (including Vandusen clay, shale, and sandstone) 2</td>
<td><em>Fairfield member</em> (of Cuyahoga formation) 1</td>
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<td><em>Granville beds</em> 1</td>
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<td><em>Granville shale facies</em> 1 (of Cuyahoga formation)</td>
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<td><em>Hanover pebble bed</em> (in Cuyahoga formation) 2</td>
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<td><em>Henley shale member</em> (in Cuyahoga formation) 1</td>
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<td><em>Hocking Valley conglomerate facies</em> 1 (of Cuyahoga formation)</td>
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<td><em>Killbuck shale facies</em> (of Cuyahoga formation) 2</td>
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Ohio—Continued

Mississippian—Continued
Licking shale 1
Lithopolis member (in Cuyahoga formation) 1

Logan formation 1
†Logan group 1
†Logan limestone or flint (in Logan formation) 1

Maxville limestone 1
†Newtonville limestone 1
Pleasant Valley member (of Cuyahoga formation) 2
Portsmouth member (in Black Hand formation) 2
Pretty Run sandstone facies (of Logan formation) 2
Raccoon shale 1
Rarden shale member J (of Cuyahoga formation) 1
Richland limestone and flint *
Rittman conglomerate lentil (of Cuyahoga formation) 1
River Styx conglomerate facies (of Cuyahoga formation) 2
†Royalton formation 1
Rushville group 1

Sagamore sandstone member
(of Bedford shale); (as lentil) 1
Scioto Valley shale facies 1 (of Cuyahoga formation)
Scotts Creek flint 1
Sunbury shale 1
Tinkers Creek shale facies (of Cuyahoga formation) 2
Toboso conglomerate facies 1 (of Cuyahoga formation)
Vinton member 1 (of Logan formation)
Warren sandstone 1
†Waverly conglomerate 1
Welsh stray sand 1 (subsurface)

Mississippian and Devonian (?)
†Sunbury calciferous sandrock 1
†Waverly group 1

Devonian (?)
Grand Rapids sandstone 1

Upper Devonian
Chagrin shale 1
Cleveland member (of Ohio shale); (as shale) 1
†Erie shale 1
Huron member (of Ohio shale); (as shale) 1
Ohio shale 1
Olentangy shale 1
†Olmsted shale member (of Cleveland shale) 1
Scioto slates and shales 1

Middle Devonian
Belleville member (of Columbus limestone) 1
Columbus limestone 1
Delaware limestone 1
Delhi limestone 1

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Ohio—Continued

Middle Devonian—Continued
Dublin blue shale 1
East Liberty bone bed (in Columbus formation) 2
Eversole chert 1
Klodike member (of Columbus limestone) 1
Marble Cliff limestone (in Columbus limestone) 1
Marblehead limestone (in Columbus limestone) 1
Plum Brook shale 2
Plum Creek shale 1
Proul limestone 1
Proul series 1
Sandusky limestone 1
Silica shale (in Traverse formation) 1
Sylvania sandstone 1 or formation 1
Tennille Creek dolomite 2
Venice member (of Columbus limestone) 1
West Jefferson sandstone 1

Lower Devonian
Austinburg sand 1 (subsurface)
Cambridge sand 1 (subsurface)
Holland sandstone 1
Lucas formation (as dolomite) 1
Monolova sandstone 1

Silurian
Beavertown marl (in Brassfield limestone) 1
Harriett formation 2
†Montgomery formation 1
Stadler sand 1 (subsurface)

Silurian (?)
Hillsboro sandstone 1

Upper Silurian
Bass Islands dolomite 1
Greenfield dolomite 1 member (of Bass Island dolomite)
Put-in-Bay dolomite member (of Bass Island dolomite)
Tymochtee formation (as shale) 1

Middle Silurian
Bisher formation 1
Cedarville dolomite (as limestone) 1

Dayton limestone 1
Durbin formation 1
Eaton beds 1
Euphemia dolomite 1
Lilley formation 1
Massie clay 1
Newburg sand 1 (subsurface)
Peebles dolomite 1
Piqua stone 1
Springfield limestone 1 or dolomite
West Union limestone 1

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Centerville formation 1
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Ohio—Continued

Upper Ordovician
- Arnheim shale; formation in Kentucky; limestone in Tennessee
- Bellevue limestone member (of McMillan formation)
- Blumester division (in Richmond group)
- Cincinnati series
- Clarksville division (in Richmond group)
- Corryville shale member (of McMillan formation)
- Covington group
- Eden group or formation
- Fairmont limestone member (of Fairview formation)
- Fairview formation
- Fort Ancient division (in Richmond group)
- Fulton shale
- Hill Quarry beds
- Lebanon beds
- McMicken member (in Latonia shale)
- McMillan formation
- Mount Auburn shale member (of McMillan formation)
- Mount Hope shale member (of Fairview formation)
- Point Pleasant limestone
- Turkey Track limestone layer (in Richmond group)
- Waynesville shale; limestone in Kentucky
- Warren beds
- Upper Ordovician
- Belfast bed
- Middle Ordovician
- Bromley shale (in Cynthiana formation) (see p. 622)
- River Quarry beds

Oklahoma

Quaternary
- Peaceable sand
- Pleistocene
- Gerty sand
- Tertiary
- Black Mesa basalt
- Tertiary
- Fort Sill series
- Pliocene or Pleistocene
- Grandfield conglomerate
- Pliocene, lower
- Laverne formation
- Upper Cretaceous
- Silo sandstone
- Lower and Upper Cretaceous
- Washita group
- Lower Cretaceous
- Antlers sand
- Baum limestone member (of Paluxy sand)
- Bennington limestone

United States—Continued
Oklahoma—Continued

Lower Cretaceous
- Bokchito formation
- Caddo limestone
- Camp Supply beds
- Comet Creek bed
- Goodland limestone
- Indian Territory division
- Kiamichi formation

Upper Jurassic
- Exeter sandstone
- Triassic
- Custer formation

Permian
- Addington formation
- Altona dolomite member (of Blaine gypsum)
- Amphitheater dolomite
- Antelope Flats member (of Wellington formation)
- Anthony sandstone
- Antioch sandstone
- Asher formation
- Auger conglomerate lentil (of Wichita formation)
- Beaver gypsum
- Bessie member (of Quartermaster formation)
- Billings member (of Wellington formation)
- Bison banded member (of Hennessy shale)
- Blackwell sand (subsurface)
- Blaine gypsum or formation
- Bu-Vi-Bar bed
- Caddo sand (subsurface)
- Cedartop gypsum member (of Blaine gypsum)
- Chaney gypsum member (of Blaine gypsum)
- Chapman dolomite
- Chickasha formation
- Chimarron anhydrite
- Cloud Chief formation (as gypsum)
- Cornish sandstone member
- Creta dolomite (in Blaine formation)
- Crouse limestone or formation (as member of Garrison shale)
- Cushing limestone member (of Elmdale formation)
- Cyril gypsum member (of Greer formation)
- Delphi dolomite
- Doe Creek sandstone member (of Marlow formation)
- Doxey member (of Quartermaster formation)
- Duncan sandstone
- Elk City member (of Quartermaster formation)
- El Reno group (as formation)
- Enid formation
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Bennett oil sand 1 (subsurface)
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Billings sand 1 (subsurface)
†Bristow formation 1
Brunner sand 1 (subsurface)
**United States—Continued**

**Oklahoma—Continued**

**Pennsylvanian—Continued**

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**Pennsylvanian (?)**

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**Pennsylvanian (Virgil)**

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<td>Boley conglomerate member</td>
<td>(of Vamoosa formation)</td>
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</table>

**Bowman sandstone member** (of Vamoosa formation); (as member of Nelagoney formation)

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<td>(of Vamoosa formation); (as member of Nelagoney formation)</td>
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<td>(of Vamoosa formation); (as member of Nelagoney formation)</td>
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<td>DeNay limestone member</td>
<td>(of Francis formation)</td>
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<td>Dewey limestone</td>
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<td>Francis formation</td>
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<td>Gap sandstone member</td>
<td>(of Tallant formation); (as member of Nelagoney formation)</td>
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<tr>
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<tr>
<td>Lost City limestone</td>
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<td>Mission sandstone member</td>
<td>(of Tallant formation); (as member of Nelagoney formation)</td>
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<td>Possum sandstone tongue</td>
<td>(of Revard sandstone member of Tallant formation); (as member of Nelagoney formation)</td>
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<td>Revard sandstone member</td>
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<td>Torpedo sandstone</td>
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<td>Union Dairy member</td>
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<tr>
<td>Zuckerman limestone member</td>
<td>(of Hoxbar formation)</td>
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### Oklahoma—Continued

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- Bad Hole sand \(^1\) (subsurface)
- Barnett sand \(^1\) (subsurface)
- Bartlesville sand \(^1\) (subsurface)
- Bixler sand \(^1\) (subsurface)
- Booch sand \(^1\) (subsurface)
- Boynton sand \(^1\) (subsurface)
- Burbank sand \(^1\) (subsurface)
- Daggett sand \(^1\) (subsurface)
- Dutcher sand series \(^1\) (subsurface)
- Fields sand \(^1\) (subsurface)
- Glenn sand \(^1\) (subsurface)
- Independence gas sand \(^1\) (subsurface)
- Leidecker sand \(^1\) (subsurface)
- Mounds sand \(^1\) (subsurface)
- Oklan series \(^2\)
- Preston sand \(^1\) (subsurface)
- Rhodes sand \(^1\) (subsurface)
- Sapulpa sand \(^1\) (subsurface)
- Scott sand \(^1\) (subsurface)
- Squaw sand \(^1\) (subsurface)
- Taneha sand \(^1\) (subsurface)
- Tucker sand \(^1\) (subsurface)
- Youngstown sand \(^1\) (subsurface)

#### Pennsylvanian (Des Moines)
- Arnold member (of Deese formation) \(^1\)
- Bluejacket sandstone member (of Cherokee shale and of Boggy shale) \(^1\)
- Boggy shale \(^1\)
- Broken Arrow formation \(^1\)
- Cabaniss group \(^2\)
- Calvin sandstone \(^1\)
- Cameron sandstone member (of McAlester shale) \(^1\)
- Cavanal group \(^1\)
- Chelsea sandstone member (of Senora formation); (as lentil of Cherokee formation) \(^1\)
- Claremore formation \(^1\)
- Craig shale \(^1\)
- Crekola sandstone member (of Boggy shale) \(^1\)
- Curl formation \(^1\)
- Deese formation \(^1\)
- Devils Kitchen member (of Deese formation) \(^1\)
- Doneley limestone member (of Savanna formation) \(^2\)
- Drywood formation or coal cycle \(^2\) (see p. 622)
- Eleventh Street limestone \(^2\)
- Elm Creek limestone (in Cherokee shale) \(^1\)
- Enterprise sandstone (in Boggy shale) \(^1\)
- Franks conglomerate \(^1\)
- Harlishorne sandstone \(^1\)
- Holdenville shale \(^1\)
- Hollis limestone member (of Deese formation) \(^2\)

### United States—Continued

#### Oklahoma—Continued

- Homer limestone member (of Holdenville shale) \(^1\)
- Inola limestone member (of Boggy shale) \(^1\)
- Jolly limestone member (of Savanna sandstone) \(^1\)
- Keota sandstone member (of McAlester formation); (as member of Savanna sandstone) \(^1\)
- Kennison shale member (of Cherokee formation) \(^1\)
- Krebs group \(^2\)
- Lenapah limestone \(^1\)
- Lequire sandstone member (of McAlester formation) \(^1\)
- Little Cabin sandstone member (of Cherokee formation) \(^1\)
- McAlester formation or shale \(^1\)
- McCurtain shale member (of McAlester formation) \(^1\)
- McNabb limestone (in Senora formation) \(^2\)
- Narissa sandstone (in Cherokee shale) \(^1\)
- Natsy member (of Deese formation) \(^2\)
- Nowata shale \(^1\)
- Okmulgee group \(^1\)
- Olympic sand member (of Senora formation) \(^2\) (subsurface)
- Oologah limestone \(^1\)
- Poteau stage \(^1\)
- Pryor Creek shale (in Cherokee shale) \(^1\)
- Rocky Point conglomerate (in Deese formation) \(^2\)
- Russell Creek limestone member (of Senora formation) \(^2\)
- Sam Creek limestone member (of Savanna sandstone) \(^1\)
- Sasakiwa limestone member (of Holdenville shale) \(^1\)
- Savanna sandstone \(^1\) or formation
- Spaniard limestone member (of Savanna sandstone) \(^1\)
- Spiro sandstone member (of Savanna formation) \(^1\)
- Stuart shale \(^1\)
- Taft sandstone member (of Boggy shale) \(^1\)
- Tamaha sandstone member (of McAlester formation); (as member of Savanna sandstone) \(^1\)
- Thurman sandstone \(^1\)
- Tiawah lime \(^1\)
- Tobucksy sandstone \(^1\)
- Verdigris limestone \(^1\) (member of Senora formation); (as limestone in Cherokee formation) \(^1\)
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<td><strong>Wetumka shale</strong></td>
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<td><strong>Wewoka formation</strong></td>
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<td><strong>Wilburton group</strong></td>
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<td><strong>Williams member</strong> (of Deese formation)</td>
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<td><strong>Wimer School limestone member</strong> (of Labette shale)</td>
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<td><strong>Pennsylvanian (Atoka)</strong></td>
<td><strong>Atoka formation</strong> 1 or series</td>
<td><strong>Blackjack School sandstone member</strong> (of Atoka formation)</td>
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<td><strong>Chickachoe chert</strong> (as lentil of Atoka formation)</td>
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<td><strong>Coata sandstone member</strong> (of Atoka formation)</td>
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<td><strong>Coody sandstone member</strong> (of Atoka formation)</td>
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<td><strong>Dirty Creek sandstone member</strong> (of Atoka formation)</td>
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<td><strong>Dornick Hills formation</strong> (may be Morrow in part)</td>
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<td><strong>Georges Fork sandstone member</strong> (of Atoka formation)</td>
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<td><strong>Moore formation</strong> 2 (subsurface)</td>
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<td><strong>Muskogee sand</strong> 1 (subsurface)</td>
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<td><strong>Webbers Falls sandstone member</strong> (of Atoka formation)</td>
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<td><strong>Bostwick member</strong> (of Dornick Hills formation)</td>
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<td><strong>Frenselay limestone</strong> 2</td>
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<td><strong>Otterville limestone member</strong> (of Dornick Hills formation)</td>
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<td><strong>Prairie Mountain formation</strong> 2</td>
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<td><strong>Pumpkin Creek limestone member</strong> (of Dornick Hills formation)</td>
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<td><strong>Pushmataha series</strong> 2</td>
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<td><strong>Union Valley sandstone member</strong> (of Wapanucka formation)</td>
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<td><strong>Mississippian and Pennsylvanian</strong></td>
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<td><strong>Ingraham gas sand</strong> 1 (subsurface)</td>
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<td><strong>Jefferson gas sand</strong> 1 (subsurface)</td>
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<td><strong>Lincolnville chert</strong> (in Boone limestone)</td>
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<td><strong>Mayes formation</strong> 1</td>
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<td><strong>Prairie Hollow member</strong> (of Prairie Mountain formation)</td>
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<td><strong>Smithville chert lentil</strong> (in Stanley shale)</td>
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<td><strong>Tuskegola siliceous shale member</strong> (of Stanley formation)</td>
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<td><strong>Upper Mississippian or Lower Pennsylvanian</strong></td>
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<td><strong>Kingwood sand</strong> 1 (subsurface)</td>
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<td><strong>Woodford chert</strong> 1 or shale</td>
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<td><strong>Haragan shale</strong> or limestone</td>
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<td><strong>Kite group</strong></td>
<td><strong>Burgen sandstone</strong></td>
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<td><strong>Lower and Middle(?) Ordovician</strong></td>
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<td><strong>Hunt limestone</strong> 1 or group</td>
<td>†<strong>Stringtown shale</strong></td>
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<td><strong>Henryhouse shale</strong> or limestone</td>
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<td><strong>Sallisaw marble</strong></td>
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<td><strong>Lower Silurian</strong></td>
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<td><strong>Cochrane limestone member (of Chimneyhill</strong></td>
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<td><strong>formation</strong></td>
<td>†<strong>Kindblade formation</strong></td>
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<td><strong>McKenzie Hill limestone</strong> 1 or formation</td>
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<td>†<strong>Talihina chert</strong></td>
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- **Valentine formation**
- **Lower Ordovician and Cambrian (?)**
- **Conestoga limestone**

### Cambrian and Ordovician
- **Annville limestone**
- **Codorus limestone**
- **Eyer member (of Hatter formation)**
- **Fannettsburg member (of Shippensburg formation)**
- **Grazier member (of Hatter formation)**
- **Greencastle bed**
- **Hatter limestone**

### Middle Ordovician
- **Antes shale**
- **Benner limestone**
- **Chambersburg limestone**
- **Clover member (of Loysburg formation)**
- **Coburn formation**
- **Curtin limestone**
- **Doylestown member (of Shippensburg formation)**
- **Eyer member (of Hatter formation)**
- **Fannettsburg member (of Shippensburg formation)**
- **Grazier member (of Hatter formation)**
- **Greencastle bed**
- **Hatter limestone**

### Upper Ordovician
- **Bald Eagle conglomerate**
- **Bangor beds (in Martinsburg shale)**
- **Bennettsville limestone**
- **Curtin limestone**
- **Doylestown member (of Shippensburg formation)**
- **Eyer member (of Hatter formation)**
- **Fannettsburg member (of Shippensburg formation)**
- **Grazier member (of Hatter formation)**
- **Greencastle bed**
- **Hatter limestone**

### Ordovician (see also Cambrian and Ordovician)
- **Cattasauqua limestone**
- **Cocalico shale**
- **Cove limestone**
- **Cove slate**
- **Dauphin shale**
- **Jonestown beds or formation**
- **Lost Run conglomerate**
- **Nittany Valley limestone**
- **Paxton Creek conglomerate (in Martinsburg shale)**
- **West Fairview member (of Martinsburg shale)**
- **Ordovician (?) or Cretaceous (?)**
- **Conshohocken clay**

### Ordovician (f.)
- **Peach Bottom slate**

### Upper Ordovician
- **Bald Eagle conglomerate**
- **Bangor beds (in Martinsburg shale)**
- **Juniata formation**
- **Pen Argyl beds (in Martinsburg shale)**
- **Redesville shale**
- **Shochary sandstone member (of Martinsburg formation)**
- **Tyrone conglomerate**

### Middle Ordovician
- **Antes shale**
- **Benner limestone**
- **Chambersburg limestone**
- **Clover member (of Loysburg formation)**
- **Coburn formation**
- **Curtin limestone**
- **Doylestown member (of Shippensburg formation)**
- **Eyer member (of Hatter formation)**
- **Fannettsburg member (of Shippensburg formation)**
- **Grazier member (of Hatter formation)**
- **Greencastle bed**
- **Hatter limestone**

### Lower Ordovician
- **Axemann limestone**
- **Bellefonte dolomite**
- **Carlim limestone**
- **Center Hall formation**
- **Coplay limestone**
- **Larke dolomite**
- **Lemont argillaceous limestone member (of Carlim limestone)**
- **Loysburg formation**
- **Mines dolomite**
- **Nittany dolomite**
- **Stonehenge limestone**
- **Valentine formation**

### Lower Ordovician and Cambrian (?)
- **Conestoga limestone**

### Cambrian and Ordovician
- **Annville limestone**
- **Codorus limestone**
- **Eyer member (of Hatter formation)**
- **Fannettsburg member (of Shippensburg formation)**
- **Grazier member (of Hatter formation)**
- **Greencastle bed**
- **Hatter limestone**

### Cambrian
- **Blue Ridge conglomerates**
- **Mountain Creek rock**
- **South Mountain slates**
- **Street Road limestone**

### Upper Cambrian
- **Allentown limestone**
- **Buffalo Run limestone**
- **Conococheague limestone**
- **Cornwall slates**

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**United States—Continued**

**Pennsylvania—Continued**

### Upper Silurian
- **Bossardsville limestone** (as Bos­
  sardville limestone J)
- **Foxy Island shale**

### Middle Silurian
- **Center Iron sandstone (in Clinton formation)**
- **Keefer sandstone member (of Clinton formation)**
- **Lakemont formation**
- **Swatara Iron sandstone (in Clinton formation)**

### Lower Silurian
- **Castanea sandstone**
- **Tuscarora sandstone** or quartzite

### Ordovician
- **Cattasauqua limestone**
- **Cocalico shale**
- **Cove limestone**
- **Cove slate**
- **Dauphin shale**
- **Jonestown beds or formation**
- **Lost Run conglomerate**
- **Nittany Valley limestone**
- **Paxton Creek conglomerate (in Martinsburg shale)**
- **West Fairview member (of Martinsburg shale)**
- **Ordovician (?) or Cretaceous (?)**
- **Conshohocken clay**

### Ordovician (f.)
- **Peach Bottom slate**

### Upper Ordovician
- **Bald Eagle conglomerate**
- **Bangor beds (in Martinsburg shale)**
- **Juniata formation**
- **Pen Argyl beds (in Martinsburg shale)**
- **Redesville shale**
- **Shochary sandstone member (of Martinsburg formation)**
- **Tyrone conglomerate**

### Middle Ordovician
- **Antes shale**
- **Benner limestone**
- **Chambersburg limestone**
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- **Coburn formation**
- **Curtin limestone**
- **Doylestown member (of Shippensburg formation)**
- **Eyer member (of Hatter formation)**
- **Fannettsburg member (of Shippensburg formation)**
- **Grazier member (of Hatter formation)**
- **Greencastle bed**
- **Hatter limestone**

### Lower Ordovician
- **Axemann limestone**
- **Bellefonte dolomite**
- **Carlim limestone**
- **Center Hall formation**
- **Coplay limestone**
- **Larke dolomite**
- **Lemont argillaceous limestone member (of Carlim limestone)**
- **Loysburg formation**
- **Mines dolomite**
- **Tyrone conglomerate**
- **Valentine formation**

### Lower Ordovician and Cambrian (?)
- **Conestoga limestone**

### Cambrian and Ordovician
- **Annville limestone**
- **Codorus limestone**
- **Eyer member (of Hatter formation)**
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### Cambrian
- **Blue Ridge conglomerates**
- **Mountain Creek rock**
- **South Mountain slates**
- **Street Road limestone**

### Upper Cambrian
- **Allentown limestone**
- **Buffalo Run limestone**
- **Conococheague limestone**
- **Cornwall slates**
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Stacy dolomite member (of Gatesburg formation) 1
Warrior limestone 1

Middle and Upper Cambrian
Elbrook limestone 1, dolomite, or formation

Middle Cambrian
Pleasant Hill limestone 1

Lower and Middle (?) Cambrian
Leithsville formation 1

Lower Cambrian
Chickies quartzite 1 and slate
Edgehill quartzite 1
Hellam conglomerate member (of Chickies quartzite) 1
Hellam quartzite 1
Kinzers formation 1
Ledger dolomite 1
Montalto quartzite member (of Harpers schist) 1
North Valley Hill sandstone 1
Reading sandstone 1
South Mountain quartzite 1
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Precambrian and Lower Cambrian
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Precambrian
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Avondale limestone 1
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Buck Ridge gneiss 1
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Frankford gneiss 1
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Toughkenamon rock 1
Tucquan gneiss 1
Vera Cruz graphite schist 1

Precambrian(?)
Chester County gneiss 1

Age(?)
Lima granite 2
Ridley Park granodiorite 2
Springfield granodiorite 2
Wiltons Run 1 (limestone belt)

Rhode Island

Pleistocene
Barrington clays 1
Mohegan Bluff beds or series 1

Carboniferous or Post-Carboniferous
Boston Neck granite 1
Westerly granite 1

Carboniferous
Aquidneck series or shales 1
Coasters Harbor Island arkose 1
Conanicut arkose 1
Diamond Hill felsite 1
Kingstown series 1
Mullers River conglomerate 1
Natick arkose 1
Newport conglomerate 1
Paradise conglomerate 1
Portsmouth conglomerate 1
Rose Island arkose 1
Sachuest arkose 1
Slab Hill shale 1
Tiverton arkose 1
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Woonsocket Basin series 1

Pre-Carboniferous
Metacomet granite-gneiss 3
Pennsylvanian and Permian(?)
Narragansett Basin series 1

Pennsylvanian
Cranston beds 1
Narragansett Basin series 1

Permian

Devonian or older
Grant Mills granodiorite (as granite group) 1

Devonian (?) or older
Maskerchugg granite 2

Devonian or older
Glenrock schists 1
Blackstone series 1
Cumberland quartzite 1
Rhode Island—Continued

Precambrian

Little Compton shales
Rhode Neck shale
†Smithfield limestone member
(of Marlboro formation)

Absalona formation

Albion schist member
(of Westboro quartzite)

Hunting Hill greenstone
Mussey Brook schist
Nepsachuck gneiss
Sneech Pond schist
Woonasquatucket formation

South Carolina

Pleistocene

†Accabbee gravels
†Bohicket marl sands
†Hampton clays

Horry clay
Myrtle Beach peat
†Sea Island sands or loams
†Simmons Bluff beds
†Tennile sands
†Wadmalaw shell marl or phase
†Wando clays and sands

Pleistocene and Pliocene
†Cheraw cobbles

Pliocene

†Goose Creek marl or phase

Miocene

†Combahee shale
†Salkehatchie marl or phase

Miocene, upper
†Peedee marl
†Rayssor marl

Miocene, lower
†Edisto marl

Eocene

†Carolinian bed

Eocene, upper, or Oligocene

Cooper marl
†Kings Creek silex or phase

Eocene, upper
†Ashley marl

Barnwell sand; formation in
Georgia
†Congaree clay member
(of McBean formation)
†Cooper-Ashley beds
†Mount Hope marl or phase

Eocene, middle and upper
†Santee beds

Eocene, middle

†Caw Caw formation or sands
Congaree formation (as shale)
†Orangeburg formation
†Santee limestone
†Warley Hill marl; †phase

United States—Continued

South Carolina—Continued

Eocene, lower

Black Mingo formation
†Lansing-Syne beds
†Rhems shale
†Williamsburg marl

Upper Cretaceous and Pliocene
†Aiken beds

Upper Cretaceous

Black Creek formation
†Burches Ferry marl
†Hamburg beds or clays
†Middendorf formation

Peedee formation

Upper Triassic

Hornsboro sandstone or zone
Carboniferous

Table Rock granite
Lower Mississippian

Yorkville quartz monzonte (as
granite)

Cambrian

Chauga zone
Cherokee zone
Poor Mountain limestone series

Probably Lower Cambrian

Blacksburg schist
†Cherokee limestone

Gaffney marble

Precambrian

Abbeville-York zone
Anderson-Spartanburg zone
Battleground schist
Carolina gneiss
Chatooga zone
Chesterfield zone
Edgefield-Chesterfield zone
Keowee zone
Oconee Creek zone
Saluda zone
Spartanburg zone
Stevens Creek slates
Tunnel Hill zone
Tyger zone
Vaucluse zone
York zone

South Dakota

Pleistocene

Herrick gravels
Orton gravels

Pleistocene (pre-Wisconsin)

Moreau gravels

Tertiary, middle

Whitean series

Miocene to Pliocene

Bijou formation

Miocene, upper, or Pliocene, lower

Oak Creek formation

Miocene, lower and middle

Rosebud beds

Oligocene, middle and upper

Brule formation or clay
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White River formation or group

*Oligocene, lower

Ahearn member (of Chadron formation)

Crazy Johnson member (of Chadron formation)

Peanut Peak member (of Chadron formation)

Eocene or Oligocene

Ree beds

*Paleocene

Ludlow member (of Fort Union formation); (as member of Lance formation)

Cretaceous

Ardmore bentonite bed (in Pierre formation)

Bull Creek sand (in Hell Creek member of Lance formation)

Middle Creek limestone ledge (in Graneros formation)

Oacoma zone (in Sully member of Pierre formation)

Stoneville member (of Fox Hills sandstone)

Sully member (of Pierre formation)

*Pierran series

Upper Cretaceous

Agency shale member (of Pierre formation)

Blackhorse shales

Crow Creek member (of Pierre shale)

DeGrey member (of Pierre shale)

Elk Butte member (of Pierre shale)

†Ft. Pierre group

Fox Hills sandstone

Gregory member (of Pierre shale)

Hernosa lens (in Newcastle formation)

Interior formation

Moberge member (of Pierre shale)

Orman Lake limestone member (of Greenhorn formation)

Pierre shale

Rapid City lens (in Newcastle formation)

Tilford lens (in Newcastle formation)

Timber Lake member (of Fox Hills sandstone)

Trail City member (of Fox Hills sandstone)

Verendrye member (of Pierre shale)

Virgin Creek member (of Pierre shale)

United States—Continued
South Dakota—Continued

Lower Cretaceous

Fall River formation (as sandstone)

Furnas member (of Lakota formation); (as shale)

Lakota formation (as sandstone)

Minnewaste limestone member (of Lakota formation)

Upper Jurassic

Redwater shale member (of Sundance formation)

Unkapa sandstone

Permian and Triassic

Spearfish formation

Permian

Minnekahta limestone

Opechee formation or shale

Pennsylvanian

Minnelusa sandstone

Lower Mississippian

Englewood limestone

Pahasapa limestone

Upper Ordovician

Whitewood limestone or dolomite

Middle Ordovician

Ice Box shale

Roughlock siltstone

Upper Cambrian

Deadwood formation

Precambrian

Corson diabase

De Smet formation

Ellison formation

Estes system

Flag rock formation

Game Lodge granite

Garfield formation

Grizzly formation

†Harney granite

Harney Peak granite

Homestake formation

Lead system

Little Elk gneissoid granite

Nemo series

Northwestern formation

Pluma formation

Poorman formation

Roubaix group

Samelias formation

Sioux quartzite

West Ledge formation

Tennessee

Pleistocene

Memphis loess

Milan loam

Eocene

† Lagrange formation

Paleocene

† Crainesville horizon

† Flatwoods group

† Middleton formation

Porters Creek clay or formation
United States—Continued
Tennessee—Continued

**Cretaceous**
- Western Valley gravel
- **Upper Cretaceous**
  - Coffee sand or formation
  - Coon Creek tongue (of Ripley formation)
  - McNairy sand or sand member (of Ripley formation)
    - McNairy shell bed
- **Pennsylvania**
  - Bon Air Measures
  - Brushy Mountain Measures
  - Clifty shale
  - Crossville sandstone (in Duskin Creek formation)
  - Duskin Creek formation
  - Emory sandstone
  - Etna sandstone
  - Fentress shale division (in Lee formation)
  - Frozenhead grit (in Anderson sandstone)
  - Herbert conglomerate
  - Jellico formation
  - Monterey conglomerate
  - Newton sandstone
  - Pilot Knob sandstone
  - Pioneer sandstone
  - Tracy City Measures
  - Walden sandstone
  - Windrock sandstone
- **Middle Pennsylvania**
  - Anderson sandstone
  - Bryson formation
  - Mingo formation
  - Scott shale
  - Wartburg sandstone
- **Lower and Middle Pennsylvania**
  - Brickeville shale
- **Lower Pennsylvania**
  - Bonair sandstone
  - Eastland shale lentil (in Bonair sandstone)
  - Gizzard formation; member (of Lookout sandstone in Georgia)
  - Sawnee conglomerate or member (of Lookout sandstone)
  - Vandever shale
  - Warren Point sandstone member (of Gizzard formation)
  - Whitwell shale
- **Mississippian**
  - Glendale shale
  - Harpeth shale
  - Newman limestone
  - Newman sandstone lentil (in Newman limestone)
    - Tullahoma formation
- **Upper Mississippian**
  - Garrett Mill sandstone member (of Warsaw formation)
- **Lower Mississippian**
  - Eulie shale
  - Maury formation (as member of Ridgetop shale)
  - Ridgetop shale
  - Short Mountain facies (of Fort Payne formation)
  - Westmoreland shale
- **Devonian or Carboniferous**
  - Cumberland Gap shale member (of Chattanooga shale)
  - Olinger gray shale member (of Chattanooga shale)
- **Devonian and Mississippian**
  - Chattanooga shale
  - Grainger shale or formation
- **Upper Devonian or Mississippian**
  - Swan Creek phosphate
- **Upper Devonian**
  - Bransford sandstone bed (in Gassaway member of Chattanooga shale)
  - Dowelltown member (of Chattanooga shale)
  - Gassaway member (of Chattanooga shale)
  - Hardin sandstone member (of Chattanooga shale)
  - Trousdale shale
- **Lower or Middle Devonian**
  - Camden chert
  - Pegram limestone
- **Lower Devonian**
  - Bear Branch limestone member (of Olive Hill formation)
  - Birdsong shale
  - Cypress Creek chert
  - Decaturville chert
  - Flat Gap limestone member (of Olive Hill formation)
  - Harriman chert
  - Linden group
  - Olive Hill formation
  - Pyburn limestone member (of Olive Hill formation)
  - Quall limestone
  - Rockhouse shale
  - Ross limestone member (of Olive Hill formation)
- **Silurian and Devonian**
  - Harpeth and Tennessee River group
- **Upper Silurian and Devonian**
  - Hancock limestone or dolomite
- **Upper Silurian**
  - Decatur limestone
  - Sneadville limestone
- **Middle Silurian**
  - Beech River shaly limestone member (of Brownsport formation)
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  (of Conococheague-Copper Ridge formation)
  Nolichucky shale 1

Middle and Upper Cambrian
  Knox shale 1

Middle Cambrian
  Craig limestone member (of Rogersville shale) 2
  Maryville limestone 1
  Pumpkin Valley shale 2
  Rogersville shale 1
  Rutledge limestone 1
  or dolomite

Lower Cambrian
  Apison shale 1
  Beaver limestone 1
  Chilhowee conglomerate 1
  Chilhowee group 1
  Citico conglomerate 1
  Cochran conglomerate 1
  Erwin quartzite 1
  or formation
  Hamptons shale 1
  or formation
  Helenmode member (of Erwin formation) 2
  Hesse quartzite 1
  member (of Erwin formation) or sandstone
  Knox sandstone 1
  Moccasin Gap member (of Unicoi formation) 2
  Murray shale or shale member
  (of Erwin formation); (as slate or shale 1)
  Nebo quartzite 1
  member (of Erwin formation) or sandstone
  Nichols shale (as slate 1)
  Shady dolomite 1
  or formation
  Starr conglomerate 1
  Unicoi formation 1
  Watauga shale 1

Precambrian
  Cades sandstone (as conglomerate 1)
  Copperhill formation 2
  Linville metadiabase 1
  Ocoee series (as group 1)
  Pigeon slate 1
  or siltstone
  Roan gneiss 1
  Sanduck formation (as slate 1)
  Thunderhead sandstone (as conglomerate 1)
  Wilhide formation (as slate 1)

Precambrian (?)
  Hiwassee slate 1

Mount Rogers volcanic group 2

Texas

Quaternary
  Calamity formation 2
  Delaney gravel 2
  Judkins formation 2
  Kokernot formation 2
  Monahans formation 1
  Neville formation 2
  Terra Blanca formation 1

United States—Continued

Texas—Continued

Recent
  Ingleside formation 2
  Lake Charles formation 2

Pleistocene
  Alta Loma sand 2 (subsurface)
  Beaumont clay 1
  Durst silts 2
  Elm Creek silts 2
  Houston group 1
  Leona formation 1
  Lissie formation 1
  Onion Creek marl 1
  Rio drift 1
  Rita Blanca deposits 2
  Rock Creek beds 1
  Seymour formation 1
  Spring Creek deposits 2
  Tahoka clay 2
  Tule formation 1

Tertiary
  Angelina series 1
  Cottonwood Spring basalt 2
  Crossen trachyte 2
  Duff formation 2
  Eagle Peak syenite 2
  Goodnight formation 1
  Green Valley volcanic series 2
  Huelster formation 2
  Jeff conglomerate member (of Huelster formation) 2
  McCutcheon volcanic series 2
  Mitchell Mesa rhyolite 3
  Potato Hill andesite 3
  Pruett formation 2
  Seven Springs formation 3
  Sheep Canyon basalt 2
  Square Peak volcanic series 2
  Star Mountain rhyolite 2
  Texhoma series 1

Tertiary (?)
  Burro gravel and tuff 1

Tertiary, lower
  Ben Day porphyry 2
  Mitre Peak complex 3

Tertiary or younger
  Butcherknife basalt 3

Pliocene
  Blanco Canyon beds 1
  Clarendon beds 1
  Coetas formation 1
  Goliad sand 1
  Labahia member (of Goliad formation) 1
  Lagarto Creek beds (in Goliad sand) 1
  Lapara sand member (of Goliad sand) 1
  Llano Estacado formation 1
  Palo Duro beds 1
  Panhandle beds 1
  Potter formation 1
  Staked Plains formation 1
INDEX TO THE GEOLOGIC NAMES OF NORTH AMERICA

United States—Continued

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**Pliocene (?)**

- Hockley Mound sand member (of Willis sand) 1
- Uvalde gravel 1
- †Willis feruginous sand member (of Willis sand) 1
- Willis sand 1

**Pliocene, middle**

- Blanco formation 1
- Bridwell formation 2

**Pliocene, lower**

- Couch formation 2
- Hemphill beds 1

**Miocene and Pliocene**

- Dewitt formation 1
- Dugout clay and gravel 1
- †Navasota beds 1

**Miocene**

- Moulton sandstone member (of Oakville formation) 2
- Oakville sandstone 1
- Onalaska clay 1

**Miocene (?)**

- Lagarto clay 1
- Rawls basalt 5
- †Rockland sandstone 1

**Miocene, upper, and Pliocene (?)**

- Burkeville beds 1
- †Fleming clay or group 1

**Miocene, upper**

- Cistern member (of Yegua formation) *2
- Greta sand (subsurface) 1

**Oligocene or younger**

- Tascotal formation 2

**Oligocene and younger (?)**

- Decie member (of Duff formation) 2

**Oligocene and Miocene (?)**

- Gueydan group 1

**Oligocene or Miocene, lower**

- Chusa tuff member (of Catahoula tuff) 1
- Fant tuff member (of Catahoula tuff) 1
- †Gueydan formation 1
- Soledad volcanic conglomerate member (of Catahoula tuff) 1

**Oligocene**

- Anahuac formation 2 (subsurface)
- Driscoll-Sevier sand 2 (subsurface)
- Flour Bluff sand 2 (subsurface)
- Old Ocean shale 2 (subsurface)
- Pierce Estate sands 2 (subsurface)
- Van Vleck sands 2 (subsurface)
United States—Continued
Texas—Continued

Eocene, upper—Continued

Dubose sands and clays
(see p. 621)
Falls City shale
Fashing clays
(see p. 621)
Fayette sandstone
Glendale beds
Gorgora shale member
(of Fayette formation)
Government Wells sand
(subsurface)
Grawunder sand
(subsurface)
Gutoskey sand
(subsurface)
Jacob sand
(subsurface)
McElroy member
(of Fayette sandstone)
Mirando sand
(subsurface)
Mitchells Ferry beds
Nichols sand
(subsurface)
Olmos sand
Petters sand
(subsurface)
Resendez shale member
(of Fayette formation)
Rock Prairie sandstone
Salineno sandstone member
(of Fayette formation)
Simms sand
(subsurface)
Stones Switch sand
(see p. 621)
Wellborn sandstone
Whitsett formation
(as beds !)
(see p. 621)
Wooleys Bluff clays
Yuma sandstone member
(of Manning formation)

Eocene, middle

Arp sand member
(of Reklaw formation)
Bigford member
(of Mount Selman formation)
Byran sandstone
Carizzo sand
Cook Mountain formation
Easterwood shales
Eaton green sand lentil
(in Claiborne group)
Falcon sandstone member
(of Cook Mountain formation)
Garceno sandstone member
(of Cook Mountain formation)
Hurricane marine lentil
(in Landrum member of Cook Mountain formation)
Jennings sand
(subsurface)
José shale member
(of Yegua formation)
Landrum shale member
(of Crockett formation)
La Perla shale member
(of Yegua formation)

Laredo formation
Little Brazos limestone lentil
(in Claiborne group)
Loma Blanca tongue
(of Yegua formation)

Eocene, lower

Butler clay member
(of Rockdale formation)
Caldwell Knob member
(of Seguin formation)
Calvert Bluff clay beds
(of Rockdale formation)
Hilbigzone
(in Rockdale formation)
Hooper formation
Indio formation
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Eocene, lower—Continued
Losoya Creek conglomerate (in Sabinetown formation) 1
Pendleton formation 2
Pendleton Ferry formation 2
Pendleton zone 1
Rockdale formation 1
Sabine formation 1
Sabinetown formation 1
Seguin formation 1
Simsbоро sand member (of Rockdale formation) 1
Solomon Creek member (of Seguin formation) 1
Tehuacana formation 1

Paleocene
Kerens member (of Wills Point formation) 1
Kincaid formation 1
Littig glauconitic member (of Kincaid formation) 1
Los Angeles limestone lentil (in Kincaid formation) 1
Mexia member (of Wills Point formation) 1
Pisgah member (of Kincaid formation) 1
Rocky Cedar Creek limestone lentil (in Kincaid formation) 1
Rosette bed (in Midway formation) 2
Tehuacana member (of Kincaid formation) 1
Wills Point formation 1
†Wortham aragonite lentil (in Wills Point formation) 1

Cretaceous
†Cross Timbers 1 (sands or formation)
Kansawha volcanic zone (of Eagleford formation) 2
Kirshberg evaporite (in Edwards limestone) 2
Lake Crockett formation 2
Lasca formation 2
Medill volcanic zone (of Eagleford formation) 2
Pine Bluff volcanic zone (of Eagleford formation) 2
Tarrantula formation 2

Cretaceous (?)
Iron Mountain intrusive 1
Ojo Bonito porphyry 1
Toborg sand 1 (subsurface)

Upper Cretaceous and Tertiary
Chisos volcanics (as beds 1)

Upper Cretaceous
Aguja formation 1
Anacacho limestone 1
Annona chalk 1
Arcadia Park formation 1
Austin chalk 1
†Bexar 1 (unit)
Black Prairie series 1

United States—Continued
Texas—Continued
Upper Cretaceous—Continued
Blossom sand 1
†Blue Bluffs division 1
Bluebonnet member (of Lake Waco formation) 2
Bonham marl 1
Boquillas flags 1
Bouldin member (of Lake Waco formation) 2
Britoяn clay 1
Buda limestone 1
Burditt marl 1
Carpenter bed 1

Carpenter limestone member (of Grayson formation) 2
Chispa Summit formation 1
†Cline 1 (beds)
Cloose member (of Lake Waco formation) 2
Colquitt formation 1
Cooledge chalk 1
Corsica marl 1
Crown conglomerate 1
†Dallas limestone 1
†Del Rio clay 1
Dessau formation 2
Dexter member (of Woodbine formation) 1

Durango sand member (of Taylor marl) 1
Eagle bed 1
Eagle Ford shale, clay 1 or formation
Eagle Mountains sandstone member (of Grayson formation) 2
Eagle Pass formation 1
Ector tongue (of Austin chalk) 1
Edens sand 1 (subsurface)
Eldorado sand 1 (subsurface)
Escondido formation 1
Euless member (of Woodbine formation) 2
Farias beds 1
Fizzle Flat lentil (in Terlingua formation) 2

Gober tongue (of Austin chalk) 1
Grayson formation, shale, or marl
(as marl member of Denison formation 1)

Gulf series
Kemp clay 1
†Kickapoo marl 1
Lake Waco formation 2

Lewisville formation or member
(of Woodbine formation); (as marine member of Woodbine sand 1)
†Lott chalk member (of Taylor marl) 1
Lytton Springs sand 1 (subsurface)
†Marlin chalk member (of Taylor marl) 1
United States—Continued
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**Upper Cretaceous**—Continued
Morrow pay sand * (subsurface)
Navarro group 1 or formation
Neylandville marl *
Olmos formation *
Pecan Gap chalk member) of
Taylor marl)
Pepper shale member) of Wood­
bine formation); (as forma­
tion 1)

†Pilot Knob tuff 2
Powell sand 1 (subsurface)
†Pinto limestone 1
†Pulliam formation 1
†Rattlesnake beds 1

Red Branch member) of Wood­
bine formation) 2
†Red River group 1

†Roxton beds 1
St. Edwards tuff 2
San Carlos formation 1
San Miguel formation 1
South Bosque marl 1
†sub-Clarksville sand 1 (sub­
surface)

Tarrant formation 1 or member
(of Lewisville formation)
Taylor marl 1
Templeton member) of Wood­
bine formation) 2

Terlingua clay 1
Thall sand 1 (subsurface)
†Timber Creek beds 1
†Timber Creek group 1
Tornillo clay 1

Upson clay 1
Valverde flags 1
Vieja series 1
Webberville beds 1
Wolfe City sand member) of
Taylor marl) 1

Woodbine sand, clay, 1 or for­
mation

Lower and Upper Cretaceous
Comanche series 1
Lower Cretaceous
†Aust in marble 1
Bacon limestone member) of
Ferry Lake formation) 2 (sub­
surface)
†Barton Creek limestone 1
Bluff bed 1
Bluff Dale sand) (in Travis Peak
formation) 1
Bluff Mesa formation 2
Bonnellian series 1
Boracho sandstone 2
†Bosque division 1
Burnt limestone 2
Caddo Levee Board horizon 1
(subsurface)
Campagrande formation 1

United States—Continued
Texas—Continued

**Lower Cretaceous**—Continued
†Carr sand 1 (subsurface)
†Cedar Park member) of Walnut
clay)
†Choctaw limestone 1
†Comanche Peak group 1
Comanche Peak limestone 1
Cow Creek limestone member) of
†(Travis Peak formation or Pears­
all formation) 1 (as beds 1
†Cox sandstone 1
†Cushillo formation 1
Dees horizon or sand 1 (sub­
surface)
†Denison formation 1
Denton clay) as member of
†Denison formation 1

†Devis River limestone 1
†Duck Creek limestone (as forma­
tion 1)

†Edwards limestone 1
†Edy formation 2
Etholen conglomerate 1
Finlay limestone 1
Fort Worth limestone 1
Fredericksburg group 1
Gatesville formation 1
†Gainesville 1 [group]
†(Galt sand 1 (subsurface)
Georgetown limestone 1
†Glen Rose limestone 1 or for­
mation
†Grand Prairie formation 1

†Hensell sand member) of Travis
Peak formation 1 or shale
member) of Pearsall forma­
tion) in subsurface

†Hill sand horizon 1
†Leander beds 1
†Main Street limestone (as mem­
er of Denison formation 1)
†Maness shale member) of Tyler
formation) 2 (subsurface)
†Marietta beds 1
Maxon sandstone 1
Mountain bed 1
Muleros sandstone 1
†North Denison sand 1
†Paluxy sand 1 or formation

†Pawpaw formation (as sandy
member of Denison formation 1)
†Pearsall formation 2 (subsurface)
†Pottsboro subgroup 1
†Presidio formation 1
†Preston formation 1
†Quitman bed 1
†Shafter limestone 1
†Shingle Hills formation 2
†Shoal Creek limestone 1
†South Tyler formation) 2 (subsur­
face)
Sycamore sand) (in Travis Peak
formation) 1
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<th>United States—Continued</th>
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<td><strong>Texas—Continued</strong></td>
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<td><strong>Permian—Continued</strong></td>
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<tr>
<td>Thorp Springs limestone</td>
<td>†Dos Alamos gypsum member (of Delaware Mountain formation)</td>
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<td>Torcer formation</td>
<td>†Dothan limestone (in Moran formation)</td>
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<td><strong>Travis Peak formation</strong></td>
<td>†Double Mountain formation</td>
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<td>Travis Peak limestone (in Travis Peak formation)</td>
<td>Doublian series</td>
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<tr>
<td><strong>Trinity group or sand</strong></td>
<td><strong>Dozier sandstone member</strong></td>
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<tr>
<td>Trinityan series</td>
<td>(of Rush Springs formation); (as member of Peacock formation)</td>
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<tr>
<td>University Mesa marl</td>
<td>Eskota beds</td>
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<tr>
<td><strong>Walnut clay</strong>; shaly member</td>
<td>Eskota dolomite or gypsum</td>
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<tr>
<td>(of Goodland limestone)</td>
<td>†Frijole limestone member (of Delaware Mountain formation)</td>
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<td>Frijole shale</td>
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<td>Fulda sandstone</td>
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<td>Glass Mountains formation</td>
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<td>Groesbeck dolomite</td>
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<td>Guthrie dolomite</td>
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<td>Hardin School limestone</td>
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<td>Hartgrove limestone member (of Talpa formation)</td>
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<td></td>
<td>Hart School bed (in Moran formation)</td>
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<td>Hueconian (series)</td>
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<td>Index Creek shale member (of Admiral formation)</td>
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<td>Lake Kemp limestone (in Lueders formation)</td>
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<td>Lake Lytle limestone</td>
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<td>Lake Trammel sandstone</td>
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<td>Limpia (limestone)</td>
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<td>Lytle limestone</td>
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<td>McCaulley dolomite</td>
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<td>Maravilla dolomite</td>
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<td>Maybelle limestone</td>
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<td>†Memphis sandstone (in Peacock formation)</td>
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<td></td>
<td>Millersview limestone member (of Grape Creek formation)</td>
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<td></td>
<td>Mina Grande formation</td>
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<td></td>
<td>†Morgan limestone member (of Moran formation)</td>
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<td></td>
<td>Morrison sand (subsurface)</td>
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<td></td>
<td>Oriana gypsum member (of Peacock formation)</td>
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<td></td>
<td>Otero limestone</td>
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<td></td>
<td>Paint Rock bed</td>
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<td></td>
<td>†Peacock formation</td>
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<td>Putnam limestone (in Putnam formation)</td>
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<td>Putnam sandstone (in Putnam formation)</td>
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<td></td>
<td>Quanah gypsum</td>
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<td>Royston formation</td>
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<td>†Rustler Springs formation</td>
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<td>Shultz limestone member (of Talpa formation)</td>
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<td></td>
<td>Sweetwater dolomite</td>
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<td>Swenson gypsum member (of Peacock formation)</td>
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</tbody>
</table>

| **Permian and Triassic** | |
| **Bissett conglomerate** | |
| Camp Springs conglomerate | |
| **Dockum group** | |
| Dockuman series | |
| **Tecovas formation** | |
| **Trujillo formation** | |
| **Malone formation** | |
| **Triassic** | |
| **Albany series** | |
| **Alta formation** | |
| Apache limestone | |
| Aspermont dolomite | |
| Bayloran series | |
| Beaverburk limestone | |
| Big Lake lime (subsurface) | |
| †Blowout Mountain sandstone | |
| †Buff bone bed | |
| †Bone Canyon limestone | |
| Briggs formation | |
| Buffalo Hill sandstone | |
| **Childress dolomite member** (of Marlow formation); (as member of Dog Creek shale) | |
| Chinati series | |
| **Cibolo formation** | |
| **Cieneguita beds** | |
| Claytonville dolomite | |
| Claytonville gypsum | |
| †Coleman division | |
| Coleman bed, clay, or limestone (in Admiral formation) | |
| Croton gypsum | |
| Culberson series | |
| Delaware Mountain sandstone | |
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Texas—Continued

Permian—Continued

Texon sand 1 (subsurface)
Tye formation 1
Wagon Yard gypsum 1
Wahs Creek shale (in Moran formation) 1
Ward gypsum 1
†Wichita conglomerate (in Clear Fork formation) 1
Winkler Ford limestone member (of Grape Creek formation) 1
Yoakum dolomite member (of Queen formation) 2 (subsurface)
Wagon Yard gypsum 1
Wahs Creek shale (in Moran formation) 1
Ward gypsum 1
†Wichita conglomerate (in Clear Fork formation) 1
Winkler Ford limestone member (of Grape Creek formation) 1
Yoakum dolomite member (of Queen formation) 2 (subsurface)

Permian (Ochoa)

Casile gypsum 1 or formation
Cowden anhydrite member (of Salado formation) 2
Dewey Lake redbeds 2 (subsurface)
Rustler formation 1 or limestone 1
Salado formation (as halite 1); (subsurface and surface)
Tessey limestone 1

Permian (Guadalupe)

Alibates dolomite lentil (of Quartermaster formation) 1
Altuda formation (as shaly member of Capitan limestone 1)
Bell Canyon formation 2
Brushy Canyon formation 2
Capitan limestone 1
Cherry Canyon formation 2
Delaware Mountain group (as formation 1)
Getaway limestone member (of Cherry Canyon formation) 2

Permian (Guadalupe)—Continued

Vidrio limestone member (of Word formation); (as member of Capitan limestone 1)
Word formation 1
Perrian (Leonard-Guadalupe)

Pipeline shale 2

Permian (Leonard)

Arroyo formation 1
Bone Spring limestone 1
Bullwagon dolomite 1 member (of Vale formation)
Choza formation 1
Clear Fork group (as formation or group 1)
Collingsworth gypsum member (of Blaine formation) 1
Cutoff shaly member (of Bone Spring limestone) 2
Hess limestone member (of Leonard formation) 1
Kirby Lake dolomite 2
Leonard formation 1 or series
Merkel dolomite member (of Choza formation); (as member of Clear Fork formation 1)
San Angelo sandstone 1
Sprayberry sandstone 2 (subsurface)

Permian (Leonard)—Continued

Voss shale member (of Belle Plains formation) 2

Permian (Leonard)—Continued

Arroyo formation 1
Bone Spring limestone 1
Bullwagon dolomite 1 member (of Vale formation)
Choza formation 1
Clear Fork group (as formation or group 1)
Collingsworth gypsum member (of Blaine formation) 1
Cutoff shaly member (of Bone Spring limestone) 2
Hess limestone member (of Leonard formation) 1
Kirby Lake dolomite 2
Leonard formation 1 or series
Merkel dolomite member (of Choza formation); (as member of Clear Fork formation 1)
San Angelo sandstone 1
Sprayberry sandstone 2 (subsurface)

Pease River group 2

Rainy limestone member (of Arroyo formation); (as member of Clear Fork formation 1)
San Angelo sandstone 1
Sprayberry sandstone 2 (subsurface)

Pease River group 2

Rainy limestone member (of Arroyo formation); (as member of Clear Fork formation 1)
San Angelo sandstone 1
Sprayberry sandstone 2 (subsurface)

Perrian (Leonard)—Continued

Bead Mountain limestone member (of Belle Plains formation) 1
Belle Plains formation 1
Clyde formation 1
Elm Creek limestone member (of Belle Plains formation); (as member of Admiral formation 1)
Grape Creek limestone member (of Clyde formation) 1
Jagger Bend limestone 1 member (of Belle Plains formation)
Jim Ned shale member (of Belle Plains formation) 2
Lueders limestone 1
Talpa limestone 1 member (of Clyde formation)
Valera shale 1 member (of Belle Plains formation)
Voss shale member (of Belle Plains formation) 2
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### United States—Continued

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**Permian (Leonard? and Wolfcamp)**

- Wichita formation or group

**Permian (Wolfcamp)**

- Admiral formation
- Camp Colorado limestone member (of Pueblo formation)
- Camp Creek shale member (of Pueblo formation)
- Coleman Junction limestone member (of Putnam formation)
- Coon Mountain sandstone member (of Pueblo formation)
- Deer Mountain red shale member (of Hueco formation)
- Fisk formation
- Gouldbusk limestone member (of Moran formation)
- Hordes Creek limestone member (of Admiral formation)
- Horse Creek limestone member (of Moran formation)
- Hueco limestone
- Ibex limestone
- Kriz lens (in Hueco formation)
- Lost Creek shale member (of Admiral formation)
- Moran formation
- Overall limestone member (of Admiral formation)
- Powwow conglomerate member (of Hueco limestone)
- Pueblo formation
- Putnam formation
- Saddle Creek limestone member (of Pueblo formation); (as member of Harpersville formation)
- Salt Creek Bend shale member (of Pueblo formation)
- Santa Anna shale member (of Moran formation)
- Santa Anna Branch shale member (of Putnam formation)
- Sedwick limestone member (of Moran formation)
- Stockwether limestone member (of Pueblo formation)
- Waldrip member (of Pueblo formation); (as member of Harpersville formation)
- Watts Creek shale member (of Moran formation)
- Wildcat Creek shale member (of Admiral formation)
- Wolfcamp formation (either series)

**Carboniferous**

- Cimarronian series
- Wichitan series
- Wiley dolomite

**Pennsylvanian**

- Antelope Creek bed (in Strawn formation)
United States—Continued

Texas—Continued

Pennsylvanian—Continued

Dickerson member (of Millsap Lake formation)

Dimple limestone

Dobbs Valley sandstone (in Millsap Lake formation)

Dog Bend limestone (in Mineral Wells formation)

Dugout beds

Earnest sand (subsurface)

†Eastland formation

†Eastland limestone member (of Caddo Creek formation)

Eastland sandstone (in Graham formation)

Elliott Creek bed (in Strawn formation)

Elm Creek limestone

Eolian limestone member (of Pueblo formation)

Finis shale member (of Graham formation)

Fox Ford bed (in Strawn formation)

Fry sand (subsurface)

Gaptank formation

Goen limestone (in Millsap Lake formation)

Gonzales Creek shale member (of Graham formation)

†Gonzales shale

Gordon sandstone (in Strawn formation)

Gose sand (subsurface)

†Grafton limestone member (of Grafton formation)

Grindstone Creek member (of Millsap Lake formation)

†Gunsight formation

Gwinnup sand (subsurface)

Hanna Valley bed (in Strawn formation)

Harris sand (subsurface)

Haymond formation

Hill Creek beds member (of Millsap Lake formation)

Hodges sand (subsurface)

Hog Mountain sandstone (in Mineral Wells formation)

Horse Creek clay and shale (in Strawn formation)

Hudson Bridge limestone (in Palo Pinto formation)

Indian Creek bed (in Strawn formation)

Jacksboro formation

Jasper Creek shale (in Grafton formation)

Keetchi Creek shale and sandstone (in Mineral Wells formation)

Kickapoo Falls limestone (in Millsap Lake formation)

Kissinger sand (subsurface)

Lake sandstone (subsurface)

United States—Continued

Texas—Continued

Pennsylvanian—Continued

Lake Bridgeport shale

La Tuna member (of Magdalena formation)

Lazy Bend member (of Millsap Lake formation)

Lone Camp limestone (in Mineral Wells formation)

Lower Freeman-Hampton sand (subsurface)

Lynch Creek bed (in Strawn formation)

McClesky sand (subsurface)

McMillan sand (subsurface)

Martin Lake limestone (in Palo Pinto formation)

Meek Bend limestone (in Millsap Lake formation)

Milburn shale

†Millsap division (in Strawn group)

Moutray sand (subsurface)

Necessity shale member (of Graham formation)

Noodle Creek limestone (subsurface)

Nimrod limestone

Nimrod shale (in Pueblo formation)

Olden sand (subsurface)

Oran sand lentil (in Grafton formation)

Posideon shale member (of Grafton formation)

†Ranger formation

Ranger oil sand (subsurface)

†Ranger series

Ray sand (subsurface)

†Richland sandstone

Ricker Station limestone member (of Grindstone Creek formation)

Rockelle conglomerate (in Grafton formation)

Rockhill limestone (in Grafton formation)

Rough Creek bed (in Grafton formation)

†Rough Creek shale member (of Tesnus formation)

Salesville shale member (of Mineral Wells formation)

Sanders Bridge limestone (in Palo Pinto formation)

Saipan limestone (in Millsap Lake formation)

Seaman Ranch shale member (of Brad formation)

Shadrick Mill sandstone (in Strawn formation)

South Bend sandstone and shale (in Graham formation)

†Speck Mountain clay (in Thrifty formation)
United States—Continued

Pennsylvanian—Continued

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<thead>
<tr>
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<tr>
<td>Spring Creek bed (in Strawn formation)</td>
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<tr>
<td>Stephens lime (subsurface)</td>
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<td>Steussy shale member (of Mill-sap Lake formation)</td>
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<td>Veale sand (subsurface)</td>
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<td>White Ranch limestone (in Graham formation)</td>
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<td>Wilbarger Creek bed (in Brad formation)</td>
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<td>Wizard Wells limestone (in Graford formation)</td>
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<td>Wolf Mountain shale member (in Graford formation)</td>
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Upper Pennsylvanian

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<td>Burger limestone member (of Graham formation)</td>
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Middle Pennsylvanian

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<td>Crystal Falls limestone member (of Thrifty formation); (as member of Harpersville formation)</td>
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<td>North Linn limestone member (of Graham formation)</td>
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<td>Wynn limestone member (of Palo Pinto formation)</td>
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United States—Continued  
Texas—Continued  

Middle Pennsylvanian—Continued  
Colony School conglomerate  
East Mountain shale member  
(of Mineral Wells formation)  
Garner formation  
Gibson limestone member (of Grindstone Creek formation)  
Lake Pinto sandstone member  
(of Mineral Wells formation)  
Millsap Lake formation  
Mineral Wells formation  
Mingus shale member (of Garner formation)  
Ricker sandstone member (of Mineral Wells formation)  
Strawn group  
Turkey Creek sandstone member  
(of Mineral Wells formation)  

Lower and Middle Pennsylvanian  
Bend group  
Marble Falls limestone  
Smithwick shale  

Lower Pennsylvanian  
Aylor member (of Big Saline formation)  
Big Saline group  
Brister member (in Big Saline formation)  
Brook lentil (of Big Saline formation)  
Caddo Pool formation (subsurface)  
Comyn formation (subsurface)  
De Leon formation (subsurface)  
Eastland Lake formation (subsurface)  
Gibbons conglomerate lentil (in Marble Falls formation)  
Kickapoo Creek group  
Lampassas series  
Lemons Bluff member (of Marble Falls formation)  
Parks formation (subsurface)  
Rayville formation  
Sipe Springs formation (subsurface)  
Sloan member (of Marble Falls formation)  
Soldiers Hole member (of Big Saline formation)  

Mississippian  
Barnett shale or formation  
Chappel formation  
Espey Creek limestone member (of Chappel formation)  
Helms formation  
King Creek marl member (of Chappel formation)  
Whites Crossing coquina member (of Chappel formation)  

Upper Mississippian  
Las Cruces formation  
Rancheria formation  

United States—Continued  
Texas—Continued  

Devonian  
Canutillo formation  
Devonian (?)  
Caballo novaculite  
†Santiago chert  
Upper (?) Devonian  
†Zesch formation  
Middle and Upper Devonian  
Ives breccia member (of Houy formation); (as breccia?) (see p. 621)  

Middle Devonian  
Bear Spring formation  
Lower or Middle Devonian  
Striling formation  
Lower Devonian  
Pillar Bluff limestone  

Silurian  
Fusselman Bluff limestone  

Ordovician  
El Pasan series  

Upper Ordovician  
Burnam limestone  
Maravillas chert  
Montoya limestone  
Montoyan series  
Persimmon Gap shale or formation  

Upper Ordovician (?)  
Solitario formation  

Middle Ordovician  
†Brewster formation  
Connell sandstone member (of Oil Creek formation) (subsurface)  

Fort Peña formation  
McKee sandstone (subsurface)  
Waddell sandstone (subsurface)  
Woods Hollow shale  

Lower Ordovician  
Alsate shale  
Deep Creek division  
Ellenburger group (as limestone)  
El Paso limestone or formation  
Gorman formation  
Honeycut formation  
Marathon limestone  
Monument Spring dolomite member (of Marathon limestone)  
Staendebach member (of Tanyard formation)  
Tanyard formation  
Threadgill member (of Tanyard formation)  

Cambrian and Ordovician  
Bliss sandstone  
Burnet marble  
†Marathon series  

Cambrian  
Era member (of Wilbers formation)
### United States—Continued

#### Texas—Continued

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<tr>
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<td>Buttrill Ranch member (of Dagger Flat formation)</td>
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<td>Cap Mountain limestone member (of Riley formation); (as formation 1)</td>
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<td>Hickory sandstone</td>
<td>1 member (of Riley formation)</td>
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<td><strong>San Saba limestone member</strong> (of Wilberns formation); (as series 1)</td>
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#### Precambrian

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### United States—Continued

#### Texas—Continued

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#### Utah

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<td>Crazy Hollow formation</td>
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<td>Utah—Continued</td>
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### Oligocene
- Duchesne formation
  - Halfway horizon (in Duchesne River formation)
  - Lapoint horizon (in Duchesne River formation)
  - Norwood tuff
  - Randlett horizon (in Duchesne River formation)

### Eocene
- Fool Creek conglomerate
- Oligocene to Pliocene
- Camp Williams unit
- Post-Eocene
  - Sunbeam monzonite
  - Fernow rhyolite
  - Duchesne River formation
  - Godiva limestone
  - Goldens Ranch formation
  - Manti beds
  - Packard quartz latite
  - Pink Cliff series
  - Raddatz porphyry
  - Vermilion Creek group

### Eocene (?)
- Eagle Hill rhyolite
- Shaggy Peak rhyolite
- Tickwale rhyolite
- White Sage formation

### Eocene, upper, or Oligocene
- Bald Knoll formation

### Eocene, upper
- Myton member (of Uinta formation)

### Eocene, middle or upper
- Sage Valley limestone member (of Goldens Ranch formation)

### Eocene, middle
- Evacuation Creek member (of Green River formation)
- Horse Bench sandstone bed (in Evacuation Creek member of Green River formation)

### Eocene, lower
- Colton formation
- Wasatch group
- Paleocene or Eocene, lower
  - Cowly Canyon limestone member (of Wasatch group)

### Paleocene
- Fayette facies (of Flagstaff formation)
- Joes Valley member (of North Horn formation)
- Pulpit conglomerate division (of Almy conglomerate)
United States—Continued

Utah—Continued

Upper Cretaceous—Continued

**Kelvin formation** (as conglomerate)

Kenilworth member (of Blackhawk formation)

**Masuk** member (of Mancos shale); (as sandstone member of Mesaverde formation)

†Masuk shale (in Mancos shale)

**Neslen formation** (as coal-bearing member of Price River formation)

**Panther tongue** (of Star Point sandstone)

†Pennell sandstone

**Price River formation**

Rim Rock sandstone

Rockport formation

Sanpete formation

**Sego sandstone** (as member of Price River formation)

**Spring Canyon tongue** (of Star Point sandstone)

**Star Point sandstone**

Storrs tongue (of Star Point sandstone)

**Straight Cliffs sandstone**

**Sulphur Canyon sandstone bed** (in Price River formation)

Sunnyside member (of Blackhawk formation)

**Thompson Canyon sandstone bed** (in Price River formation)

**Tropic shale**

Tununkian series

**Tununk shale** (in Mancos shale); sandstone member (of Mancos shale)

**Tuscher formation**

Wanship formation

Wahweap sandstone

**Upper Cretaceous**

**Currant Creek formation**

**Iron Springs formation**

**Marshall Creek breccia**

**Lower Cretaceous**

**Buckhorn conglomerate**

**Jurassic**

**Homestake limestone** member (of Carmel formation)

**Jurassic and Jurassic**

**Lamb Point tongue** (of Navajo sandstone)

**Shuriz sandstone tongue** (of Navajo sandstone)

**Temple Cap member** (of Navajo sandstone)

**Upper Jurassic and Upper Cretaceous**

**Arapien shale**

Bishop sandstone

Bluff sandstone (as member of Morrison formation)

Brush formation

Brushy Basin shale member (of Morrison formation)

Curtis formation

Duchesne limestone

**Entrada sandstone**

†Flaming Gorge group

Junction limestone

Moab sandstone member or tongue (of Entrada sandstone)

**Recapture shale member** (of Morrison formation)

Red Mesa member (of Entrada formation)

**Salt Wash sandstone member** (of Morrison formation)

**Summerville formation**

**Twelvemile Canyon member** (of Arapien shale)

**Twist Gulch member** (of Arapien shale)

**Westwater Canyon sandstone member** (of Morrison formation)

†White Cliff limestone

**Winsor formation**

**Middle and Upper Jurassic**

**Carmel formation**

**San Rafael group**

**Triassic and Jurassic**

**Glen Canyon group**

†**Kanab Canyon group**

**Triassic**

**Ankareh shale** formation, or redbeds

**Mahogany member** (of Ankareh formation)

Shinarump clay

†Shinarump group

Shinarumpian series

**Triassic**

**Hoskinnini tongue or member** (of Moenkopi formation); (as tongue or member of Cutler formation)
### United States—Continued

#### Utah—Continued

**Upper Triassic**
- Duffin sandstone and shale (in Chinle formation)¹
- Fire Clay Hill bentonitic shale (in Chinle formation)²
- Gartra grit member (of Stanaker formation)²
- Hartley shale and sandstone (in Chinle formation)²
- Leeds sandstone (in Silver Reef sandstone member of Chinle formation)²
- *Moss Back member* (of Chinle formation)²
- *Petrified Forest member* (of Chinle formation)²
- Shinarump member (of Chinle formation); (as conglomerate)¹
- Silver Reef sandstone ¹
- Stanaker formation ²
- Suicide grit ²
- Tecumseh sandstone (in Silver Reef sandstone member of Chinle formation)²
- Trail Hill sandstone (in Chinle formation)²
- *†Vermilion Cliff group* ¹

**Lower Triassic**
- Emigration formation ¹
- Harrington formation ¹
- Pinecrest formation ¹
- Red Wash formation ²
- *Shinabkai shale member* (of Moenkopi formation)¹ or member (of Moenkopi formation)¹
- *Sinbad limestone member* (of Moenkopi formation)¹
- *Thaynes limestone*, formation, or group
- *Timpoweap member* (of Moenkopi formation)²
- *Virgin limestone member* (of Moenkopi formation)¹
- †Verkin shales ¹
- *Woodside formation* (as shale)¹

**Paleozoic**
- Allah quartzite ²
- Orient formation ²

**Permian and Triassic**
- †Oljeto sandstone member ¹ (of Moenkopi formation)

**Permian**
- Baby sand ¹ (subsurface)
- †Bogus tongue (of Cutler formation)¹
- *Cedar Mesa sandstone member* (of Cutler formation)¹
- *Diamond Creek sandstone* ¹
- *Gerster formation* or limestone
- Goodridge sand ¹ (subsurface)

### United States—Continued

#### Utah—Continued

**Permian—Continued**
- *Haigaito tongue or member* (of Cutler formation)¹
- *Harrisburg gypsiferous member* (of Kaibab limestone) ¹
- *Kirkman limestone* ²
- Little Loop oil sand ¹ (subsurface)
- *Mackenhir “red-beds” tongue* (of Phosphoria formation)²
- Mendenhall sand ¹ (subsurface)
- †Monument Valley shale ¹
- *Organ Rock tongue or member* (of Cutler formation)¹
- *Park City formation* ¹ or group
- †Shafer limestone ¹
- *White Rim sandstone member* (of Cutler formation)¹

**Post-Pennsylvanian**
- *Last Chance quartz monzonite* ³
- *Carboniferous* (subsurface)
- Heber limestone ¹
- *Oquirrh quartzite* ¹
- Park sandstone ¹
- †Weberan series ¹

**Pennsylvanian or Permian**
- *Arcola sand* ¹ (subsurface)
- *Pennsylvania and Permian* ¹
- †Goodridge formation ¹
- *Oquirrh formation* ¹

**Pennsylvanian**
- Amber sand ¹ (subsurface)
- *Argenta limestone* ¹
- *Bingham quartzite* ¹
- *Bullard limestone* ¹
- *Butterfield limestone member* (of Bingham quartzite)¹
- *Columbus quartzite* ¹
- *Commercial limestone member* (of Bingham quartzite)¹
- *Elephant limestone* ¹
- *Galena King limestone* ¹
- *Goose Neck sand* ¹ (subsurface)
- *Hercules limestone* ¹
- *Highland Bay limestone member* (of Bingham quartzite)¹
- *Hobble formation* ²
- *Honaker sand* ¹ (subsurface)
- Honerine limestone ¹
- *Jordan limestone member* (of Bingham quartzite)¹
- *Kelly formation* ²
- *Lenox limestone member* (of Bingham quartzite)¹
- *Maverick limestone* ¹
- *Morgan formation* ¹
- *North Ada limestone* ¹
- †Ontario quartzite ¹
- *Petro limestone* ¹
- †Petro limestone lentil (of Bingham quartzite)¹
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Utah—Continued

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Utah Metals limestone 1
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Mississippian

†Humbug limestone 1
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Upper Mississippian

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Benson limestone 1

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Devonian

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†Gardner dolomite 1
Pinyon Peak limestone 1

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Utah—Continued

Upper Devonian

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City Creek limestone 2
Hades quartzite 1
McClellan member (of Elbert formation) 2 (subsurface)

Moavite shale 1
Victoria formation (as quartzite 1)

Middle Devonian

Guilmette formation 1
Sevy dolomite 1
Simonson dolomite 1

Lower Devonian

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Silurian

Dora member (of Bluebell formation) 2
Laketown dolomite 1
Nash member (of Bluebell formation) 2
†Paradise limestone 1
Silurian(? and Devonian(?)

Red Warrior limestone 1

Middle Silurian

Bell Hill dolomite 2
Harriste dolomite 2
Lost Sheep dolomite 2
Thursday dolomite 2

Ordovician to Mississippian

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†Wasatch limestone 1

Ordovician

Chief Consolidated limestone 1
Gemini limestone 1

Ordovician and Cambrian(?)

Grampian limestone 1

Upper Ordovician, Silurian, and Devonian

Bluebell dolomite 1

Upper Ordovician and Silurian

Beecher member (of Bluebell formation) 2

Upper Ordovician and (or) Silurian

Floride dolomite 2

Upper Ordovician

Eagle member (of Bluebell formation) 2

Middle Ordovician

Swan Peak formation (as quartzite 1)

Lower Ordovician

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†Geneva quartzite 1
House limestone 2
Juab limestone 2
Kanosh shale 2
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United States—Continued
Utah—Continued

Cambrian and Lower Ordovician
†Eureka limestone
†Mammoth limestone

Cambrian
Busby quartzite member (of Langston formation)
Butlerville quartzite
Dagmar limestone member (of Ute formation)
Holliday shale
†Milliard limestone
Naomi Peak limestone member (of Langston formation)
Opex formation (as dolomite)

Pine Valley quartzite
Timpanogos shales

Cambrian (?)
Morehouse quartzite
Sentinell limestone
Sentinell quartzite

Upper Cambrian and Ordovician (?)

Chokecherry dolomite

Upper Cambrian
Ajax dolomite (as limestone)
Emerald member (of Ajax dolomite)
Hicks formation
Lamb dolomite
Notch Peak limestone
Orr formation
Weeks limestone

Upper and Middle (?) Cambrian
Lynch dolomite

Middle Cambrian to Lower Ordovician
Centennial limestone

Middle and Upper (?) Cambrian
Maxfield limestone

Middle Cambrian
Abercrombie formation
Blacksmith limestone
Bluebird dolomite
Bowman limestone
Cole Canyon dolomite
Dagmar limestone
Dome Canyon limestone
Golden Ray limestone
Hartmann limestone
Herkimer limestone
Hodges shale member (of Bloomington formation)
Howell formation
Landston formation
Marjum limestone
Millard limestone
Swasey formation
Teutonic limestone
Tripe limestone
Ute limestone
Wheeler formation
Young Peak dolomite

Middle and Lower (?) Cambrian
Brigham quartzite

United States—Continued
Utah—Continued

Lower and Middle Cambrian
†Alta shale
†Ogden quartzite

Ophir formation or shale
†Tintic slate

Lower Cambrian
Barkley quartzite
Busby quartzite
Cabin shale
Dale quartzites
†Robinson quartzite
Tintow limestone
Uinta series

Lower Cambrian and Precambrian (?)

Tintic quartzite

Precambrian
Bald Mountain formation
Big Cottonwood formation (as quartzite series)
Box Canyon member (of Mutual quartzite)
Cottonwood schists and gneisses
Emmons Peak quartzite
Farmington Canyon complex
Little Willow series
Mineral Fork tillite
Mutual formation
Red Creek quartzite
Red Pine shale
†Unta quartzite and sandstone

Uinta Mountain group

Vermont
Eocene
Brandon lignite
Paleozoic
Belvidere Mountain amphibolite
Lowell Mountain formation
Upper Paleozoic
Plymouth granite
Carboniferous
Mount Ascutney granite
Devonian
Barre granite
Bethel granite
Calais granite
Craftsberry granite
Groton granite
Hardwick granite
Irasburg granite
Newark granite
Newport granite
Orange granite
Pomfret granite
Randolph granite
Ryegate granite
Tunbridge granite
Vernon limestone
West Dummerston granite
Williamstown granite
Woodbury granite

Devonian and Silurian (?)

Gile Mountain formation
### United States—Continued

**Vermont—Continued**

- **Upper or post-Devonian**
  - Durkee Hill greenstones
  - Brocklebank granite
- **Silurian**
  - Waits River formation (as limestone)
- **Silurian or Lower Devonian**
  - Westmore formation
- **Silurian**
  - Barton River formation
- **Silurian (f)**
  - Guilford slate
  - Northfield slate
  - Middle or Lower (f) Silurian
  - Shaw Mountain formation
- **Post-Ordovician**
  - Bellows Falls granite gneiss
- **Ordovician** (see also Cambrian and Ordovician)
  - Bascom formation
  - Bradford schist
  - Brattleboro phyllite
  - Columbian marble
  - Coventry limestone
  - Fairlee quartz monzonite
  - Memphremagog gneiss
  - Montpelier slate
  - Moretown formation
  - Morgan Corners formation
  - Orleans phyllite
  - Vershire schist
  - Washington limestone
  - Woodstock schist
- **Ordovician (f)**
  - Meetinghouse slate
- **Middle Ordovician**
  - Shoreham member (of Sherman Fall formation)
  - Sudbury marble
  - West Rutland marble
  - Weybridge member (of Beldens formation)
  - Whipple member (of Berkshire schist)
  - Youngman formation
- **Middle Ordovician (f)**
  - Meetinghouse slate
  - Standing Pond volcanics
  - Lower or Middle Ordovician
  - Walloomsac slate
  - Lower and Middle Ordovician
  - Highgate Springs series
  - Isle La Motte marble
- **Lower Ordovician**
  - Albany conglomerate
  - Boardman formation
  - Bridport dolomite
  - Cassin formation
  - Corliss conglomerate
  - Coventry conglomerate
  - Cutting dolomite
  - Fort Cassin formation
  - Georgia slate
  - Grandje slate
  - Ira slate
  - Isle La Motte sandstone
  - Monastery formation
  - Morse Line slate
  - Northfield conglomerate
  - Poulteny slate
  - Province Island limestone
  - Shelburne marble
  - Sutherland Falls marble
  - Wing conglomerate
- **Cambrian or Lower Ordovician**
  - Turkey Mountain member (of Hoosac formation) (J. B. Thompson, Jr., 1952, Geol. Soc. America Guidebook for field trips in New England, p. 41)
  - Cambrian and Ordovician
  - Dorset limestone
  - Eolian limestone
  - Grahamville formation
  - Whetstone Hill member (of Moretown formation)
- **Cambrian**
  - Barnard gneiss
  - Newbury granite gneiss
  - Ottawaquechee formation
- **Cambrian (f)**
  - Pico Peak series
  - Plymouth Union series
  - Springfield conglomerate
- **Upper Cambrian**
  - Bethel group
  - Bethel schist
United States—Continued
Vermont—Continued

Upper Cambrian—Continued
Cavendish schist 1
Clarendon Springs dolomite 1
Gorge formation 2
Hungerton schist 1
Lunenburg schist 1
Milford dolomite 1
†Missisquoi formation 1
Reading gneiss 1
Rockledge limestone breccia 2
Russell slate 2
Saxe Brook formation 2
Williston limestone 1

Upper Cambrian (?)
Gassetts schist 1
Halifax chlorite schist 1
Heartwellville schist 1
Highgate slate 1
Missisquoi schist 1
Readsboro schist 1
Whittingham schist 1.

Middle or Upper Cambrian
Skeels Corners formation 2
Middle Cambrian
Boucher formation 3
Mill River conglomerate 1
St. Albans slate 1
Middle (?) Cambrian
Rugg Brook dolomite conglomerate 1

Lower Cambrian to Lower Ordovician
†Swanton conglomerate 1

Lower Cambrian
Barker quartzite 1
Battell member (of Monastery formation) 2
Beebe limestone 1
Bennington quartzite 1
Bomoseen grit 1
Breezy phylite 1
Brigham Hill graywacke 1
Bull slate 1
†Colchester formation 1
Connor facies (of Dunham dolomite) 2
Danby formation 1
†Georgian epoch or series 1
Granville formation 2
Hancock member (of Pinney Hollow formation) 2
Hooker slate 1
Hubbardton slate 1
Mallet dolomite 1
Monastery formation 2
Monkton quartzite 1
Noah Parker horizon 1
Parker slate 1
Pine Hill quartzite 1
Pinney Hollow conglomerate 1
Plymouth conglomerate 1
Plymouth marble 1
Rutland dolomite 1
Sherburne conglomerate 1
United States—Continued
Virginia—Continued

Eocene, lower and middle
Pamunkey group 1
Woodstock greensand marl member (of Nanjemoy formation) 1

Eocene, lower
Aquia formation 1 or greensand
Pasquotanka greensand marl member (of Aquia formation) 1

Lower Cretaceous
†Aquia Creek series 1
†Brooke formation 1
†Fredericksburg sandstone 1
†James River series 1
†Mount Vernon series 1
†Rappahannock series 1

Upper Triassic
†Border conglomerate 1
Boscobel boulder beds 1
Bull Run shales 1
Chesterfield group 1
Otterdale sandstones 1
Tuckahoe group 1
Vinita beds 1

Paleozoic(f)
Arch marble 2
Archer Creek formation 2
Candler formation 3
Evington group 2
Joshua schist 2
Max Meadows fault breccia 2
Mount Athos formation 1
Pelier schist 2
Slippery Creek greenstone 2

Upper Paleozoic
Petersburg granite 1

Pennsylvanian
Dismal conglomerate lentil (in Dismal formation) 1
Dismal formation 1
Panther conglomerate 1
†Pocahontas group 1
Pocahontas sandstone 1

Middle Pennsylvanian
Addington sandstone member (of Wise formation) 1
Gladeville sandstone 1
McClellan sandstone member (of Norton formation) 1
Norton formation 1
Wise formation 1

Lower and Middle Pennsylvanian
Lee formation 1 or group

Lower Pennsylvanian
Bald Rock conglomerate member (of Lee formation) 1
Pocahontas formation 1
Sequoyah formation 1
Telfair formation 1

Mississippian
Bent limestone (in Bluestone formation) 1
Broad Ford sandstone (in Pocono sandstone) 1

United States—Continued
Virginia—Continued
Mississippian—Continued
Cloyd conglomerate member (of Price formation) 2
Falls Mills limestone member (of Price formation) 2
Falls Mills limestone (in Hinton formation) 1
Falls Mills sandstone (in Hinton formation) 1
Falls Mills shale (in Hinton formation) 1
Graham limestone (in Bluefield formation) 1
Graham sandstone (in Bluefield formation) 1
Graham shale (in Bluefield formation) 1
†Montgomery buhr, grits, or sandstone 1
Mud sandstone (in Bluestone formation) 1
Mud shale (in Bluestone formation) 1
†Pulaski shale 1

Upper Mississippian
Bluestone formation 1
†Cove Creek limestone 1
†Fido sandstone 1
Hinton formation 1
Little Valley limestone 2
Maccrady shale 1
Pennington shale, 1 formation, or group

Lower Mississippian
Price sandstone 1, formation, or siltstone

Upper Devonian and Lower Mississippian

Big Stone Gap shale 1

Upper Devonian
Hilton shale member (of Portage formation) 1
Jennings formation 1
Kimberling shale 1
Walker shale 1

Middle and Upper Devonian
Millboro shale 2

Lower Devonian
Clifton Forge sandstone member (of Keysor limestone) 1
Craigsville limestone 1

Healing Springs sandstone member (of New Scotland limestone) 1
Longdale limestone 1
†Monterey sandstone 1
Rocky Gap sandstone 1
Saltville chert 1

Silurian or younger
Bremo quartzite 2

Silurian and Lower Devonian
Giles formation 1

Silurian
Crabbottom sandstone (in Wills Creek formation) 2
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Upper and Middle(? ) Devonian and Mississippian

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Ledbetter slate
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Pre-Ordovician(?)
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Barboursville silts

Pliocene
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Barboursville silts

Pliocene
Shepherdstown gravel
Permian

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<td>Welch formation</td>
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<td>Avis limestone</td>
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<tr>
<td>Avis sandstone</td>
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Denzer tuff 1

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<td>Merrimac rhyolite</td>
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<td>Oronto group</td>
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Pence ferruginous slate member of Ironwood-iron formation

*Penokee series

Pine River granite

Plymouth ferruginous chert member of Ironwood-iron formation

†Portland quartzite

†Powers Bluff quartzite

†Rib Hill quartzite

†Rowley Creek slate

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†St. Cloud granite

†Seneca quartz porphyry

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†Wausau granite

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†Baxter Hollow granite

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†Hot Springs formation

†Quaternary

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Recent

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Lightning formation

†Recent

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†Pliocene, lower

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†Miocene and (or) Pliocene

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Crescent Hill basalt

Elk Creek basalt

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<td>Kaskapau member (of Smoky River formation)</td>
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<td>Lineham member (of Cardium formation)</td>
<td>Paskapoo formation</td>
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<td>St. John formation</td>
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<td>Saunders group</td>
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<tr>
<td>Viking sand or sandstone (subsurface)</td>
<td>Belly River formation</td>
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<td>Dods Creek sandstone (in Dunvegan formation)</td>
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<td>Howard Creek sand (in Kaskapau formation)</td>
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<td>Oldman formation</td>
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<td>Medicine Lodge member (of Bearpaw formation)</td>
<td>Pakan formation</td>
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<td>Pakowki formation</td>
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<td>Mulga tongue (subsurface)</td>
<td>Pelican shale or sandstone</td>
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<td>Myrtle Creek formation</td>
<td>Pouce Coupe sandstone (in Smoky River shale)</td>
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<td>Oldman formation</td>
<td>Ryegrass sandstone (in Bearpaw shale)</td>
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<tr>
<td>Pakan formation</td>
<td>St. Mary River formation</td>
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<tr>
<td>Pakowki formation</td>
<td>Sawridge formation</td>
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<td>Pelican shale or sandstone</td>
<td>Shandro shale</td>
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<td>Pouce Coupe sandstone (in Smoky River shale)</td>
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<td>Ryegrass sandstone (in Bearpaw shale)</td>
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<td>St. Mary River formation</td>
<td>Vanesti tongue</td>
</tr>
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<td>Sawridge formation</td>
<td>Verdigris sandstone</td>
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<td>Shandro shale</td>
<td>Victoria sandstone</td>
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<td>Solomon sandstone member (of Brazeau formation)</td>
<td>Wapiabi shale</td>
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<td>Tar sands</td>
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<td>Vanesti tongue</td>
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<td>Lower and Upper Cretaceous</td>
<td>Borradaile member (of Mannville formation) (subsurface)</td>
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<td>Blairmore formation</td>
<td>Bull Head Mountain sandstone</td>
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<tr>
<td>Lower Cretaceous</td>
<td>Cadomin conglomerate</td>
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<td>Cummings member (of Mannville formation) (subsurface)</td>
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<td>Bull Head Mountain sandstone</td>
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<tr>
<td>Cadomin conglomerate</td>
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<td>Father member (of Spray River formation) (subsurface)</td>
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<td>Grand Rapids sandstone</td>
<td>Looma member (of Grand Rapids formation) (subsurface)</td>
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<td>Looma member (of Grand Rapids formation) (subsurface)</td>
<td>Mannville formation (subsurface)</td>
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### Canada—Continued

#### Alberta—Continued

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<th>Formation/Member</th>
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<td>Moose Mountain member (of Kootenay formation)</td>
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<td>Mountain Park formation</td>
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<td>Nikanassin formation</td>
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<td>Notikewin member (of Spirit River formation)</td>
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<td>Paddy member (of Peace River formation)</td>
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<td>Pocaterra Creek member (of Blairmore formation)</td>
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<td>St. Paul member (of Grand Rapids formation)</td>
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<td>Wabiskaw member (of Clearwater Formation)</td>
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#### Jurassic

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<tr>
<td>Conrad sandstone member (of Sawtooth formation)</td>
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<td>Crow Indian Lake member (of Sawtooth formation)</td>
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<tr>
<td>Lille member (of Fernie formation)</td>
<td>2</td>
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<tr>
<td>Nordegg member (of Fernie formation)</td>
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#### Triassic

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<td>Sprayan series</td>
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#### Lower Triassic

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<td>Sulphur Mountain member (of Spray River formation)</td>
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#### Permian (see Pennsylvanian to Permian)

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<tbody>
<tr>
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#### Carboniferous

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<tr>
<td>Banner silt (in Turner Valley member of Livingstone formation)</td>
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<td>Baril member (of Mount Head formation)</td>
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<td>Carnarvon member (of Mount Head formation)</td>
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### Canada—Continued

#### Alberta—Continued

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<td>Conings member (of Mount Head formation)</td>
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<td>Etherington member (of Rocky Mountain formation)</td>
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<td></td>
<td>Greenock formation</td>
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<td></td>
<td>Livingstone formation</td>
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<td></td>
<td>Marston member (of Mount Head formation)</td>
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<td>Mount Head formation</td>
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<td>Pekisko member (of Livingstone formation)</td>
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<td></td>
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<td>Wileman member (of Mount Head formation)</td>
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#### Carboniferous and Devonian

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#### Pennsylvanian to Permian

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#### Mississippian and Pennsylvanian

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#### Mississippian

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<td>Debolt formation</td>
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<tr>
<td>Dyson Creek member (of Rundle formation)</td>
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<td>Loomis member (of Mount Head formation)</td>
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<td>Moosehorn limestone</td>
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<td>Shunda member (of Rundle formation)</td>
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<tr>
<td>Turner Valley member (of Tunnel Mountain formation)</td>
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#### Devonian and Carboniferous

<table>
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#### Devonian

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<td>Beaverhill Lake formation</td>
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<td>Blue Ridge member (of Graminia formation)</td>
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<td>Cooking Lake member (of Woodbend formation)</td>
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<td>Duvernay member (of Woodbend formation)</td>
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<td>Fairholme formation</td>
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<td>Leduc member (of Woodbend formation)</td>
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</table>
Canada—Continued
Alberta—Continued

Devonian—Continued
Miette member (of Minnewanka formation) 2
Minnewanka formation 1
Mount Wilson quartzite 1
Muskeg formation 2 (subsurface)
Nisku member (of Winterburn formation) 2 (subsurface)
Palliser formation 1
Roche Miette limestone 1
Southesk formation 2
Wabamun formation 2 (subsurface)
Watt Mountain formation 2 (subsurface)
Winterburn formation 2 (subsurface)
Woodbend formation 2 (subsurface)

Devonian (?)
Ghost River formation 1

Upper Devonian
Alexo formation 2
Banffian series 1
Big Valley member (of Wabamun formation) 2 (subsurface)
Boule limestone 1
Cinquefoil limestone 1
Coronach shale 1
Costigan member (of Palliser formation) 2
Delburne formation 2
Delea member (of Woodbend group) 2
Donald formation 2
Exshaw shale 2
Fenn formation 2
Fiddle limestone 1
Grosmont member (of Woodbend formation) 2 (subsurface)
Hondo member (of Woodbend formation) 2 (subsurface)
Kiln shale 1
Leahurst formation 2
Morro member (of Palliser formation) 2
Mount Hawk formation 1
Perdrix shale 1
Spence River shale 2 (subsurface)
Stettler member (of Wabamun formation) 2 (subsurface)
Territories formation 2 (subsurface)
Waterways formation 2

Middle Devonian
Fort Vermilion member (of Slave Point formation) 2
Flume dolomite 1
Steen River formation 1 (subsurface)

Silurian
Elk Point formation 1 (subsurface)

Canada—Continued
Alberta—Continued

Ordovician
Sarceen series 1
Skoki formation 1

Lower Ordovician
Mons formation 1
Sarbach formation 1

Cambrian and Lower Ordovician (?)
Sawback formation 1

Cambrian
Barker shale 1
Bosche formation 1
Chetang limestone 1
Mahto sandstones 1
Sullivanian series 1
Tatay formation 1 (see also Tatay limestone 1)
Thompson dolomite 1
Titkana limestone 1

Upper Cambrian
Arctomys formation 1
Bosworthian series 1
Chetamon limestone 1
Lyell formation 1
Pika formation 2
Sawbackian series 1
Sharing formation 1
Sullivanian formation 1
Tangle Ridge formation 2

Middle Cambrian
Eldon limestone 1
Eldonian series 1
Murchison formation 1
Naiset formation 2
Ptarmigan limestone 1
Sunwapta Peak formation 2

Lower Cambrian
Cavell formation 1
Fairview formation 1
Gog formation 1
Lake Louise shale 1
Louise formation 1
Mount Whyte formation 1
Piran series 1
St. Piran sandstone 1
Whyte formation 1

Precambrian and (?) Lower Cambrian
Jonas Creek formation 2

Precambrian
Albertian series 1
Athabasca sandstone 1
Blackfoot Canyon facies (of Belt series) 2
Cartewh member (of Altyin formation) 2
Corral formation 1
Corral Creek formation 1
Cour d’Alene facies (of Belt series) 2
Glacier Park facies (of Belt series) 2
Goat River horizon of McBride group 1
Hector formation 1
### Geologic Names of North America

#### Canada—Continued

#### Alberta—Continued

**Precambrian—Continued**

- Hell Roaring member (of Altyn formation) 2
- Jasper series 1
- McBride group 2
- Meagher facies (of Belt series) 2
- Miette formation 1
- Mount Rowe member (of Miller Peak formation) 2
- Tete Jaune horizon (of McBride group) 2
- Waterton dolomite 1 *(see also Watertown formation)*

#### British Columbia

**Quaternary**

- Cordilleran formation 1
- Hoodoo lavas 2
- Iskut River lava 2
- Stikine lavas 2

**Recent**

- Alouette gravel 3
- Capilano group 3
- Salish group 3
- Tseax River lava flow 1

**Pleistocene to Recent**

- Bose gravel 2
- Cloverdale sediments 2
- Sunnyside sand 2

**Post-Pleistocene (?)**

- Bellabella formation 1

**Pleistocene**

- Abbotsford gravel 2
- Colebrook gravel 2
- Colwood sands and gravels 1
- Cordova sands and gravels 1
- Garibaldi volcanic formation 1
- Lynn outwash 2
- Marysville sands 1
- Maywood clay 1
- Newton stony clay 2
- Nicomeki silt *(see also Nikomeki sand and silt)*
- Point Grey formation 1
- Quadra group 2
- Saanich formation 1
- St. Eugene silts 1
- Sapperton sediments 2
- Semiambu group 2
- Semiambu till 2
- Seymour group 2
- Seymour till 1
- Sisters varved clay 2
- Surrey till 2
- Thompson River silts 1
- Wreck Bay formation 1
- Wytheville glacial epoch and drift 1

**Tertiary (see also Mesozoic or Tertiary; and Cretaceous or Tertiary)**

- Boundary Bay formation 1
- Coquihalla series 1
- Etheline volcanics 1
- Kitsilano formation 1

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#### Canada—Continued

#### British Columbia—Continued

**Tertiary—Continued**

- Kruger alkaline body 1
- Mann Creek formation 1
- Masset volcanics 1
- Park granite 1
- Rapid formation 2
- Rexmont porphyry 1
- Rossland alkali granite 1
- Sheppard granite 1
- Similkameen beds 1
- Skonun formation 1
- Sophie Mountain conglomerate 1
- Spence Bridge series 1
- Sunloch metagabbro 1
- Tranquille beds 1
- Tuya lavas 1
- Valhalla granite 1
- White Lake formation 1

**Tertiary (?)**

- Similkameen granite 1

**Miocene (see also Oligocene or Miocene)**

- Carmanah Point beds 1
- Nipple Mountain series 3
- Otter granite 1
- Skull Hill formation 1

**Miocene (?)**

- Chilliwack granodiorite 1
- Lightning Creek diorite 1
- Salmon River monzonite 1
- Slesse diorite 1

**Oligocene and (or) Miocene**

- Sooke formation 1

**Oligocene or Miocene**

- Kamloops volcanic group 1
- Midway volcanic group 1

**Oligocene**

- Allenby formation 2
- Cedar volcanic series 1
- Coldwater group 1
- Curry Creek series 1
- Escalante formation 2
- Franklin monzonite 1
- Sooke gabbro group or intrusives 1

**Oligocene (?)**

- Ashcroft rhyolite porphyry 1
- French Bar formation 1
- Kettle River formation 1
- Taseko formation 1

**Oligocene or younger**

- Endako group 2

**Eocene or Oligocene**

- Princeton group 3

**Post-Eocene**

- Prospect Point eruptives 1

**Eocene**

- Burrard formation 1
- Chu Chua formation 1
- Huntingdon formation 1
- Marron formation 2
- Metehosin volcanics 1
- Springbrook formation 2
Canada—Continued
British Columbia—Continued

| Eocene(f) | Beaverdell quartz monzonite 1 | Kishenehn formation 1 | Rexmouth volcanics 1 |
| Mesozoic or Tertiary | Australian members (of Fraser River formation) 2 |
| Eocene or older | Beavermount volcanics 2 |

| Mesozoic | Beaver Mountain group 1 |
| Lower Mesozoic | Rossland monzonite 1 |
| Lower Mesozoic(f) and older(?) | Phoenix volcanic group 1 |
| Lower Mesozoic and Carboniferous(?) | Wallace group 3 |
| Lower Cretaceous | Shonektaw formation 2 |
| Cretaceous or Tertiary | Bulkley eruptives 1 |
| Cretaceous or Tertiary | Skagit volcanic formation 1 |
| Cretaceous or Tertiary | Skoko group 2 |
| Cretaceous or Tertiary | Whitemans Creek granite 2 |

| Cretaceous (see also Jurassic or Cretaceous) | Cedar District formation 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Comox formation 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Eagle diorite 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Eldorado series 1 or granodiorite 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Fraser River formation 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Ganges formation 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Gates formation 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Getting member 1 (of Bullhead Mountain formation) |
| Cretaceous (see also Jurassic or Cretaceous) | Haida member (of Queen Charlotte series) 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Honna formation 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Komooks beds 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Moosear formation 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Quesnal River beds 1 |
| Cretaceous (see also Jurassic or Cretaceous) | Skidegate formation 1 |
| Cretaceous(?) | Baker gabbro 1 |
| Cretaceous(?) | Beady formation 1 |
| Cretaceous(?) | Bitter Creek peridotite 1 |
| Cretaceous(?) | Duncan formation 1 |
| Cretaceous(?) | Fife gabbro 1 |
| Cretaceous(?) | Quesnal River series 1 |
| Cretaceous(?) | Silver King porphyry 2 |
| Cretaceous(?) | Tamihy series 1 |

<p>| Upper Cretaceous or Tertiary | Sheba group 2 |
| Upper Cretaceous | Benson formation 1 |
| Upper Cretaceous | Cowichan group 1 |
| Upper Cretaceous | Cranberry formation 1 |
| Upper Cretaceous | De Courcy formation 1 |
| Upper Cretaceous | Deman formation 3 |
| Upper Cretaceous | Departure Bay calcarenites 1 |
| Upper Cretaceous | East Wellington formation 1 |
| Upper Cretaceous | Extension formation 1 |
| Upper Cretaceous | Fort Nelson formation 2 |
| Upper Cretaceous | Gabriola formation 1 |
| Upper Cretaceous | Geoffrey formation 2 |
| Upper Cretaceous | Haslam formation 1 |</p>
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<td>Clifton formation</td>
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<td>Grande Anse formation</td>
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Canada—Continued
New Brunswick—Continued

**Pennsylvanian—Continued**

- Hurley Creek formation
- MacDonald Glen formation
- Minto formation
- Newcastle Creek formation
- Petitcodiac series
- Richibucto formation
- Salisbury formation
- Scoudouc formation
- Shepody formation
- Sunbury Creek formation
- Tormentine formation

**Pennsylvanian or older**

- Hardwood Ridge flow

**Mississippian and (or) Pennsylvanian**

- Balls Lake formation
- Maringouin formation
- West Beach formation

**Mississippian**

- Albert formation
- Demoiselle formation
- Gautreau formation
- Memramcook formation
- Moncton group
- Upham formation
- Weldon formation

**Devonian or Carboniferous**

- Bloomsbury formation
- Lancaster formation

**Devonian (see also Silurian or Devonian; and Ordovician to Devonian)**

- Barberie andesite
- Bon Ami andesite
- Campbellton formation
- Inch Arran latites
- Maple Green andesite
- Mispec group
- Restigouche volcanic series
- Saint George granite or plutonics
- Sugar Loaf dacites

**Devonian(t)**

- Nipisiguit granite

**Middle Devonian(t)**

- Lepreau diorite
- Musquash granite

**Lower Devonian**

- Dalhousie shales

**Silurian to Mississippian**

- Coal Creek formation

**Silurian or Devonian**

- Little River group
- Mascarene series

**Silurian**

- Belledune group
- Dalhousie limestones
- Elmtree slates
- Oak Bay formation
- Turgeon formation

Canada—Continued
New Brunswick—Continued

**Upper Silurian**

- Jones Creek formation
- Long Reach formation

**Post-Ordovician**

- Austin Brook quartz porphyry

**Ordovician to Devonian**

- Fournier group

**Ordovician**

- Beccaguimic formation
- Millstream series
- Tetagouche series

**Ordovician(t)**

- Charlotte group

**Lower Ordovician**

- Navy Island formation
- Suspension Bridge formation

**Cambrian (see also Precambrian or Cambrian)**

- Narrows formation

**Upper Cambrian**

- Agnostus Cove formation
- Black Shale Brook formation

**Middle Cambrian**

- Fossil Brook formation
- Loch Lomond series
- Porter Road formation
- St. Jean group
- St. John group
- St. Johns shales

**Lower Cambrian**

- Etcheminian series or group
- Glenn Falls formation
- Hanford formation
- Hanford Brook formation
- Hanfordian series
- Ratcliffe Brook formation

**Precambrian or Cambrian**

- Coldbrook group

**Precambrian**

- Coastal group
- Green Head formation
- Kingston group
- Portland group
- Robin Hood formation
- Saint John volcanics
- Saint Martins intrusives and extrusives

**Age(t)**

- Gauvin andesite

Newfoundland (proper)

**Carboniferous**

- Humber grit series

**Upper Carboniferous**

- Barachois series

**Mississippian**

- Anguille series
- Aquathuna limestone
- Black Point formation or limestone
- Boswarlis beds
- Cape Anguille sandstone
- Cape Rouge series
### INDEX TO THE GEOLOGIC NAMES OF NORTH AMERICA

#### Canada—Continued

**Newfoundland (proper)—Continued**

**Mississippian**—Continued

- Codroy breccia
- Codroy series
- Codroy shale
- Cormorant limestone
- Crabb’s limestone
- Deer Lake (group)
- Fishels conglomerate
- Fishels limestone
- Heatherton limestone
- Highlands sandstone
- Humber Falls formation
- Jeffreys limestone
- Rocky Brook formation
- Seacllifs sandstone
- Seaston beds
- Ships Cove limestone
- Snakes Bight shale
- Spear Point formation
- Woody Cove shale
- Woody Head beds
- Woody Point sandstone

**Devonian or Mississippian**

- Rencontre formation

**Devonian**

- Baggs Hill granite
- Burlington granite
- Cape Brule granite
- Chetwynd granite
- Dolman gneiss
- Dunamagon granite
- La Poile group
- Roti granite

**Devonian**

- Colchester granodiorite-quartz diorite
- Dollond Arm Head quartz diorite
- Grand Beach rhyolite-porphry
- Mansfield Head granodiorite
- North Bay granite
- Northern Bight granite
- Powder Horn diorite
- South Brook biotite-quartz-monzonite

**Lower or Middle Devonian**

- Bay du Nord group

**Lower Devonian**

- Clam Bank series

**Pre-Devonian**

- Keepings gneiss
- Victoria River series

**Post-Silurian**

- Ackley granite

**Silurian**

- Botwood formation
- Grand Lake series
- Goldson formation
- Herring Head conglomerate
- Indian Island group
- Natlins Cove formation
- Notre Dame series

**Silurian**

- Pike Arm formation
- Pikes Island conglomerate
- Sops Island member (of Natlins Cove formation)

**Silurian (?)**

- Baie d’Esper series
- Springdale formation

**Upper Silurian or younger**

- Garrison Hills granite

**Post-Ordovician**

- North Brook granite
- Twillingate granite

**Ordovician** (see also Cambrian and Ordovician)

- Andersons Cove slates
- Baie Verte formation
- Bide Arm formation
- Breakheart basalt
- Cape St. John group
- Cutwell group
- Deadmans Cove member (of Giles Cove formation)
- Englee formation
- Exploits series
- Fortune tuffs and cherts
- Foulke Cove slate and shale
- Giles Cove formation
- Goose Tickle slate
- Gravel Head formation
- Hornet conglomerate
- Ireland Point volcanics (in Maiden Point sandstone)
- Jacksons Arm conglomerate member (of Giles Cove formation)
- Lawrence Harbour shale
- Luke Arm formation
- Maiden Point sandstone
- Mortons volcanics
- Nippers Harbour group
- Northwest Arm formation
- Parsons Pond beds
- Round Head breccia
- St. Pauls group
- Sanson graywacke and quartz
- Simms Ridge shale
- Sivier formation
- Snooks Arm series
- Taylors Pond shale member (of Giles Cove formation)

**Ordovician (?)**

- Belle Bay volcanics
- Brent Island limestone
- Burin series
- Farewell group
- Fogo group
- Goose Cove schist
- Goss Pond volcanics
- Little Lawn formation
- Long Harbor series
- Lushs Bight group
- Mings Bight formation
Canada—Continued
Newfoundland (proper)—Continued

**Ordovician**—Continued

- Mooring Cove volcanics
- Mount Margaret volcanics
- Pilpys series
- Red Cliff volcanics
- Wellmans Cove diorite

**Upper Ordovician or Devonian**
- Blow-me-down complex

**Middle and Upper Ordovician**

- Canada Head formation
- Humber Arm series

**Post-Middle Ordovician**

- Bay of Islands complex
- Bluff Head volcanics
- Mount Barren metamorphic complex

**Middle Ordovician**

- Cooks limestone tongue (of Humber Arm series)
- Cow Head limestone breccia
- Hare Island limestone
- Long Point series
- Portland Head group
- Table Head series

**Middle Ordovician (?)**

- Badger Bay series
- Beaver Bight formation
- Burtons Head group
- Crescent Lake formation
- Gull Island formation
- Julies Harbour group
- Roberts Arm volcanics
- Shoal Arm formation
- Wild Bight volcanics

**Lower Ordovician**

- Apsey formation
- Beach formation
- Bell Island series
- Brown Mead formation
- Chimney Arm formation
- Clarenville series
- Dominion ore bed
- Eastern Head formation
- Green Point series
- Kelly Island formation
- Lance Cove formation
- Little Bay Head lavas
- Little Bell Island formation
- McGraw bed
- Maidment formation
- Redmond formation
- Riders Brook formation
- St. George series
- Scotia ore bed
- Southern Arm limestone
- Wabana series
- Western Arm basalts or group
- Western Brook Pond group

**Cambrian or Ordovician**

- Buchans series
- Waban formation

Canada—Continued
Newfoundland (proper)—Continued

**Cambrian** (see also Precambrian and Cambrian)

- Beaver Brook shale
- Belle Isle shale
- Chamberlins Brook formation
- Doucers marble and limestone
- Grand Lake Brook series
- Kippens formation
- Long Pond formation
- Newfoundland formation
- Random Sound series
- St. Johns slate

**Upper Cambrian**

- East Arm formation
- Elliot Cove formation
- March Point formation

**Middle Cambrian**

- Cloud Rapids formation
- Killigrews Brook formation
  (see also Killigrews Brook formation)
- Manuels formation
- Petit Jardin formation
- Trefton Pond formation

**Middle (f) Cambrian**

- Sound Island formation

**Lower and Middle Cambrian**

- Fortune Brook formation

**Lower Cambrian**

- Bonavista formation
- Brigu's formation
- Devils Cove formation
- Doten Cove formation
- Goose Cove formation
- Hawke Bay formation
- Placentia (terrane)
- Pools Cove formation
- Smith Point formation
- Terra Nova (series)

**Lower Cambrian and Precambrian (f)**

- Dantzic group

**Precambrian and later**

- Terranovan (series)

**Precambrian and Cambrian**

- Bay d'Est formation
- Bull Arm felsite member (of Musgravetown group)
- Cloud Mountain series
- Salt Water Fund series
- Spoon Cove formation
- Spyglass Cove formation
- Tilt Point formation

**Precambrian**

- Avalon group
- Avalonian formation
- Avondale volcanics
- Barrys zone (in Headland gneiss)
- Birchy schist
- Blackhead formation
- Cabot group
Canada—Continued

Newfoundland (proper)—Continued

Precambrian—Continued

Caplin Cove member (of Logy formation) 2
Capta zone (in Headland gneiss) 2
Carbonate formation 2
Cloud River granite 2
Conception slate 1
Connecting Point group 2
Fleur de Lys group 2
Fresh Pond granodiorite 2
Grand Bank series 1
Great Harbour Deep granite 2
Halls Town formation 2
Harbour Main volcanics 2
Headland gneiss 2
Hibbs Hole formation 2
Highlands formation 2
Hodgewater group 2
Lanse a Loup series 1
Lince-a-Jardin member (of Logy formation) 2
Logy formation 2
Lue Point member (of Logy formation) 2
Mamable slates 1
Pardee gneiss 2
Partridge granite 2
Pigeon gneiss 2
Random formation 1
St. Lawrence granite 2
Signal Hill formation 1
Shoalrooks gneiss 2
Snows Pond formation 2
Starboard gneiss 2
Torbay slate 1
Whiteway formation 2
Woody Cove member (of Logy formation) 2
Ygol member (of Logy formation) 2

Precambrian(f)

Musgravetown group 2
Rattling Brook group 2

Age(f)

Humber limestone 1
Newfoundland coal formation 1
North Arm complex 2
Port au Port shale and gritstone 1
Trinity Bay sandstone 1
White Bay group 2

Newfoundland (Labrador)

Quaternary

Labrador formation 1

Paleozoic

Double Mer sandstone 1

Cambrian

L’Anse au Loup limestones 1
Lower Cambrian

Bradore formation 1
Forteuau formation 1
Labrador series 2

Precambrian

Aillik formation 2
Domino gneiss 1

Canada—Continued

Newfoundland (Labrador)—Con.

Precambrian—Continued

Duley Lake group 1
Ferriman series 2
Hamilton series 2
Harp Lake anorthosite 2
Holyrood granite 2
Hopedale gneiss 2
Kaipokok gneiss 2
Kaniapiskau series 2
Kuamajet volcanic series 2
Makkovik granite 2
Mealy Mountains anorthosite 2
Mountignais formation 2
Mugford series 1
Nain anorthosite 2
Point series 2
Ramah series 1
Red Wine anorthosite 2
Sandgirt Lake formation 1
Sims group 2
Strawberry granite 2
Wapussakatoe group 1
Zebra slate 4

Northwest Territories (Franklin)

Cretaceous or Cenozoic

Eureka Sound group 2

Cretaceous or Tertiary(?)

Intrepid Bay formation 2
Lower Cretaceous or younger

Christopher formation 2
Hassel formation 2
Isachsen formation 2

Lower Cretaceous

Deer Bay formation 2
Lower Jurassic(?)

Cape With formation 2

Middle to Upper Triassic

Blaa Mountain formation 2

Paleozoic (see Precambrian or Paleozoic)

Upper Paleozoic or Mesozoic

Disappointment Bay formation 2

Permian

Greely Fjord group 2
Permian or older

Sail Harbor group 2
View Creek group 2
Carboniferous or Permian

Pfeilden group 2
Guide Hill group 2

Middle Pennsylvanian

Canyon Fjord formation 2

Devonian

Dana Bay beds 2
Snowblind Bay formation 2

Silurian and Ordovician(?)

Allen Bay formation 2

Ordovician and Silurian

Read Bay formation 2

Ordovician

Cape Baird limestone 2
Putnam Highland formation 2
Thorup Fjord limestone 2
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<tbody>
<tr>
<td>Northwest Territories (Franklin)—Continued</td>
</tr>
<tr>
<td><strong>Upper Ordovician</strong></td>
</tr>
<tr>
<td>Cornwallis formation ⁰</td>
</tr>
<tr>
<td>Silliman Mount formation ¹</td>
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<tr>
<td><strong>Middle or Upper Ordovician</strong></td>
</tr>
<tr>
<td>Croker Bay limestone ²</td>
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<tr>
<td><strong>Lower Ordovician</strong></td>
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<tr>
<td>Mingo River formation ²</td>
</tr>
<tr>
<td>Nadlo Point limestone ³</td>
</tr>
<tr>
<td><strong>Middle Cambrian</strong></td>
</tr>
<tr>
<td>Bear Point limestone ²</td>
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<tr>
<td>Ooyahgah formation ²</td>
</tr>
<tr>
<td><strong>Lower Cambrian</strong></td>
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<tr>
<td>Police Post limestone ³</td>
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<tr>
<td>Rabbit Point sandstone ⁸</td>
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<tr>
<td><strong>Precambrian or Paleozoic</strong></td>
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<tr>
<td>Cape Columbia group ²</td>
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<tr>
<td>Mount Disraeli group ²</td>
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<th>Northwest Territories (Keewatin)</th>
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<tr>
<td><strong>Precambrian</strong></td>
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<tr>
<td>Belcher series ¹</td>
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<tr>
<td>Belcher Island series ²</td>
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<tr>
<td>Dubawnt group ³</td>
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<tr>
<td>Hurwitz group ³</td>
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<tr>
<td>Keepalloo iron formation ¹</td>
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<tr>
<td>Marble Island quartzite ³</td>
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<tr>
<td>Tookcarak diabase ¹</td>
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<tr>
<td><strong>Cretaceous</strong></td>
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<tr>
<td>Meander shales ¹</td>
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<tr>
<td>Mountain shales ¹</td>
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<tr>
<td>Rabbitskin sandstone ¹</td>
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<tr>
<td><strong>Upper Cretaceous</strong></td>
</tr>
<tr>
<td>East Fork formation or series ²</td>
</tr>
<tr>
<td>Little Bear formation ³</td>
</tr>
<tr>
<td>Slater River formation ³</td>
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<tr>
<td><strong>Lower Cretaceous</strong></td>
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<tr>
<td>San Sault group ²</td>
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<tr>
<td><strong>Devonian</strong></td>
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<tr>
<td>Beavertail limestone ¹</td>
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<tr>
<td>Bosworth sandstone and shale ¹</td>
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<tr>
<td>Camp Creek series ¹</td>
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<tr>
<td>Carcajou Mountain beds ¹</td>
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<tr>
<td>Fort Creek shale ¹</td>
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<tr>
<td>Hare Indian River shale ¹</td>
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<tr>
<td>Hare River shales ¹</td>
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<tr>
<td>Horn River shales ¹</td>
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<tr>
<td>Mount Charles formation ¹</td>
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<tr>
<td>Pine Point limestone ¹</td>
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<tr>
<td>Presqu’ile dolomite ¹</td>
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<tr>
<td>Rampart limestone ¹</td>
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<tr>
<td>Simpson shale ¹</td>
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<tr>
<td>Slave Point limestone ¹</td>
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<tr>
<td><strong>Upper Devonian</strong></td>
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<tr>
<td>Alexandra formation ²</td>
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<tr>
<td>Canyon sandstone (in Fort Creek formation) ²</td>
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<tr>
<td>Carcajou series ²</td>
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<tr>
<td>Grumbler formation ²</td>
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<td>Hay River series ²</td>
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<tr>
<td>Imperial formation ²</td>
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<tr>
<td>Jungle Ridge limestone member (of Fort Creek formation) ²</td>
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<th>Canada—Continued</th>
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<td>Northwest Territories (Mackenzie)—Continued</td>
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<tr>
<td><strong>Upper Devonian</strong>—Continued</td>
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<tr>
<td>Kee Scarp limestone member (of Fort Creek formation) ²</td>
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<tr>
<td>Trout River formation ²</td>
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<tr>
<td><strong>Middle Devonian</strong></td>
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<tr>
<td>Amoo horizon (of Slave Point formation) ²</td>
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<tr>
<td><strong>Silurian or Devonian</strong></td>
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<tr>
<td>Bear Rock formation ²</td>
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<tr>
<td><strong>Silurian</strong></td>
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<tr>
<td>Bear Mountain formation ¹</td>
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<tr>
<td>Franklin Mountain formation ¹</td>
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<tr>
<td>Fitzgerald limestones ¹</td>
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<tr>
<td>Lone Mountain dolomite ¹</td>
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<tr>
<td>Mount Kindle formation ¹</td>
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<tr>
<td>North Nahanna River dolomite ¹</td>
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<tr>
<td>Ronning group ²</td>
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<tr>
<td><strong>Ordovician</strong></td>
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<tr>
<td>Sunblood formation ³</td>
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<tr>
<td><strong>Cambrian</strong></td>
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<tr>
<td>Macdougal group ²</td>
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<td>Saline River formation ¹</td>
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<tr>
<td><strong>Middle Cambrian</strong></td>
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<tr>
<td>Mount Cap formation ¹</td>
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<tr>
<td><strong>Cambrian and (or) older</strong></td>
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<tr>
<td>Katherin group ²</td>
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<tr>
<td><strong>Precambrian</strong></td>
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<tr>
<td>Akaiteho flow (in Yellowknife group) ²</td>
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<tr>
<td>Baker Creek member (in Yellowknife group) ²</td>
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<tr>
<td>Bode conglomerate ²</td>
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<tr>
<td>Bow Lake flow (in Yellowknife group) ²</td>
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<tr>
<td>Broek group ²</td>
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<tr>
<td>Cameron Bay series ¹</td>
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<td>Charlton group ¹</td>
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<td>Coppermine River series ¹</td>
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<td>Drill Camp flow (in Yellowknife group) ²</td>
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<td>Echo Bay series ¹</td>
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<td>Epworth dolomite ¹</td>
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<tr>
<td>Et-Then series ²</td>
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<td>Fox flows ²</td>
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<td>Goulburn quartzite ¹</td>
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<td>Great Slave group ¹</td>
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<td>Hornby Bay series ²</td>
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<td>Kahochella formation ³</td>
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<td>Kanuyak formation ¹</td>
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<td>Lindsley Bay granite porphyry ¹</td>
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<td>Lone Land formation ¹</td>
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<td>Marian group ²</td>
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<td>Millsite flow (in Yellowknife group) ²</td>
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<td>Nob Hill flow (in Yellowknife group) ²</td>
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<td>Nonacho series ²</td>
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<td>Pearson formation ²</td>
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<tr>
<td>Pekanatui series ¹</td>
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<td>Pethei formation ²</td>
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Canada—Continued
Northwest Territories (Mackenzie)—Continued

**Precambrian**—Continued
Point Lake phase (of Point Lake-Wilson Island group) 2
Point Lake-Wilson Island group 2
Powder House flow (in Yellowknife group) 2
Preble formation 2
Prosperous Lake granite 2
River Lake granite 2
Runa Lake granodiorite 2
Snare group 2
Snowdrift series 1
Sosan formation 2
Staff House flow (in Yellowknife group) 2
Stalk group 1
Stark formation 2
Stock flow 2
Tazin series 1
Tshierpi granite 2
Tochatwi group 1
Townsite flows 2
Union Island group 2
Wilson Island phase (of Point Lake-Wilson Island group) 2
Yellorex flow 2
Yellowknife group 2

**Age(f)**

**Carboniferous** (see also Devonian or Carboniferous)
Canary lime 1
Canad a Continued
Northwest Territories (Mackenzie)—Continued

Precambrian—Continued
Point Lake phase (of Point Lake-Wilson Island group) 2
Point Lake-Wilson Island group 2
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Tochatwi group 1
Townsite flows 2
Union Island group 2
Wilson Island phase (of Point Lake-Wilson Island group) 2
Yellorex flow 2
Yellowknife group 2

**Age(f)**

**Carboniferous** (see also Devonian or Carboniferous)
Canary lime 1
Canad a Continued
Northwest Territories (Mackenzie)—Continued

Precambrian—Continued
Point Lake phase (of Point Lake-Wilson Island group) 2
Point Lake-Wilson Island group 2
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Preble formation 2
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River Lake granite 2
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Snare group 2
Snowdrift series 1
Sosan formation 2
Staff House flow (in Yellowknife group) 2
Stalk group 1
Stark formation 2
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Tshierpi granite 2
Tochatwi group 1
Townsite flows 2
Union Island group 2
Wilson Island phase (of Point Lake-Wilson Island group) 2
Yellorex flow 2
Yellowknife group 2

**Age(f)**

**Carboniferous** (see also Devonian or Carboniferous)
Canary lime 1

**Canada—Continued**

**Nova Scotia Continued**

**Pleistocene**
Bridgewater conglomerate 2

**Triassic**
Annapolis formation 1
Blomidon shale 1
Cape Spencer flow 2
Five Islands volcanics 1
Grande Pre formation 1
North Mountain basalt 1
Scots Bay formation 1
Wolfville sandstone 1

**Carboniferous** (see also Devonian or Carboniferous)
Canary lime 1
Canad a Continued
Northwest Territories (Mackenzie)—Continued

Precambrian—Continued
Point Lake phase (of Point Lake-Wilson Island group) 2
Point Lake-Wilson Island group 2
Powder House flow (in Yellowknife group) 2
Preble formation 2
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River Lake granite 2
Runa Lake granodiorite 2
Snare group 2
Snowdrift series 1
Sosan formation 2
Staff House flow (in Yellowknife group) 2
Stalk group 1
Stark formation 2
Stock flow 2
Tazin series 1
Tshierpi granite 2
Tochatwi group 1
Townsite flows 2
Union Island group 2
Wilson Island phase (of Point Lake-Wilson Island group) 2
Yellorex flow 2
Yellowknife group 2

**Age(f)**

**Carboniferous** (see also Devonian or Carboniferous)
Canary lime 1
Canad a Continued
Northwest Territories (Mackenzie)—Continued

Precambrian—Continued
Point Lake phase (of Point Lake-Wilson Island group) 2
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Tshierpi granite 2
Tochatwi group 1
Townsite flows 2
Union Island group 2
Wilson Island phase (of Point Lake-Wilson Island group) 2
Yellorex flow 2
Yellowknife group 2

**Age(f)**

**Carboniferous** (see also Devonian or Carboniferous)
Canary lime 1
Canad a Continued
Northwest Territories (Mackenzie)—Continued

Precambrian—Continued
Point Lake phase (of Point Lake-Wilson Island group) 2
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Tochatwi group 1
Townsite flows 2
Union Island group 2
Wilson Island phase (of Point Lake-Wilson Island group) 2
Yellorex flow 2
Yellowknife group 2

**Age(f)**

**Carboniferous** (see also Devonian or Carboniferous)
Canary lime 1
Canad a Continued
Northwest Territories (Mackenzie)—Continued

Precambrian—Continued
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Snowdrift series 1
Sosan formation 2
Staff House flow (in Yellowknife group) 2
Stalk group 1
Stark formation 2
Stock flow 2
Tazin series 1
Tshierpi granite 2
Tochatwi group 1
Townsite flows 2
Union Island group 2
Wilson Island phase (of Point Lake-Wilson Island group) 2
Yellorex flow 2
Yellowknife group 2

**Age(f)**

**Carboniferous** (see also Devonian or Carboniferous)
Canary lime 1

**Canada—Continued**

**Nova Scotia Continued**

**Carboniferous** (see also Devonian or Carboniferous)
Coppermine series 1

**Lower Pennsylvanian**
Millville conglomerates 1

**Pennsylvanian(f)**
Claremont formation 2
MacFarlane redbeds 1
Middle Bridge formation 1
Mississippian or Pennsylvanian
Scotch Village formation 2

**Mississippian**
Ainslie sandstone 1
Ardness formation 1
Avon River limestone 1
Cheverie formation 1
Grantmire member (of Windsor series) 2
Horton series 1
Judique series 1
Kennetcook limestone 1
Canada—Continued
Nova Scotia—Continued

Mississippian—Continued
McAra Brook formation 1
Macumber formation 2
Maxner limestone 1
Miller limestone 1
Pembroke limestone 1
River John series 1
Tennycape formation 2
Windsor group 1
Mississippian (?)
Dunbar series 1
Kewstoke conglomerate 1
Lower Mississippian
Piller conglomerate and sandstone 2
Devonian or Carboniferous
Union formation 1
Devonian
Bear River formation 2
Knoydart formation 1
Lower or Middle Devonian
McAdam Lake formation 2
Silurian or Lower Devonian
Middle River group 2
Silurian
Arisaig series 1
Beechhill formation 1
Beechhill Cove formation 1
Cobequid series 1
Kentville formation 1
McAdam formation 1
Moydart formation 1
Nictaux beds 2
Ross Brook formation 1
Stonehouse formation 1
Torbrook sandstone 1
Silurian (?)
New Canaan formation 2
Ordovician
Baxters Brook formation 1
Browns Mountain group 1
James River formation 1
Malignant Cove formation 1
Stewart Brook formation 2
Lower Ordovician (?)
James River granite 2
Lower Ordovician and Upper Cambrian (?)
McLeod Brook formation 2
Cambrian (see also Precambrian or Cambrian)
Atlantic Coast series 1
Barachois slate 1
Bears Brook formation 1
Guysborough formation 1
Mira series or formation 1
Cambrian and older (?)
Morrison formation 2
Upper Cambrian
Brotonian 1 (series)
MacNeill formation 2
Middle Cambrian
Bourinot group 2
Coldbrookian series 2

Canada—Continued
Nova Scotia—Continued

Middle Cambrian—Continued
Dugald formation 2
Dugald Brook series 2
Dugaldian series 2
Eskasoni formation 3
Grenville formation 2
Kelvin Glen group 2
MacLean Brook formation 2
MacMullin formation 2
Trout Brook formation 2
Middle Cambrian (?)
Myrabayan series 2
Lower Cambrian
Canoe Brook formation 2
MacCodrum formation 2
Morrison River formation 2
Precambrian or Cambrian
Goldenville formation 1
Halifax formation 1
Whiterock Quartzite 1
Precambrian
Fourchu group 2
George River series 1
Meguma series 1
Precambrian (?)
Clyburn formation 1
Ingonish gneiss 1
Age (?)
Chegoggin Point formation 1
Franey granite 1
George River limestone 1
South Mountain granite 2

Ontario

Pleistocene
Algoma sand 1
Artemisia gravel 1
Clarke interglacial 1 (sands and clays)
Don beds (in Toronto formation) 1
Erie clay 1
Iroquois clay 1
Nipissing clay 1
Patrician drift 1
Saugeen clay 1
Scarboro beds 1
Toronto formation 1
Warren gravel 1
Upper Jurassic or Lower Cretaceous
Mattagami series 1
Devonian
Abitibi River formation 1
Arkona beds 1
Ipperwash limestone 1
Ipperwash limestone member 1
(of Hamilton formation)
Long Rapids shale 1
Norfolk formation 2
Petrolia shale 1
Petrolia shale member (of Hamilton formation) 1
Port Lambton beds 1
Sextant formation 1
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<td>Thunder Bay shales 1</td>
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<td>Widder beds 1</td>
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<td>Williams Island limestone 1</td>
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<tr>
<td><strong>Upper Devonian</strong></td>
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<tr>
<td>Kettle Point black shale 1</td>
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<td>William Island formation 1</td>
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<td><strong>Middle Devonian</strong></td>
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<tr>
<td>Anderdon limestone member (of Lucas formation); (as member of Detroit River dolomite 1)</td>
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<td>Decewsville formation 1</td>
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<td>Hungry Hollow formation 1</td>
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<td>Springvale sandstone 1</td>
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<tr>
<td><strong>Lower and Middle Devonian</strong></td>
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<tr>
<td>Moose River formation 1</td>
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<td><strong>Silurian</strong></td>
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<td>Attawapiskat coral reef 1</td>
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<td>Attawapiskat limestone 1</td>
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<td>Barton beds 1</td>
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<td>DeCew limestone 1</td>
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<td>Ekwan limestone 1</td>
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<td>Eramosa member 1 (of Lockport formation)</td>
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<td>Galt limestone 1</td>
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<td>Kenogami River formation 1</td>
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<td>Pagwa River formation 1</td>
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<td>Svern limestone 1</td>
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<td>Severn River limestone 1</td>
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<tr>
<td>Wabin formation 1</td>
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<td>Wingfield formation 1</td>
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<tr>
<td><strong>Middle Silurian</strong></td>
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<tr>
<td>Albemarle group 2</td>
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<td>Amabel member 2</td>
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<td>Ancaster member (of Eramosa formation) 1</td>
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<td>Assignack member (of Burnt Bluff formation) 1</td>
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<td>Billings member (of Burnt Bluff formation) 1</td>
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<td>Colby Bay member (of Amabel formation) 1</td>
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<td>Fossil Hill formation 1</td>
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<td>Guelph dolomite 1</td>
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<td>Lion Head member (of Manitoulin dolomite member (of Cataract formation) 1</td>
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<td>Power Glen formation 1</td>
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<td>St. Edmund dolomite lentil (of Cabot Head shale member) 1</td>
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<td>**Thorold sandstone member (of Albion sandstone) 1</td>
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<td><strong>Ordovician</strong> (see also Cambrian and Ordovician)</td>
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<td>Billings formation 2</td>
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<td>Blue Mountain formation 1</td>
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<td>Christie member (of Dundas formation) 1</td>
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<td>Cobooenk limestone 1</td>
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<td>Cobourg limestone 1</td>
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<td>Cradleth formation 1</td>
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<td>Danforth member (of Dundas formation) 1</td>
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<td>Haileybury formation 1</td>
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<td>Kirkfield limestone group 1</td>
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<td>Verulam formation 1</td>
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<td>Vincent member (of Meaford formation) 1</td>
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<td>Whitby group 2 (subsurface)</td>
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<td>Winnipeg limestone 1</td>
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<td>Carlsbad formation 1</td>
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<td>Collingwood formation 1</td>
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<td>Don River member 1</td>
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<td>Queenston shale 1</td>
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<td>Streetsville member 1</td>
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<td>Wekwenikongsing beds 1</td>
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<td>Cloche Island beds 1</td>
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<tr>
<td>Glenburnie member (of Chau- mont formation) 1</td>
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<td>Gull River formation 1</td>
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Ontario—Continued

Middle Ordovician—Continued

Hallowell member (of Cobourg formation) 2
Hillier member (of Cobourg formation) 2
Moore Hill formation  2
Napanee member (of Rockland formation) 2
Rockcliffe formation  2
Rockland formation  1
Selby member (of Rockland formation) 2
Shadow Lake formation  2
Swift Current beds  1

Lower Ordovician

Hallo well member (of Cobourg formation) 2
Hillier member (of Cobourg formation) 2
Moore Hill formation  2
Napanee member (of Rockland formation) 2
Rockcliffe formation  2
Rockland formation  1
Selby member (of Rockland formation) 2
Shadow Lake formation  2
Swift Current beds  1

Lower Ordovician and Upper Cambrian

Nepean sandstone  2

Cambrian and Ordovician

Battle mill beds  2
Brockville beds  2
Maitland beds  2
Prescott series  2

Upper Cambrian

Sault St. Mary sandstones  1

Precambrian

Abras granite gneiss  2
Common% granite gneiss  2
Aries formation  2
Bad Vermillion Lake granite  1
Batchawana series  1
Belmont amygdaloidal basalt and tuff  1
Birch Lake series  1
Blessington gabbroic anorthosite  2
Boulter gabbro  2
Boulter granite  2
Brockville granite  1
Brownridge sediments  2
Brownridge volcanics  2
Bruce conglomerate  1
Bruce series  1
Burleigh granite gneiss  2
Caribou complex  2
Carpenter sediments  2
Carpenter volcanics  2
Central series  2
Centre Hill complex  2
Centre Lake leuco-granite gneiss  2
Chelmsford sandstone  1
Clara bell granite  2
Clearwater volcanics  2

Canada—Continued
Ontario—Continued

Precambrian—Continued

Cobalt series  1
Cobalt tillite or conglomerate (in Gowganda formation) 2
Confederation granophyre  2
Coniston series  2
Copper Cliff arkose  1
Cosmo series  2
Creighton granite  3
Crowduck Lake conglomerate  1
Daredevil formation  1
Deer Lake syenite  2
Doré series  1
Doré conglomerate  1
Doré formation  2
Driving Creek formation  1
Duncan greenstone  1
Dysart granite gneiss  2
East Bay formation  2
East Bull Lake gabbro  2
Eleanor slate  1
Elise Mountain greenstones  2
Espanola granite  1
Espanola graywacke  1
Espanola limestone  1
Frood series  2
Ghost Range complex  2
Gillies Lake porphyry  2
Glamorgan gabbro  1
Glamorgan granite gneiss  2
Goldale formation  2
Gold Centre series  2
Gowganda formation  1
Grassy Island granite gneiss  1
Green Lake limestone  1
Gritville Lakes  1
Gros Cap greenstone  1
Gullwing Lake conglomerate  2
Gullwing Lake volcanics  2
Hallnor conglomerate  2
Hardy Lake volcanics  1
Hardrock "porphyry"  2
Hastings series  1
Helen iron formation  1
Hill group  3
Hinehinde granite  3
Howey diorite  2
Hoyle sedimentary series  2
Huronian series  1
Island Lakes gabbroic anorthosite  2
Jackfish Lake conglomerate  1
Juttan volcanics  1
Kakabeka formation  1
Kaministikwia group  1 (see also Kaministikquia formation 1)
Kashabowie series  2
Kennebec volcanics  2
Kenoran volcanics  2
Kiask series  1
Kanora volcanics  3
Kangatirra volcanics  3
Kapuskasing volcanics  3
Kaministikquia volcanics  3
Keshiketung volcanics  3
Keweenawan volcanics  3
Canada—Continued  
Ontario—Continued  
Precambrian—Continued  
Killarnean granites  
Killarney granite  
Krist fragmental (unit)  
Lac Seul series  
Larder Lake series  
Levack granite  
Linklater formation  
Long Lake diorite  
Lorrain granite  
Lorrain quartzite  
McIntyre series  
MacKenzie Island graywacke  
McKim graywacke  
Mallard Lake metagabbro  
Mamainse diabase  
Mallorytown granite  
Marshall Lake series  
Marten River granite  
Matachewan series  
Mather sediments  
Meach Lake conglomerate  
Miller Lake porphyry  
Millerton porphyry  
Miminiska series  
Mining Mountain granite gneiss  
Miniss series  
Mississagi quartzite  
Moira granite  
Monek Lake leuco-granite gneiss  
Mud Lake granite  
Murray granite  
Neepawa volcanics  
Newfield diabase  
Nipigon group  
Oconto gabbroic anorthosite  
Olden gabbro  
Onaping tuff  
Onwatin slate  
Osler series  
Ottawa gneiss  
Ottertail white quartzite  
Pamour conglomerate  
Parham gabbro  
Patara schist or series  
Pearl Lake porphyry  
Peewatay Lake granite  
Phantom Island slate  
Philcot-Crossecho Lakes volcanics  
Proctors Lake limestone  
Quadeville metagabbro  
Raglan metagabbro  
Ramsey Lake graywacke conglomerate  
Rest Island granite  
Rice Bay granite gneiss  
Ridout series  
Rove slate  
St. Andrew gabbroic anorthosite  
Savant group  
Seine conglomerate  
Seine series  

Canada—Continued  
Ontario—Continued  
Precambrian—Continued  
Seine River series  
Serpent quartzite  
Shabu series  
Shoal Lake conglomerate  
Shibley series  
Silver Lake granite  
Slate Lake series  
Snider series  
Soo series  
Soulton series  
Steep Rock series or group  
Steep Rock Lake series  
Stoble series  
Sudbury norite  
Sudbury series  
Sudbury-Bruee series  
Swayze series  
Taft volcanics  
Thanet gabbro  
Thessalon group  
Thunder Bay slates  
Thunder Lake sediments  
Thunder River volcanics  
Tichborne gabbroic anorthosite  
Tichborne-Buck Bay granite and alaskite  
Tisdale group  
Tot-Gullwing Lakes granite  
Trembling Lake limestone  
Trot Lake conglomerate  
Uchi series  
Umfraville gabbro  
Varenessic period  
Vermilion-Bluett Lakes conglomerate  
Vermilion-Centrefire Lakes volcanics  
Victoria gabbroic anorthosite  
Vipond series  
Wabigoon volcanics  
Wanapitei quartzite  
Wanipigow series  
Warclub Lake series  
Warden-Munro complex  
Wawa tuff  
White Lake syenite  
Whitewater series  
Wilkinson anorthosite  
Windegoan series  
Winnipeg River granite  
Zealand sediments  

Age (?)  
Bear Passage granite  
Knuckle Island granite  
Michipicoten schists  
Nowhere Island granite gneiss  
Redgut Bay granite  

Prince Edward Island  
No geologic formations with type localities in the province of Prince Edward Island have been recorded in the Lexicon files.
### Canada—Continued

#### Quebec

**Quaternary**
- Beauport sand and gravels
- Montreal formation
- Rupert formation
- St. Maurice sand
- Sorel sand

**Pleistocene**
- Hochelagan formation
- Lawrencian clay
- St. Lawrencian terrane

**Pennsylvanian**
- Cannes de Roche formation

**Mississippian or Pennsylvanian**
- Bonaventure formation

**Devonian and Mississippian**
- Gaspé series

**Post-Devonian (?)**
- Stanstead granite

**Devonian or younger**
- Breeches Lake granite
- Mount Aylmer granite
- Waterloo lava
- Winslow granite

**Devonian**
- Barré limestone
- Big Megantic nordmarkite or granite
- Bon Ami beds
- Cape Barré beds
- Cape Bon Ami limestone
- Causapscale formation
- Cranbourne series
- Famine series
- Fortin series
- Gaspé limestone
- Gaspé sandstone
- Griffon Cove River beds
- Lake Aylmer series
- Lake Branch formation
- Lambton formation
- Levis shale
- Malbaie conglomerate
- Pic d'Aurore series
- Price conglomerate
- St. Albans formation
- St. Gerrard member (of Lake Aylmer formation)
- St. Lawrence shale
- Scotstown granite
- Seventeen-Mile Brook beds
- Søneau Brooker member (of Gaspé sandstone)
- York River sandstone

**Devonian (?)**
- Mount Wissick group
- St. Helens Island breccia
- Talon formation
- Weedon granite and aplite

**Upper Devonian or post-Devonian**
- Bolton igneous series

**Upper Devonian**
- Escuminac beds
- Fleurant conglomerate
- Four Mile Brook member (of Heppel sandstone)
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<td>Mount Alexander series 2</td>
<td><strong>Middle and Upper(?) Ordovician</strong></td>
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<td>Pohenagamuk formation 1</td>
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<td>Romaine formation 1</td>
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<td>Sr. Hilaire member (of Nicolet River formation) 2</td>
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<td>Macquereau series 1</td>
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Canada—Continued
Quebec—Continued

Cambrian and Ordovician

- Cape Rosier beds
- Carillon limestone
- Chatham limestone
- Lachine beds
- Levis formation
- Missiquoiay bay series
- Rigaud passage beds
- St. Flavien basic eruptives

Cambrian

- L’Islet formation
- Manitouwuck group
- Mistassini formation
- Pinnacle graywacke
- Pointe Levis group
- Redoute limestone
- Sutton schists

Upper Cambrian

- Mansonville slates
- Murphys Creek formation
- Oak Hill slate
- Rock River formation
- Strites Pond formation

Lower Cambrian

- Bunker slate
- Call Mill slate
- Charny formation
- Dunham dolomite
- Dunmore quartzite
- Gilman quartzite
- Melbourne limestone
- Scottsmore quartzite
- Sweetsburg slate
- Vail slate
- West Sutton slate
- White Brook dolomite

Lower (?) Cambrian

Corner-of-the-Beach formation

Precambrian, Cambrian, and Ordovician

Quebec group

Precambrian

Abitibi group
- Albanel group
- Aldermac syenite porphyry
- Alison quartzite
- Ashuanipi complex or series
- Attikamagen formation
- Auger Lake conglomerate
- Bachelor Lake granite
- Barralute gabbro
- Barry Lake gneiss
- Beattie syenite porphyry
- Bell River anorthosite
- Bennett quartzite
- Bernetz gneiss
- Billy Lake quartz porphyry
- Black River group
- Blake River group
- Bourlamaque granodiorite
- Brassier-Dollard biotite granite
- Bristol series
- Broadback series
- Brock series
- Broughton series
- Buckingham gneiss
- Buit Lake granite
- Cache Lake gabbro
- Cadillac group
- Capisit Lake granite
- Cedar Rapids granite
- Celoron granite
- Chadbourne series
- Chertsey facies (of Morin anorthosite)
- Chibougamau complex
- Chionek conglomerate-sandstone
- Claverry albite granodiorite
- Cleric granodiorite
- Cleric sediments
- Cleric porphyritic syenites
- Coom Lake diorite-gabbro
- Dalquier granite
- Dastur metagabbro
- Dauversière granite
- David Lake group
- Davy Lake breccia
- Denault dolomite
- Doré Lake group
- Doublet group
- Dufault diorite and quartz diorite
- Dufault granodiorite
- Duparquet sediments
- Duverny granite
- Fabre series
- Fiedmont granodiorite
- Figuerie granodiorite
- Fenimore iron formation
- Flavrian granite
- Fleming chert breccia
- Fort Chimo group
- Fornáire sediments
- Glenwood series
- Grenville limestone
- Goeland granite
- Goldvue quartz diorite
- Granada conglomerate
- Granada greywacke
- Guenette granite aplite
- Gull Lake anorthosite
- Harricanaw series
- High Falls granite
- Holmes gneiss
- Horne rhyolites
- Howse group
- Hub Lake syenite
- Jossein gneiss
- Kastasakau complex
- Kayrand quartz gabbro
- Kensington syenite
- Kewagama group
INDEX TO THE GEOLOGIC NAMES OF NORTH AMERICA

**Canada—Continued**

**Quebec—Continued**

**Precambrian—Continued**

- Kinojevis group
- Kirkland Lake series
- Kitehigama granite
- Knob Lake group
- Koksoak series
- LaBelle series
- Labyrinth Lake granite
- LaCorne hornblende-granodiorite
- Lacoste series
- Lake Evans series
- Lake Mistassini group
- Lake Robertson granite
- Landrienne gabbro-peridotite complex
- La Motte granite
- La Motte-LaCorne granite
- La Pause syenites
- Laporte group
- La Reine granite
- Lichen Lake granite
- Loranger series
- Lorrain series
- Louvicourt granodiorite
- McWatters group
- Maikasagi River gneiss
- Malartic granodiorite
- Malartic volcanics
- Matagami series
- Menihek formation
- Mildale gabbro
- Mistassini limestone
- Moisie series
- Moose Lake granite
- Murdock group
- Nastapoka series
- Nelson Lake granite
- Nemenjish series
- Newbec breccia
- Newport albitized quartz diorite
- Nipissing diabase
- Noranda Lake granite
- Onapingoan granite
- Ojikeska series
- Olga quartz diorite
- Onslow syenite
- Opaska River complex
- Opeymisk granite
- Opeymisk series
- Osisko Lake rhyolites
- Ottawa gneiss
- Palmarolle granodiorite
- Papaskwasati group
- Pascalis-Tiblemont granodiorite
- Pine Hill syenite
- Pontiac schist or group
- Port Harrison series
- Powell granite

**Canada—Continued**

**Quebec—Continued**

**Precambrian—Continued**

- Preissac granite
- Preissac syenites
- Quinville granite
- Rapid River conglomerate
- Red Chute quartz diorite
- Richmond group
- Richmond Gulf group
- Roberval (as Robervel) formation
- Roberval (as Robervel) granite
- Rolland granite
- Rouyn Lake sediments
- Ruth Lake formation
- Sagenay formation
- Saint Jude igneous breccia
- Seaforth porphyry
- Seal Lake series
- Seward grits
- Siscoe granodiorite
- Sokoman formation
- Soma gabbro
- Stadacona tuffs
- Strangway granite
- Sutton Mountain series
- Temiscaamie group
- Tibbit Hill schist
- Tonnancourt quartz monzonite
- Trembling Mountain gneiss
- Unison granodiorite
- Verneuil granite
- Wareham Lake series
- Waswanipi granite
- Wilson granite
- Wishart quartzite

**Precambrian(f)**

- Pentecote granite

**Age(f)**

- Dalhousie Mountain andesites
- Disraeli series
- Maria latite
- Nouvelle dacites
- Rosenberg series
- Thetford series

**Saskatchewan**

**Pleistocene**

- Regina clay
- Saskatchewan gravels

**Tertiary or Quaternary**

- South Saskatchewan gravels
- Miocene, middle or upper
- Wood Mountain gravels

**Oligocene**

- Cypress Hills beds

**Eocene**

- Roche Percée group
- Swift Current formation

**Eocene(f)**

- Estevan formation

**Eocene, upper**

- Swift Current Creek formation

**Eocene, lower**

- Willowbunch member (of Ravenscrag formation)
Canada—Continued

Saskatchewan—Continued

Upper Cretaceous or Tertiary

Ravenscrag beds

Upper Cretaceous

Battle formation

Belanger member (of Bearpaw formation)

Frenchman formation

Oxarart member (of Bearpaw formation)

Thelma member (of Bearpaw formation)

Whitemud formation

Jurassic

Davidson formation (subsurface)

Gravelbourg formation (subsurface)

Shaunavon formation (subsurface)

Vanguard formation (subsurface)

Watrous formation (subsurface)

Devonian

Davidson evaporite (subsurface)

Saskatchewan group (subsurface)

Upper Devonian

Duperow formation (subsurface)

Ordovician

Black Island member (of Winnipeg formation)

Deer Island member (of Winnipeg formation)

Grindstone Point unit (in Winnipeg formation)

Precambrian

Athona granite

Beaverlodge series

Brindon Lake granite

Cameron Island granite

Churchillian group

Elliot Bay conglomerate

Frontier Lake conglomerate

Kenwood River granite

Kisseynew gneisses

La Rouge group; Lac La Rouge series

Lodge Bay granite

Mackintosh Bay granite

Missi formation

Morin limestone

Nistoassini-Nayelles Lakes granite

Pebble Island conglomerate

Waddy-Contact Lakes granite

White Lake granite

Yukon

Recent

Kluane silt

Shims Valley silt

Pleistocene and Recent

Selkirk volcanics

Canada—Continued

Yukon—Continued

Tertiary or Pleistocene

Carmack basalt

Klusha intrusives

Tertiary (see also Triassic and Tertiary)

Flat Creek beds

Horsefly gravels

Hutshi group

Klondike drift

Miles Canyon basalts

Skukum volcanic rocks

Wheaton River volcanics

Tertiary (?)

Chieftain Hill volcanics

Schwatka andesites

Cretaceous

Perkins volcanics

Tutshi series

Lower Cretaceous

Dendreash group

Jurassic or Cretaceous

Laberge series

Nordenskiöld dacite

Upper Jurassic or Cretaceous

Quiet Lake intrusives

Tantalus conglomerate

Upper Jurassic or Lower Cretaceous

Mount Nansen group

Upper Jurassic or Cretaceous (?)

Glenlyon granodiorite

Jurassic and Triassic (?)

Mush Lake group

Triassic to Tertiary

Hutshi-Schwatka group

Triassic

Lewes River series

Paleozoic (?)

Moose Hide group

Carboniferous or Permian

Kaskauskulsh group

Carboniferous

Raquet series

Carboniferous (?)

Braeburn limestone

Pennsylvanian to Lower Cretaceous

Orange group

Pre-Carboniferous

Harvey group

Devonian or Carboniferous (?)

Montague group

Ordivician

Tatanduk shales

Cambrian

Hunker Creek series

Indian River series

Cambrian (?)

Kluane schists

Precambrian

Pelly gneiss

Razor Mountain group

Yukon group

Precambrian (?)

Klondike series

Mount Stevens group or series
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<td>Yukon—Continued</td>
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| **Age**  
| Hunker series 1 |
| Indian River group 1 |
| Moosehide diabase 1 |
| Windy Arm series 1 |
| St. Pierre and Miquelon  
| **Post-Cambrian**  
| Galancy breccia 3 |
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| **Pleistocene**  
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| Salada formation 1 |
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| **Inferno formation** 2 |
| **Marquer formation** 4 |
| **Pliocene, middle**  
| Carmen formation 2 |
| **Gloria formation** 2 |
| **Pliocene, lower**  
| **Bolo formation** 2 |
| **San Marcos formation** 2 |
| **Miocene**  
| Comondu formation 1 |
| **Isidro formation** 1 |
| **Oligocene(? ) to Miocene, lower**  
| **San Gregorio formation** 2 |
| **Oligocene(? )**  
| **Purisima Nueva formation** 3 |
| **Eocene**  
| **Tepetate formation** 1 |
| **Eocene, lower**  
| **Sepultura formation** 2 |
| **Mesozoic**  
| **Todas Santos formation** 1 |
| **Cretaceous**  
| **Catarina formation** 1 |
| **Encina Sola quartz diorite** 3 |
| **La Guilla granodiorite** 2 |
| **La Providencia granite** 2 |
| **Mesa sandstones** 1 |
| **Rosario formation** 1 |
| **Santa Eulalia formation** 3 |
| **San Fernando formation** 3 |
| **San Jose quartz diorite** 2 |
| **San Telmo formation** 2 |
| **Lower Cretaceous**  
| **Alisitos formation** 3 |
| **Paleozoic(? )**  
| **Volcan Peak group** 1 |

| Mexico—Continued  
| Baja California—Continued  
| **Precambrian**  
| **Volcan group** 1 |
| Campeche  
| No geologic formations with type localities in the State of Campeche have been recorded in the Lexicon files. |
| **Chiapas**  
| **Miocene or Pliocene**  
| **Tenejapa formation** 1 |
| **Miocene, upper**  
| **Simojovel formation** 1 |
| **Eocene or Oligocene**  
| **Triunfo formation** 1 |
| **Cretaceous**  
| **Comitán limestone** 2 |
| **Cristobal formation** 1 |
| **Petape (formation)** 2 |
| **Tuxtla formation** 1 |
| **Permian**  
| **Grupera formation** 2 |
| **La Vainilla limestone** 3 |
| **Paseo Hondo formation** 2 |
| **Santa Rosa littoral marine formation** 1 |
| **Age(? )**  
| **Cintalapa beds** 2 |

| Chihuahua  
| **Tertiary**  
| **Talamantes volcanic series** 2 |
| **Tertiary, lower**  
| **Buja rhyolite series** 2 |
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| **Pliocene, upper**  
| **Boquilla formation** 2 |
| **Temosahach formation** 2 |
| **Yepomera formation** 2 |
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| **Santa Barbara series** 2 |
| **Cretaceous**  
| **Angela formation** 1 |
| **Buena Suerte formation** 1 |
| **Los Lamentos formation** 1 |
| **Ojinaga formation** 1 |
| **San Vicente formation** 1 |
| **Soledad beds** 1 |
| **Sonora formation** 1 |
| **Tlaxcala formation** 1 |
| **Triste formation** 1 |
| **Lower Cretaceous**  
| **Aurora formation** 1 |
| **Las Vegas formation** 1 |
| **Age(? )**  
| **Chorreras granite** 1 |
| **Conchos gravels** 1 |
| **Navosia game formation** 1 |
| **Plomosas formation** 1 |
| **Coahuila**  
| **Pleistocene(? )**  
| **Mayrán formation** 2 |
| **Pliocene(? )**  
| **Santo Madero formation** 2 |
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Coahuila—Continued

Cretaceous
Las Cortinas formation 2
Las Esperanzas formation 1
Indidura formation 1
Monclova shale 1
Papagayos formation 1; Papagayos formation 1; Papagallos formation 1
Peyotes division 1
Rubio shale 1
Upper Cretaceous
Caracol formation 2
Difunta formation 2
Parras shale 2
Lower Cretaceous
Barril Viejo shale 2
Coahuila group 2
Cuesta del Cura limestone 3
Cupido limestone 2
La Mula shales 2
La Peña formation 2
Menchacha limestone 3
Padilla limestone 2
Parritas formation 2
Patula arkose 2
San Marcos arkose 2
Taraises formation 2
Pre-Cretaceous
Boquilla slate 1
Upper Jurassic
La Caja formation 2
La Casita formation 2
La Gloria formation 2
Paleozoic
Delicias beds 1
Permian
Pichagua limestone 2
Colina
No geologic formations with type localities in the state of Colina have been recorded in the Lexicon files.

Distrito Federal
Pleistocene
Armenta horizon (of Becerra formation) 2
Morales caliche 2
Tacubaya formation 2
Pleistocene(?)
Tarango formation 2
Durango
Cretaceous
Los Muertos formation 1
Lower Cretaceous
Carbonera formation 1
Durango group 2
Age(?)
Copper Queen intrusion 1
Guardarraya intrusion 1
Guanajuato
Tertiary
Guanajuato conglomerate 1
Cretaceous or Tertiary
Bufa sandstone 1

Mexico—Continued
Guanajuato—Continued
Triassic
La Luz basalts 1
Age(?)
La Luz schists 1
Pingüico rhyolites 1
Guerrero
Upper Cretaceous
Escamela limestone 1
Middle Jurassic
Tecocoyuncas beds 2
Triassic(?)
Cualac quartzite 2
Hidalgo
Tertiary, middle or upper
Las Espinas volcanics 2
Tertiary, lower or middle
El Morro fanglomerate 2
Oligocene
Huatac basalt 1
Cretaceous
Bofay formation 2
El Monte limestone 2
Malatra division 1
Neeoxtila formation 1
Jalisco
Quaternary
Estancia basalt 1
Pleistocene(?)
Chapala beds 1
Tertiary
Tizapan basalt 1
Mexico (Estado)
Recent
Barrilaco caliche 2
Noche Buena formation 2
Pleistocene, upper
Becerra formation 2
Totolcingo formation 2
Miocene
Ajusco formation 2
Oligocene(?)
Sierra Nevada formation 2
Upper Cretaceous(?)
Jasso formation 2
Michoacan
Tertiary
Zumpimiento formation 2
Lower Cretaceous
Chichilxla beds 2
Mexcal beds 2
Middle Cretaceous
Chile limestone 2
Morelos
Nayarit
No geologic formations with type localities in the States of Morelos and Nayarit have been recorded in the Lexicon files.

Nuevo León
Miocene, lower
Norma gravel 2
Eocene
Arenal formation 1
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**Nuevo León—Continued**

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<td>Tulillo beds 1</td>
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<td>San Juan formation 1</td>
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<tr>
<td><em>Lower Cretaceous</em></td>
<td>Nuevo León group 2</td>
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**Oaxaca**

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<td><em>Tertiary</em></td>
<td>Cuicatlan formation 2</td>
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<tr>
<td><em>Tertiary</em></td>
<td>Huajuapan beds 2</td>
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<tr>
<td><em>Miocene, upper</em></td>
<td>Tuxtepec formation 1</td>
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<tbody>
<tr>
<td><em>Pre-Cretaceous</em></td>
<td>Santa Cecilia limestone 2</td>
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<tr>
<td><em>Upper Cretaceous</em></td>
<td>San Juan Raya formation 1</td>
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<tr>
<td><em>Cretaceous</em></td>
<td>Cardenas formation 1</td>
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<tr>
<td><em>Upper Cretaceous</em></td>
<td>Guadalcázar limestone 2</td>
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<td>Tepee formation 2</td>
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<tr>
<td><em>Pre-Mesozoic</em></td>
<td>Acatlán schists 3</td>
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**Puebla**

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<td><em>Lower Cretaceous</em></td>
<td>Totolapa facies 2</td>
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**Querétaro**

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<td>Cerro Ladrón facies (of El Doctor limestone) 2</td>
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<td>El Doctor limestone 2</td>
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<td>Barranca formation 1</td>
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<tr>
<td><em>Permian</em></td>
<td>Tigre formation 2</td>
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**Quintana Roo**

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<td><em>Miocene</em></td>
<td>Estero Franco formation 2</td>
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**Sonora**

<table>
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<tr>
<th>Epoch</th>
<th>Formation</th>
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</thead>
<tbody>
<tr>
<td><em>Quaternary</em></td>
<td>Santa Domingo flood plain deposits 1</td>
</tr>
<tr>
<td><em>Tertiary</em></td>
<td>Henrietta diorite porphyry 1</td>
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<tr>
<td><em>Late Tertiary</em></td>
<td>Baucaíri division 1</td>
</tr>
<tr>
<td><em>Mesozoic</em></td>
<td>Lista Blanca complex or division 1</td>
</tr>
<tr>
<td><em>Upper Mesozoic or lower Tertiary</em></td>
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</tr>
<tr>
<td><em>Triassic</em></td>
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**Sinaloa**

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<td><em>Triassic</em></td>
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**San Luis Potosí**

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<td><em>Cretaceous</em></td>
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<td>Huihuilán beds 2</td>
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<tr>
<td><em>Lower Cretaceous</em></td>
<td>Velasco formation 1</td>
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<tr>
<td><em>Upper Cretaceous</em></td>
<td>El Abra limestone 1</td>
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<tr>
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**Upper Pennsylvanian**

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Sonora—Continued
Mississippian
Represo beds  
Venada beds  
Devonian or Carboniferous
Santa Rosa beds  
Cambrian
Bolza quartzite  
Esperanza limestone  
Upper Cambrian(f)
Puertecitos limestone  
Middle Cambrian
Arrojos formation  
Tren formation  
Lower Cambrian
Buelna formation  
Cerro Prieto formation  
Provedora formation  
Puerto Blanco formation  
Precambrian or Lower Paleozoic
Atil sandstone  
Precambrian
Altar schists  
Capote limestone  
Jajoba formation  
Age(f)
Bella Union granite  
Caliche Mountain rhyolite  
Cananea granite  
Capote limestone  
Caridad conglomerate  
Caridad quartz monzonite  
Cuitaca granodiorite  
Durazno formation  
Elenita syenite porphyry  
Elisa quartz monzonite porphyry  
El Torre syenite  
Encinas quartz porphyry  
Golden Bar andesite rocks  
Huacalote rhyolite  
La Brisca formation  
Magallanes rhyolite  
Mariquita diabase  
Nacozari granite  
Pilares monzonite  
San Pedro andesite  
Santo Domingo rhyolite  
Saracachi formation  
Tinaja granite porphyry  
Tabasco
Pleistocene
Tierra Colorada formation  
Miocene
Amate (Lower and Upper) formation  
Encaracione shale  
Macuspana limestone  
Macuspana shale  
Misopah Shales  
Eocene or Oligocene
Pichucalco beds  
Eocene, middle and upper
Chinal limestone  
Chinal shales  
Puente de Piedra conglomerate  
Upper Cretaceous
Ocozocualta (formation)  
Paso Mono limestone  
Lower Cretaceous
Chival (formation)  
Guayal limestone  
San Ricardo (formation)  
Tamaulipas
Tertiary, upper
Cerro Topilla beds  
Quintero limestone  
Pliocene and Pleistocene or Recent
Reynosa formation  
Miocene
Panoramaes beds (in San Fernando formation)  
Miocene, lower
Guajalote formation  
Oligocene
Palo Alto formation  
Pinole formation  
Saladito formation  
San Fernando formation  
San Rafael formation  
Eocene
Los Esteros formation  
Eocene, upper
Los Guerros sandstone member (of Fayette formation)  
Roma sandstone member (of Fayette formation)  
Sanchez sandstone member (of Fayette formation)  
Villa Nueva sandstone member (of Fayette formation)  
Eocene, middle
Alamo sandstone member (of Yegua formation)  
Alberca sandstone member (of Yegua formation)  
Mier sandstone member (of Yegua formation)  
Once Lomas sandstone member (of Carrizo formation)  
Saucito sandstone member (of Cook Mountain formation)  
Eocene, lower
Chalma shale (in Chicontepec formation)  
Jaco sandstone (in Chicontepec formation)  

Mexico—Continued
Tamaulipas—Continued

Eocene, lower—Continued
Puerto Colorado sandstone member (of Indio formation) 1

Upper Cretaceous
Solis limestone 2
Victoria limestone 1

Middle Cretaceous
Otates horizon (of Tamaulipas limestone) 2
San Tamaulipas formation 1 (subsurface)
Tamaulipas limestone 2

Jurassic
Huizachal formation 2
Olvido formation 3

Permian
Guacamaya beds 2
Mississippian
Peregrina formation 3

Tlaxcala
No geologic formations with type localities in the State of Tlaxcala have been recorded in the Lexicon files.

Vera Cruz

Tertiary
Ozuluama series 1

Pliocene
Acalapa conglomerate 2

Miocene
Coatzacoalcos formation 1
Papantla formation 1
Punta Gorda (formation) 3
Teapa (formation) 2
Tuxpan formation 1
Veronica (formation) 2

Miocene, upper
Cedral formation 2

Miocene, middle
Agueguexquite formation 1
Pajaritos (formation) 2
Paraje Solo formation 2
Santa Rosa beds 1

Miocene, lower
Concepcion (Lower and Upper) series 2
Encanto series 2
Filisola series 4

Oligocene
Alazan shale 1
Cazantitla formation 2
Deposito series 2
Esolin series 2
La Laja series 2
Meson beds 1
Palma Real 1 (formation)
Temapache limestone 1
Texistepec (formation) 2

Oligocene, lower
Huasteca formation 2

Eocene to Oligocene

Mexico—Continued
Vera Cruz—Continued

Eocene
Chapatan formation 2
Chicontepec formation 1
Guayabal formation 1
Idolo beds 1 (subsurface)
Tantoyuca formation 1
Tempoal shale 1

Eocene, upper
Carmen (formation) 1
Chapapote formation 1

Eocene, middle and upper
Nanchital conglomerate series 2

Eocene, lower
Aragon formation 1
Nanchital shales 2
Uzpanapa conglomerate 3

Cretaceous
Limon beds 1
Orizaba limestone 1
Tamabra 1 (formation)
Tamesi formation 1

Upper Cretaceous
Agua Nueva formation 2
Barrancón beds 2
Mendez formation 1
Panuco gray limestone 1 (subsurface)
Penuela limestone 2

Middle Cretaceous
Sierra Madre limestone 3
Tamiahua facies 3

Lower Cretaceous
Comal series 3

Jurassic
San Bartolo formation 2

Upper Jurassic to Lower Cretaceous
Chinameca limestone 2

Lower Jurassic
Divisadero facies 2
Huayacocotla formation 2

Yucatan

Tertiary
Sierrita limestone 2

Oligocene or Miocene
Icaiché formation 2

Zacatecas

Tertiary
Mazapil conglomerate 2

Middle Cretaceous or older
Proaño group 2

Lower Cretaceous
Nazareno bed (in Cupido limestone) 2
Nieva shale 1

Upper Jurassic
Zuloaga limestone 2

Central America
British Honduras

Miocene
Rio Dulce limestone 1
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<td>Penitas formation 2</td>
<td>Upper Cretaceous or lower Tertiary</td>
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<td>Suretka conglomerate 1</td>
<td>Valle de Angeles formation 2</td>
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<tr>
<td><em>Miocene</em></td>
<td>Upper Cretaceous</td>
</tr>
<tr>
<td>Bonilla formation 1</td>
<td>Esquias formation 1</td>
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<tr>
<td>Nicoyan series 1</td>
<td><em>Upper Triassic</em></td>
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<tr>
<td>Sherofi formation 1</td>
<td>El Plan formation 2</td>
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<tr>
<td><em>Miocene, lower</em></td>
<td>Tegucigalpa 1 (formation)</td>
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<tr>
<td>Uscaír shale 1</td>
<td><em>Pre-Upper Triassic</em></td>
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<tr>
<td><em>Oligocene or lower Miocene</em></td>
<td>Peten formation 2</td>
</tr>
<tr>
<td>Amoura shale 2</td>
<td><strong>Guatemala</strong></td>
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<tr>
<td><em>Oligocene</em></td>
<td><strong>Tertiary</strong></td>
</tr>
<tr>
<td>Guallava sandstone 1</td>
<td><em>Brito formation</em></td>
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<tr>
<td>Manzanilla beds 1</td>
<td><em>Oligocene (?)</em></td>
</tr>
<tr>
<td><em>Eocene (?)</em></td>
<td>Machuca formation 1</td>
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<tr>
<td><em>Cretaceous or Lower Tertiary</em></td>
<td><strong>Panama and the Canal Zone</strong></td>
</tr>
<tr>
<td>Desamparados formation 1</td>
<td><em>Pleistocene and Recent</em></td>
</tr>
<tr>
<td>San Miguel limestone 1</td>
<td>Atlantic muck 2</td>
</tr>
<tr>
<td><em>Age (?)</em></td>
<td>Chargres alluvium 2</td>
</tr>
<tr>
<td>Aguacate series 1</td>
<td>Pacific muck 2</td>
</tr>
<tr>
<td>Colorado limestone 3</td>
<td><strong>Pleistocene</strong></td>
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<tr>
<td>Rio Seco diabase 3</td>
<td>Aguadulce formation 1</td>
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<tr>
<td>Sabana Grande siliceous limestone 3</td>
<td>Armuelles formation 2</td>
</tr>
<tr>
<td>El Salvador</td>
<td>Marista formation 1</td>
</tr>
<tr>
<td><em>Pliocene (?)</em></td>
<td>Mount Hope formation 1</td>
</tr>
<tr>
<td>Rio Torola limestone 2</td>
<td>San Carlos formation 1</td>
</tr>
<tr>
<td><strong>Guatemala</strong></td>
<td><strong>Pre-Pleistocene</strong></td>
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<tr>
<td><em>Tertiary</em></td>
<td>Azuero formation 1</td>
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<td><em>Sepur beds</em></td>
<td><strong>Pliocene</strong></td>
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<tr>
<td><em>Miocene (?)</em></td>
<td>Caribbean limestone 1</td>
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<td><em>Santo Toribio beds</em> 2</td>
<td>Charco Azul formation 2</td>
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<td><em>Mesozoic</em></td>
<td>Piliguilla conglomerate 2</td>
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<td><em>Ixcoy limestone 2</em></td>
<td><strong>Pliocene, lower</strong></td>
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<tr>
<td><em>Cretaceous</em></td>
<td><em>Chargres sandstone</em> 1</td>
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<tr>
<td><em>Coban limestone 3</em></td>
<td><em>Toro limestone</em> 1 member (of Chargres sandstone)</td>
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<td><em>Upper Cretaceous (?), Eocene (?)</em></td>
<td><em>Pre-Pliocene</em></td>
</tr>
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<td><em>Oligocene (?)</em></td>
<td><em>Acom rhyolite</em> 2</td>
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<tr>
<td><em>Petén marls and limestone</em> 2</td>
<td>Chiva Chiva andesite 2</td>
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<tr>
<td><em>Lower Cretaceous</em></td>
<td>Point Farfan diorite 2</td>
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<tr>
<td><em>Metapán formation</em> 1</td>
<td><strong>Miocene, upper</strong></td>
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<tr>
<td><strong>Honduras</strong></td>
<td>Chucunque formation 2</td>
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<tr>
<td><em>Pliocene (?)</em></td>
<td>Limones shale 3</td>
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<tr>
<td>_Escobales granodiorite_2</td>
<td><em>Miocene, upper, or Pliocene, lower</em></td>
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<tr>
<td><em>Guacamayas dacite tuffs and flows</em> 2</td>
<td><em>Burica sandstone</em> 2</td>
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<tr>
<td><em>Jutiapa rhyolitic tuffs and sediments</em> 2</td>
<td><em>Miocene, middle and upper</em></td>
</tr>
<tr>
<td><em>Ranco Quemado dacite</em> 2</td>
<td><em>Gatun formation</em> 1</td>
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<tr>
<td><em>Pliocene, lower</em></td>
<td><em>Miocene, middle</em></td>
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<td><em>Gracias formation</em> 2</td>
<td><em>Cativa marl (in Gatun formation)</em> 2</td>
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<td><em>Miocene</em></td>
<td><em>Puero sandstone</em> 3</td>
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<td><em>Toledo series</em> 2</td>
<td><em>Tuira formation</em> 2</td>
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<td><em>Miocene, middle (?)</em></td>
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<td><em>Cantarranas formation</em> 2</td>
<td>Sabanitas formation 2</td>
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<td><em>Colonia andesitic tuffs and breccias</em> 2</td>
<td><strong>Miocene, lower</strong></td>
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<td><em>Crucero tuffaceous dacite flows</em> 2</td>
<td>**Alhajuela sandstone member (of Caimito formation)_2</td>
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<tr>
<td><em>Planctitos formation</em> 2</td>
<td><strong>Bruja Island dolerite_ 2</strong></td>
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</table>
### Central America—Continued

#### Panama and the Canal Zone—Con.

**Miocene, lower—Continued**

- Cerro Gigante basalt
- Chillibrillo limestone member (of Caimito formation)
- Chorrera basalt
- Cucuracha formation
- Culebra formation
- Emperador limestone member (of Culebra formation)
- La Boca marine member (of Panamá formation)
- Miraflores basalt
- Panamá formation
- Pedro Miguel agglomerate member (of Panamá formation)
- Sosa Hill basalt

<table>
<thead>
<tr>
<th>Oligocene or Miocene</th>
</tr>
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<tbody>
<tr>
<td>Vamos Vamos beds 1</td>
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<table>
<thead>
<tr>
<th>Oligocene and Miocene</th>
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<tr>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Gamboa formation 2</td>
</tr>
<tr>
<td>Mona shale 1</td>
</tr>
<tr>
<td>Monkey Hill formation 1</td>
</tr>
<tr>
<td>Peña Blanca marls 1</td>
</tr>
<tr>
<td>Sensorí agglomerate and limestone 1</td>
</tr>
<tr>
<td>Tigre limestone 1</td>
</tr>
<tr>
<td>Watsi shale 1</td>
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<table>
<thead>
<tr>
<th>Oligocene (?)</th>
</tr>
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<tbody>
<tr>
<td>Bas Obispo formation 1</td>
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<table>
<thead>
<tr>
<th>Oligocene, upper, or Miocene, lower</th>
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<td>Rio Duque shales 2</td>
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<table>
<thead>
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<th>Oligocene, upper, and Miocene, lower</th>
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<tr>
<td>Águaqua formation 2</td>
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<tr>
<td>Carba facies (of Caimito formation) 2</td>
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<td>Tapaliza shales 2</td>
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<table>
<thead>
<tr>
<th>Oligocene, upper</th>
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<tbody>
<tr>
<td>Arusa formation 2</td>
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<table>
<thead>
<tr>
<th>Las Cascadas agglomerate (as Las Cascades agglomerate)</th>
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| Quebrancha limestone member (of Caimito formation) 2 |

<table>
<thead>
<tr>
<th>Oligocene, lower-upper</th>
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<tr>
<td>Bohío formation (as conglomerate) 1</td>
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<table>
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<th>Oligocene, lower</th>
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<td>Clarita limestone 2</td>
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<tr>
<td>Bucarú formation 2</td>
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<tr>
<td>Mindi Hill beds 2</td>
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<table>
<thead>
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<th>Eocene, upper</th>
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<tbody>
<tr>
<td>Bohío limestone 1</td>
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<tr>
<td>Casa Larga marls 3</td>
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<tr>
<td>David formation 2</td>
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<td>Tranquilla shale 2</td>
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<table>
<thead>
<tr>
<th>Eocene, middle and upper</th>
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<td>Gartuncillo formation 2</td>
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<th>Pre-Eocene</th>
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<tr>
<td>Barbacoas formation 2</td>
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<tr>
<td>Miraflores pumice 2</td>
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<td>San Pablo phase (of Barbacoas formation) 2</td>
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### Central America—Continued

#### Panama and the Canal Zone—Con.

**Cretaceous and Eocene**

<table>
<thead>
<tr>
<th>Cretaceous and Eocene</th>
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<tbody>
<tr>
<td>Moro Chin formation 2</td>
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<table>
<thead>
<tr>
<th>Age (?)</th>
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<tbody>
<tr>
<td>The names Bijuco, Guaxaro, and Rio Santa Maria are erroneously listed in lithic combinations with age unknown in part A of this bulletin, owing to mistranslation.</td>
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<table>
<thead>
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<th>Canazes formation 1</th>
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<tr>
<td>Montújio conglomerate 1</td>
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<tr>
<td>Obispo breccia 1</td>
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<td>Obispo limestone 1</td>
</tr>
<tr>
<td>Parita formation 2</td>
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<tr>
<td>Santiago formation 1</td>
</tr>
<tr>
<td>Torio limestone 1</td>
</tr>
<tr>
<td>Veraguas crystalline series 1</td>
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<tr>
<td>Wemir agglomerate 2</td>
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**Greenland**

| Detailed information on the geologic formations of Greenland can be found in the Lexique Stratigraphique International, v. 1, Europe, fascicule 1 a, Greenland. |

<table>
<thead>
<tr>
<th>Pleistocene</th>
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<tbody>
<tr>
<td>Baffin till 1</td>
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<table>
<thead>
<tr>
<th>Tertiary (see also Cretaceous-Tertiary)</th>
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<tbody>
<tr>
<td>Cape Edward Holm complex 2</td>
</tr>
<tr>
<td>Dreibuchen zone 2</td>
</tr>
<tr>
<td>Kangerdlugssuaq complex 2</td>
</tr>
<tr>
<td>Kap Simpson complex 2</td>
</tr>
<tr>
<td>Skaergaard complex 2</td>
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<table>
<thead>
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<th>Tertiary (?)</th>
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<tr>
<td>Cape Parry alkaline complex 2</td>
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<tr>
<td>Tertiary, upper, to Quaternary, lower</td>
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| Skeldal conglomerate 2 |

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<th>Miocene</th>
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<tr>
<td>Sinnifik strata 2</td>
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<tr>
<td>Atanikerdluk beds 2</td>
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<td>Ipsorisk strata 2</td>
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<table>
<thead>
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<tr>
<td>Cape Dalton formation 2</td>
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<td>Sahine Island formation 2</td>
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<table>
<thead>
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<tbody>
<tr>
<td>Lilloise complex 2</td>
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<td>Prinsen af Wales Bjaerge lavas 2</td>
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<table>
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<th>Cretaceous-Tertiary</th>
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<tbody>
<tr>
<td>Nugsuak formation 2</td>
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<table>
<thead>
<tr>
<th>Upper Cretaceous</th>
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<tbody>
<tr>
<td>Albrechtsbugt facies 2</td>
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<tr>
<td>Atane beds 2; see also Atane beds 1</td>
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<tr>
<td>Kap Gustav Holm series 2</td>
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<tr>
<td>Knudshoved beds 2</td>
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<tr>
<td>Patoot beds 2; see also Patoot beds</td>
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<table>
<thead>
<tr>
<th>Upper Cretaceous (?)</th>
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<tbody>
<tr>
<td>Kangerdlugssuaq series 2</td>
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<table>
<thead>
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<th>Lower Cretaceous</th>
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<tbody>
<tr>
<td>Cape Hamburg formation 2</td>
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<tr>
<td>Falskebugt beds 2</td>
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<td>Hartz Fjaeld formation 2</td>
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</table>
Greenland—Continued

**Lower Cretaceous**—Continued

Home Foreland beds
Kome beds; see also Kome beds
Kuhnpas facies
Lindemansbugt facies
Niesen beds
Røddygen beds
Young Sound facies

**Jurassic**

Cape Leslie sandstone
Chatton Bay sandstone

**Upper Jurassic**

Cape Maurer formation
Charcotbucht sandstone
Fossil Mountain formation
Kløft T formation
Koch Fjaeld formation
Kuhn beds
Rigi series
Tassek facies
Vardekløft formation

**Lower Jurassic**

Neills Cliff formation

**Triassic** (see also Permo-Triassic)

Fleming Inlet series

**Upper Triassic**

Cape Biot formation
Cape Stewart formation

**Lower Triassic** (see Permian or Lower Triassic)

**Eotriassic**

Wordie Creek formation

**Paleozoic**

Cape Fletcher series

**Lower Paleozoic**

Angmagssalik granite
Cape Greg gneisses
Emilia group
Franz Josef beds
Grejsdalene granite
Hagar group
Hurry Inlet gneisses
Isfjord zone
Mülenland granite
Store Fjord gneisses
Store Fjord granite
Svejstrips injection complex
Sylya-Maria group

**Permian or Lower Triassic**

Cape Brown and Hurry Inlet series

**Permo-Triassic**

Mount Nordenskiold formation

**Permo-Triassic (?)**

Klitdal formation

**Permian**

Cape Stosh formation
Depot Island formation

**Lower Permian**

Donkin Series

**Upper Carboniferous**

Halle Mountains formation
Mallemuk Mountain formation

**Lower Carboniferous**

Mount Pictet formation

Greenland—Continued

**Lower Carboniferous (?)**

Foldvik Creek formation

**Middle Pennsylvanian**

Blyklippen series

**Devonian or younger**

Råsøbøl conglomerate

**Devonian**

Cape Graah formation
Kap Bull series
Kap Franklin conglomerate
Kap Kolthoff series
Mont Celsius series

**Devonian (?)**

Hurry Inlet granite
Igaliko sandstone
Ilmausak complex
Ilmausak porphyries
Kakarsuak porphyrite
Tassek porphyrite

**Upper Devonian**

Mount Hogbom series

**Middle Devonian**

Kap Franklin-Vildtal granite
Margethøtel formation
Mount Werner series
Ravnefjeld formation
Rodetal conglomerate (in Magrethøtel series)
Vildtal series

**Pre-Devonian**

Cape Wardlaw complex

**Silurian** (see also Ordovician and Silurian)

Polaris Harbour formation; see also Polaris Harbour formation

**Silurian (?)**

Proffjeldet shales

**Middle Silurian**

Cape Schuchert formation
Cape Tyson formation
Drømmebjerg limestone
Offley Island formation; see also Offley Island formation

**Ordovician and Silurian**

Centrum limestone

**Ordovician**

Narwhale Sound formation

**Middle or Upper Ordovician**

Børglum River limestone
Cape Weber formation

**Middle and Upper Ordovician**

Cape Calhoun series

**Middle Ordovician**

Cape Webster formation
Gonioceras Bay formation
Troedsson Cliff formation; see also Troedsson Cliff formation
Wright Bay formation

**Middle Ordovician (?)**

Painted formation

**Lower Ordovician**

Cape Clay formation
Cass Fjord formation
Danmarks Fjord dolomite
Greenland—Continued

Lower Ordovician—Continued

Eskimo Hut formation
Nunatami formation; see also Nunatami formation
Nygaaard Bay limestone
Poulsen Cliff shale
Wandel Valley limestone

Cambrian or Ordovician

Kap Holbaek sandstone

Cambo-Ordovician

Hurry Inlet formation

Cambrian (see Precambrian or Cambrian; and Precambrian to Cambrian)
Cape Frederick VII formation
Dolomite Point formation
Hyolithus Creek formation

Cambrian (f)

Brygland Fjord dolomite

Upper Cambrian (f)

Pemmican River formation; see also Pemmican River formation

Middle Cambrian

Blomsterbaek limestone member (of Cape Wood formation)
Cape Russell member (of Cape Wood formation)
Cape Wood formation
Ymer formation

Middle Cambrian (f)

Blomsterbukta quartzite and shale
Hidden Valley formation
Noa Lake quartzite

Lower Cambrian

Bastion formation
Cape Kent formation
Ella Island formation
Marshall Bay formation
Petermann series; see also Petermann series
Wulff River formation

Lower Cambrian (f)

Spiral Creek formation; see also Spiral Creek formation

Precambrian or Cambrian

Cape Ingersoll dolomite
Cape Leiper dolomite
Cape Oswald formation
Rensselaer sandstone
Tillite Canyon formation; see also Tillite Canyon formation

Precambrian to Cambrian

Tömmer Bay group

Precambrian

Appat formation
Alpesjord series (of Eleonore Bay formation)
Arsuk group
Canyon series (in Eleonore Bay formation)
Cape Rawson beds
Danish Village formation
Dombjerg parascists

Greenland—Continued

Precambrian—Continued

Egedesminde gneiss complex
Eleonore Bay formation
Eleonores Sø series
Eremitdal series (in Eleonore Bay formation)
Etah formation
Finnefjeld complex
Gardar formation
Greenlandian
Gregory series
Ikertoq gneiss complex
Isortoq gneiss complex
Julianehaab granite
Kangamiut diabase
Kangamiut gneiss complex
Ketilidian period
Kungnat granite
Maalebjerg series (in Eleonore Bay formation)
Mørkebjerg formation
Mystery quartzite series
Narsarsuq formation
Nunarsuit granite
Rivieradal sandstone
Sermilik group
Stenorkenen phyllites
Sukkertoppen gneiss or granite
Sydprøven granite
Sydvejdal marbles
Tasegefjeldene graywackes
Thule formation; see also Thule formation
Tvege banded psammitic/pelitic group
Tyrolean series
Tyroledal banded psammitic/pelitic group
Tyroledal group
Ulvebjerg sandstones and tilites
Westendspids pelitic group
Woisthenholme quartzite

Precambrian (f)

Marmovigen conglomerate
Norsemandal sandstone

Age (f)

Bjærne Ø conglomerate
Campanulaid sandstones and limestones
Fyns Sø dolomite
Milne Land quartzite
Røde Ø conglomerate

Bermuda

Pleistocene

Belmont limestone
Devonshire formation
Harrington soil
McGalls soil
Pembroke eolianite
St. Georges soil
Shore Hill soil
Signal Hill soil
Somerset eolianite
## Bermudas—Continued

**Pleistocene—Continued**

- Southampton eolianite
- Warwick eolianite

**Pliocene**

- Walsingham formation
- Age(t)
- Paget formation

### West Indies

Small islands of the West Indies from which no geologic formations have been named are not listed here. Detailed information on these and the larger islands except Cuba can be found in the Lexique Stratigraphique International, v. 5, Amerique Latine, fascicule 2 b, Antilles.

#### Anguilla, British West Indies

- *Miocene, lower*
  - Anguilla formation

#### Antigua, British West Indies

- *Pliocene*
  - Friars Hill gravel and marls

- *Oligocene*
  - Cassada-Garden gravels
  - Central Plain tuff formation
  - Hodges Hill sandstone
  - Seaforth limestone

- *Oligocene, upper*
  - Antigua formation

- Age(t)
  - Friars Hill series

#### Aruba, Netherlands West Indies

- *Upper Cretaceous*
  - Aruba formation

#### Bahamas Islands

No geologic formations in the Bahamas Islands have received names.

#### Barbados, British West Indies

- *Quaternary*
  - Bath-Reef series

- *Tertiary*
  - Ragged Point series

- *Oligocene, upper*
  - Bissex Hill marl

- *Oligocene, lower*
  - Codrington College marl

- *Eocene*
  - Mount Hillaby beds
  - Mount Poyer sandstone (in Scotland beds)

- *Eocene, upper*
  - Bath beds (in Oceanic formation)
  - Joes River beds

- *Eocene, upper, to Oligocene*
  - Oceanic formation

- *Eocene, middle*
  - Chalky Mount group
  - Mount All beds (in Scotland formation)
  - Murphys beds (in Scotland formation)

#### West Indies—Continued

#### Barbados, British West Indies—Con.

- *Eocene, lower and middle*
  - Scotland beds

- *Eocene, lower*
  - Morgan Lewis beds (in Scotland formation)
  - St. Andrews beds
  - Walkers beds (in Scotland formation)

#### Barbuda, British West Indies

- *Pleistocene*
  - Barbuda limestone

#### Bonaire, Netherlands West Indies

- *Pleistocene*
  - Seroe Largo limestone

- *Eocene, upper*
  - Seroe Montagne limestone

- *Cretaceous or Tertiary*
  - Rincon formation
  - Soebi Blanco conglomerate

#### Cuba

- *Quaternary*
  - Coastal limestone

- *Recent*
  - Surgidero formation

- *Pleistocene*
  - Jaimanitas formation
  - Zapata formation

- *Pleistocene(t)*
  - Las Puercoa marl

- *Pliocene*
  - Matanzas series

- *Miocene*
  - La Cruz marl
  - Manzanillo formation
  - Punta Maisi limestone

- *Miocene, upper*
  - El Abra formation

- *Miocene, middle*
  - Cañimar formation

- *Miocene, lower*
  - Limonar formation

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  - Guantanamo shale
  - Guines limestone
  - Maquay formation
  - Yumuri limestone

- *Oligocene and Miocene*
  - Nipe series
  - Paso Real formation

- *Oligocene*
  - Adelina marl
  - Farallon Grande breccia

- *Oligocene, upper*
  - Tarará formation

- *Oligocene, middle*
  - Colón formation

- *Marino formation*
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Rio Yuaco series
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San German limestone
Sierra de Cuyay tuffs

Cretaceous
Rio conglomerate *
Rio Blanco series
Rio Culebrinas series
Rio Yuaco series
San Diego formation *
San German limestone
Sierra de Cuyay tuffs

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- Lantern marl (in Chaudiere shale)
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- Laventille limestone

**Jurassic**
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- Maracas beds
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    - Garim limestone
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- Caroline Islands (Map)
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    - Map formation
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- Caroline Islands (Ponape)
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    - Getuyoto beds
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- Hawaii (Island of Hawaii)
  - **Quaternary** (see also Tertiary, upper, to Quaternary)
    - Glenwood tuff
    - Kapukapu tuff
    - Olaa agglomerate
    - Waiau formation
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Hawaii (Island of Hawaii)—Con.

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- **Keanakakoi formation**
- **Recent and Pleistocene, upper**
- **Kau volcanic series**
- **Kona tuff formation**
- **Puna volcanic series**
- **Pleistocene or Recent**
- **Uwekahuna ash**
- **Pleistocene and Recent**
  - **Hualalai volcanic series**
  - **Honolulu volcanic series**
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  - **Laupahoehoe volcanic series**
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  - **Hawaii volcanic series**
  - **Hawaii drift and stage**
  - **Hawaii ash**
  - **Waihuna fanglomerate**
- **Pleistocene(f)**
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  - **Waawaa volcanics**
- **Tertiary, upper, to Quaternary**
  - **Hamakua volcanic series**

Hawaii (Island of Kahoolawe)

- **Pliocene(f)**
  - **Eanapou volcanic series**

Hawaii (Island of Kauai)

- **Pleistocene**
  - **Palikea formation**
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- **Pleistocene(f)**
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  - **Makaweli formation**
  - **Mokuone member**
  - **Napali formation**
  - **Olokele formation**
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Hawaii (Island of Lanai)

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  - **Lanai volcanic series**
  - **Age(f)**
  - **Makalapua basalt**
  - **Mokuolu basalt**
  - **Pohaku volcanic series**
  - **Waiakea volcanic series**
  - **Kilauea volcanic series**

Hawaii (Island of Maui)

- **Pleistocene or Recent(f)**
  - **Lahaina volcanic series**
  - **Lana volcanic series**
  - **Pleistocene and Recent**
  - **Hana volcanic series**
  - **Pleistocene**
  - **Kaupu mud flow**

Hawaii (Island of Molokai)

- **Pliocene**
  - **West Molokai volcanic series**
  - **East Molokai volcanic series**

Hawaii (Island of Niihau)

- **Pleistocene**
  - **Makiike volcanic series**
  - **Paniau volcanic series**

Hawaii (Island of Oahu)

- **Quaternary**
  - **Aliamanu basalt**
  - **Kaau mud flow**
  - **Kii Point limestone**
  - **Pyramid Rock basalt**

**Recent**
- **Black Point ash**
- **Diamond Head talus breccia**
- **Kalama volcanics**
- **Pleistocene(f)**
  - **Kolekole volcanics**
- **Pleistocene, upper, or Recent**
  - **Kaupo basalt**
  - **Koko volcanics**
  - **Manana tuff**
  - **Sugar Loaf basalt**
  - **Tantalus basalt**
  - **Pleistocene, upper, and Recent**
  - **Kaohikaipu volcanics**
- **Pleistocene, upper**
  - **Ainoni volcanics**
  - **Aliamanu tuff**
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**Hawaii (Island of Oahu)—Continued**

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**ADDITIONS AND CORRECTIONS TO “ROCK UNITS”**

**Additions:**

The following new units are being used by the U.S. Geological Survey as formations containing earlier named units as members:


Recent additions to and revisions of Survey usage made too late to be included in the text:

- **Genesee formation** (as group ^1^), Upper Devonian of New York (p. 512), containing the following members:
  - Genesee shale ^1^ member (p. 512)
  - Genundewa limestone member (as lentil of Geneseo shale ^1^) (p. 512)
  - Ithaca member (as shale member of Portage formation ^1^) (p. 512)
  - Penn Yan shale member (as Tongue of West River shale ^2^) (p. 512)
  - Renwick shale member ^1^ (p. 512)
  - Sherburne flagstone member (as member of Portage formation ^1^) (p. 512)
  - West River shale ^1^ member (p. 512)
- **Keiser limestone** (as member of Helderberg limestone ^1^), Upper Silurian and Lower Devonian (?) of West Virginia (p. 571)
- **McElroy formation** (as member of Fayette sandstone ^1^), upper Eocene of Texas (p. 546), containing the following members:
  - Dilworth sandstone member (as sand ^1^) (p. 545)
  - Manning clay member (as beds ^1^) (p. 545)
- **Shublik formation**, ^1^ Middle and Upper Triassic of Alaska (p. 433)
- **Wells formation**, ^1^ Pennsylvanian and Permian of Idaho (p. 460)
Additions:

**Whitsett formation** (as beds\(^1\)), upper Eocene of Texas (p. 546), containing the following members:
- **Callihan sandstone member** (as sand\(^1\)) (p. 545)
- **Dubose member** (as sands and clays\(^1\)) (p. 546)
- **Fashing clay member** (as clay\(^1\)) (p. 546)
- **Stones Switch sandstone member** (as sand\(^1\)) (p. 546)

Corrections:

\(^1\)Sharon coal group, Lower Pennsylvanian of Maryland, omitted from text

**Sugarloaf quartz latite** (p. 435), Cretaceous or Tertiary of Arizona (James Gilluly, 1956, U.S. Geol. Survey Prof. Paper 281, p. 90–93), erroneously entered in part A (p. 354) with reference belonging to Sugarloaf series (see below)


The names listed below are cited under erroneous localities in the text:
- **Bromley shale** (in Cynthiana formation), Middle Ordovician of Kentucky (p. 522)
- **Floyd shale**, Upper Mississippian of Georgia (p. 430)
- **Drywood formation or coal group**, Pennsylvania (Des Moines) of Missouri (p. 526)
The U.S. Geological Survey Library has cataloged this publication as follows:

**Wilson, Druid, 1906–**


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