

Index to the Geologic Names of North America

GEOLOGICAL SURVEY BULLETIN 1056-B



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

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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



UNITED STATES DEPARTMENT OF THE INTERIOR

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GEOLOGICAL SURVEY

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Major stratigraphic and time divisions in use by the U.S. Geological Survey

Era	System or Period		Series or Epoch	Estimated ages of time boundaries in millions of years ¹
Cenozoic	Quaternary		Recent	
			Pleistocene	— 1 —
	Tertiary		Pliocene	— 10 —
			Miocene	— 25 —
			Oligocene	— 40 —
			Eocene	— 60 —
			Paleocene	
Mesozoic	Cretaceous ²		Upper (Late) Lower (Early)	— 125 —
	Jurassic		Upper (Late) Middle (Middle) Lower (Early)	— 150 —
	Triassic		Upper (Late) Middle (Middle) Lower (Early)	— 180 —
Paleozoic	Permian ²			— 205 —
	Carbon- iferous systems	Pennsylvanian ²	Upper (Late) Middle (Middle) Lower (Early)	
		Mississippian ²	Upper (Late) Lower (Early)	— 255 —
	Devonian		Upper (Late) Middle (Middle) Lower (Early)	— 315 —
	Silurian ²		Upper (Late) Middle (Middle) Lower (Early)	— 350 —
	Ordovician ²		Upper (Late) Middle (Middle) Lower (Early)	— 430 —
	Cambrian ²		Upper (Late) Middle (Middle) Lower (Early)	— 510 —
	Precambrian ²			Informal subdivisions such as upper, middle, and lower, or upper and lower, or younger and older may be used locally.

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 Knapf 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.

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INTRODUCTION

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

"North American Geologic Formation Names," by F. B. Weeks (Bull. 191, 1902).

"The Geologic Time Classification of the United States Geological Survey Compared with Other Classifications, Accompanied by the Original Definitions of Era, Period, and Epoch Terms," by M. Grace Wilmarth (Bull. 769, 1925).

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

"Lexicon of Geologic Names of the United States (including Alaska)," by M. Grace Wilmarth (Bull. 896, 1938; reprinted 1951, 1957).

"Geologic Names of North America Introduced in 1936-1955," by Druid Wilson, W. J. Sando, R. W. Kopf, and others (Bull. 1056-A, 1957).

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

territories. 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. iv). 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 Nutrián 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 group¹] 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.

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- Chart 3. Swartz, C. K., and others, 1942, Correlation of the Silurian formations of North America: *ibid.*, v. 53, no. 4, p. 533-538.
4. Cooper, G. A., and others, 1942, Correlation of the Devonian sedimentary formations of North America: *ibid.*, v. 53, no. 12, pt. 1, p. 1729-1794.
5. Weller, J. M., and others, 1948, Correlation of the Mississippian formations of North America: *ibid.*, v. 59, no. 2, p. 91-196.
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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 ¹
Holocene ¹
†Psychozoic era ¹

Quaternary

Antropoceno periodo ²
Cenocene series ¹
Epicene series ¹
Hectozoic ¹

Tertiary

Neozoic ¹
Pentozoic ¹

Miocene-Pliocene

Neogene ¹; Neocene ¹

Eocene-Oligocene

Eogene ¹

Paleocene-Oligocene

Paleogene ¹

Mesozoic

Deutozoic ¹
Tetrazoic ¹
Trizoic ¹

Precambrian

† Agnotozoic era ¹
† Archean period or system ¹
† Archeozoic era ¹
† Azoic era ¹
† Collozoic age ¹
† Eobiotic era ¹
† Eomorphic era ¹
† Eozoic era ¹
† Eparchean ¹
† Hypozoic era ¹
† Progonic ¹
† Proterozoic era ¹
† Protozoic era ¹
† Prozoic era ¹

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 ¹ (Wisconsin)*
Sangamon [interglacial] stage ¹ (Illinois)
Illinoian [glacial] stage ¹ (Illinois)
Yarmouth [interglacial] stage ¹ (Iowa)
Kansan [glacial] stage ¹ (Kansas; standard sections in Iowa)
Aftonian [interglacial] stage ¹ (Iowa)
Nebraskan [glacial] stage ¹ (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)
- Cochrane glacial substage ² (Ontario)
- Eldoran epoch and series ¹ (Iowa)
- Farmdale 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)
- Twin Lakes 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

- Makanaka 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):

- | | | |
|------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Eocene</i> | { | Jackson [<i>see</i> Jackson formation ¹ or group ; Jacksonian ¹ (Mississippi)]
Clairborne [<i>see</i> Clairborne group ¹ ; Claibornian ¹ (Alabama)]
Wilcox [<i>see</i> Wilcox group ¹ (Alabama)] |
| <i>Paleocene</i> | { | Midway [<i>see</i> 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):

<i>Miocene</i>	{late	{Yorktownian substage (Virginia)
	{middle	{St. Marysian 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 megafossils, 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

<i>Microfaunal stages</i>		<i>Megafaunal "stages"</i>
Hallian stage	} <i>Pleistocene</i>	<i>Pleistocene</i>
Wheelerian stage		San Joaquin [<i>see</i> San Joaquin fm. ¹]
Venturian stage	} <i>Pliocene</i>	Etchegoin [<i>see</i> Etchegoin fm. ¹]
Repettian stage		Jacalitos [<i>see</i> Jacalitos fm. ¹]
Delmontian stage	} <i>Miocene</i>	Neroly [<i>see</i> Neroly fm. ¹]
		Cierbo [<i>see</i> Cierbo ss. ¹]
Mohnian stage		Briones [<i>see</i> Briones ss. ¹]
Luisian stage		
Relizian stage		Tembler [<i>see</i> Temblor fm. ¹]
Saucesian stage		
Zemorrian stage		Vaqueros [<i>see</i> Vaqueros ss. ¹]
		Blakeley [<i>see</i> Blakeley fm. ¹ (Wash.)]
Refugian stage		Lincoln [<i>see</i> Lincoln fm. ¹ (Wash.)]
		Keasey [<i>see</i> Keasey sh. ¹ (Oreg.)]
Narizian stage	} <i>late</i> }	Tejon [<i>see</i> Tejon fm. ¹]
Ulatisian stage		"Transition beds"
Penutian stage		Domengine [<i>see</i> Domengine fm. ¹]
Bulitian stage	} <i>early</i> }	Capay [<i>see</i> Capay fm. ¹]
		Meganos [<i>see</i> Meganos fm. ¹ ; lower Eocene according to U.S. Geol. Survey usage]
Ynezian stage	} <i>Paleocene</i>	Martinez [<i>see</i> Martinez fm. ¹]

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

Pleistocene
 Pedroian ¹
 Red Bluff epoch ¹
 San Pedran epoch ¹
Pliocene and Quaternary
 Sierran ¹
Eocene, late
 Fresnian stage ²
Eocene, early
 Juniperan stage ²

Cenozoic (continental)

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

<i>Tertiary</i>	<i>Pliocene</i>	Blancan age (Texas)
		Hemphillian age (Texas)
		Clarendonian age (Texas)
	<i>Miocene</i>	Barstovian age (California)
		Hemingfordian age (Nebraska)
		Arikareean age (Nebraska)
	<i>Oligocene</i>	Whitneyan age (Nebraska)
		Orellan age (Nebraska)
		Chadronian age (South Dakota)
	<i>Eocene</i>	Duchesnean age (Utah)
		Uintan age (Utah)
		Bridgerian age (Wyoming)
	<i>Paleocene</i>	Wasatchian age (Wyoming-Utah)
		Clarkforkian age (Wyoming)
		Tiffanian age (Colorado)
		Torreonian age (New Mexico)
		Dragonian age (Utah)
		Puercan age (New Mexico)

Other continental Cenozoic ages and stages:

North America

Pleistocene

Rancholabrean age ² (California)

Irvingtonian age ² (California)

California

Pliocene (Clarendonian)

Montediablan stage ²

Cerroteronian 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.

<i>Cretaceous</i>	<i>Late</i>	Maestrichtian	} Senonian
		Campanian	
		Santonian	
		Coniacian	
		Turonian	
	<i>Early</i>	Cenomanian	} Neocomian
		Albian	
		Aptian	
		Barremian	
		Hauterivian	
<i>Jurassic</i>	<i>Late</i>	Valanginian	} Neocomian
		Berriasian (Infra-Valanginian)	
		Purbeckian	
		Portlandian	
		Kimmeridgian	
	<i>Middle</i>	Oxfordian	} Neocomian
		Calloviaian	
		Bathonian	
		Bajocian	
		Toarcian	
<i>Triassic</i>	<i>Early</i>	Pliensbachian	} Neocomian
		Sinemurian	
		Hettangian	

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

Mesozoic—Continued

<i>Triassic</i>	{ <i>Late</i>	{ Rhaetian Norian Carnian (Karnian)
		{ Ladinian Anisian (Virglorian)
	{ <i>Early</i>	{ Scythian (Werfenian)

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 ¹

Early Cretaceous

†Comanchean system ¹ (Texas)

†Shastan system ¹ (California)

Gulf Coastal Plain

Late Cretaceous

Gulf series ¹ (Texas)

Early and Late Cretaceous

Comanche series ¹ (Texas)

Early Cretaceous

Coahuila series (as Coahuila group²) (Mexico)

California and Oregon

Early Cretaceous

Shasta series ¹ (California)

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

<i>Late Cretaceous</i>	{	Cheneyan stage ("pre-Martinez Paleocene or post-Moreno Cretaceous"; author favored Paleocene; placed here for convenient listing)
		Ciervian stage
		Ingramian stage
		Tracian stage
		Weldonian stage
		Cachenian stage
		Delevanian stage

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 ¹ (Pennsylvania)

†New York system ¹ (New York)

Devonian—Mississippian

†Bradfordian ¹ (Pennsylvania-New York)

Chattanooga series ¹ (Tennessee)

Erian period ¹ (New York)

†Waverlyan system ¹ (Ohio)

Paleozoic—Continued

Silurian-Devonian

Monroan ¹ (Michigan)

Yorkian period ¹ (New York)

Ordovician—Silurian

†Oswegan 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:

- { **Ochoa 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)]

Minco 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:

- | | | |
|---|-----------------------------------------------------------------------------|---------------------------------------------|
| | | Age according to U.S.
Geol. Survey usage |
| { | Virgil series ¹ (Kansas) | Late |
| | Missouri series [<i>see</i> Missouri group ¹ (Missouri)] | |
| | Des Moines series [<i>see</i> Des Moines group ¹ (Iowa)] | |
| | Atoka series [<i>see</i> Atoka formation ¹ (Oklahoma)] | Middle |
| { | Morrow series [<i>see</i> Morrow group ¹ (Arkansas)] | 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)Oklan series (epoch) ² (Oklahoma)Venteran substage ² (Missouri)*Early and Middle Pennsylvanian*†Bend series ¹ (Texas)Ti Valley series ² (Oklahoma)*Early Pennsylvanian*Ardian series (epoch) ² (Oklahoma)Lampasas 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)] }	<i>Late</i>
	<i>Early</i>

Other Mississippian time units:

Eastern United States

Late Mississippian†Tennessean system ¹ (Tennessee)

Central United States

*Mississippian*Leeic 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 ¹ (Pennsylvania-New York)]	Conewango stage [see Conewango series ¹ (Pennsylvania)]
Chautauquan series [see Chautauquan group ¹]	Cassadaga stage ²
Senecan series [see under Seneca limestone ¹]	Chemung stage [see under Chemung formation ¹]
Erian series [see Erie series ¹]	Finger Lakes stage ²
	Taghanic (Taughannock) stage ²
	Tioughnioga stage ²
	Cazenovia stage [see Cazenovia group ¹]
	Onesquethaw stage ²
Ulsterian series [see Ulster group ¹]	Deerpark stage ²
	Helderberg stage [see Helderberg group ¹ ; Helderbergian ¹]

Other Devonian time units:

Eastern North America

Middle Devonian

†Hamilton period¹ (New York)

Stroudsburgian stage² (Pennsylvania)

Early Devonian

Oriskanian¹ (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, ¹ Cayuga group ¹ (New York); Cayuga series of the U.S. Geol. Survey]	} Late
Niagaran series [see Niagaran ¹ , Niagara series ¹ , Niagara group ¹ (New York)]	
Albion series [see under Albion sandstone ¹ (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 ¹ (Illinois)]	} Middle
	} Early

Age according
to U.S. Geol.
Survey usage

Other Silurian time units:

Eastern North America

Silurian

†Ontarian¹ (New York)

Late Silurian

Salinan¹ (New York)

Middle Silurian

Anticostian¹ (Quebec)

†Lockport group¹ (New York)

Early and Middle Silurian

†Niagara period¹ (New York)

Early Silurian

Medinan¹ (New York)

Central North America

Middle Silurian

†Chicago group¹ (Illinois)

Ordovician

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

Cincinnatian series ¹ [see also Cincinnati system ¹ (Ohio); restricted in use by the U.S. Geol. Survey to Ohio, Indiana, Kentucky and Tennessee]	{ 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]
		{ Trentonian stage [see under Trenton limestone or group ¹ (New York)] Black River stage [see Black River group ¹ (New York)]
		{ Chazy stage [see Chazy group ¹ (New York)]
Champlainian series [see † Champlainian system ¹ (New York)]		
Canadian series [see under † Canadian series ¹ ; † Canadian system ¹ (Quebec)]		

Other Ordovician time units:

Eastern North America

Ordovician

†**Champlainian system**¹ (New York)

†**Nashvillean**¹ (Tennessee)

†**Trenton period**¹; **Trentonian**¹ (New York)

Middle Ordovician

Bolarian series² (Virginia) {**Hunterian subseries**² (Pennsylvania)
Hatterian subseries² (Pennsylvania)

Chazyan¹ (New York)

Lincolnshirian stage² (Virginia)

Early Ordovician

Beekmantownian¹ (New York)

Shenandoan¹ (Appalachian region)

Stonehengean division² (Pennsylvanian)

Central and eastern North America

Ordovician

Simpsonian series² (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

Bretonian¹ (Nova Scotia)

Johannian series¹; **Johannian**¹ (New Brunswick)

†**Potsdamian**¹ (New York)

†**Saratogan epoch or series**¹ (New York)

Middle Cambrian

Acadian series or epoch¹ (New Brunswick)

Coldbrookian series² (Nova Scotia)

Conasaugan series² (Georgia)

Dugaldian series² (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. 57–67; 1955, p. 25–29; 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

Algonic period ¹ (Ontario)

†**Algonkian period** ¹ or system ¹ (Lake Superior region)

Anianic period ¹ (Cloud-Cuckoo-Land)

Animikie series ¹; **Animikean** ¹ (Ontario)

Coutchiching series ¹ (Ontario or Minnesota)

Grenville series ¹; **Grenvillian** ¹ (Ontario)

Haileyburian [see **Haileyburnian** ¹ (Ontario)]

Huronian series ¹; **Huronic 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

Laurencic 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)
Varennescic period ¹ (Ontario)

Cordilleran North America

Belt series ¹; Beltian system ¹ (Montana)
Bitterroot period ¹ (Montana)
Cherrie period ¹ (Montana)
Connaughtic ¹
Grand Canyon series ¹ (Arizona)
Llano series ¹ (Texas)
Madisonic 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.

United States

Alabama

Quaternary(?)

Buttahatchie gravel ¹

Pleistocene

Conecuh sands ¹

†Geneva sands ¹

†Mobile Bay formation ¹

Mon Louis formation ¹

†Ozark sands ¹

Tertiary

†Alabama white limestone ¹

Pliocene

Citronelle formation ¹

Miocene(?)

Roberts sand ¹

Miocene, lower

Paynes Hammock sand ²

Oligocene, middle

Glendon limestone ¹ member (of Byram formation)

Eocene

†Tombigbee ¹ (formation)

Eocene, upper, and Oligocene

†St. Stephens division ¹, formation, ¹ group, ¹ or limestone ¹

Eocene, upper

Cocoa sand member (of Yazoo clay); (as member of Jackson formation ¹)

Dellet sand member (of Moodys Branch marl) ²

North Creek member (of Yazoo clay) ²

Pachuta marl member (of Yazoo clay) ²

Shubuta member (of Yazoo clay) ²

Shubuta Hill clay ²

Eocene, middle

†Choctaw buhrstone ¹

Claborne group ¹

†Claborne sand ¹

Gosport sand ¹

Lisbon formation ¹

Tallahatta formation ¹

Eocene, lower

Bashi marl member (of Hatchetigbee formation); (as formation ¹)

†Bashi marl ¹

Bells Landing marl member (of Tuscahoma sand) ¹

†Bells Landing series ¹

†Fort Gaines ¹ (formation)

Grampian Hills member (of Nanafalia formation) ²

United States—Continued

Alabama—Continued

Eocene, lower—Continued

Greggs Landing marl member (of Tuscahoma sand) ¹

†Greggs Landing series ¹

Gullette Bluff beds ¹

Hatchetigbee formation ¹

Nanafalia formation ¹

†Nanafalia marl ¹

Salt Mountain limestone ¹

†Tuscahoma marl ¹

Tuscahoma sand ¹ or formation

Wilcox group ¹ or formation

†Woods Bluff group or series ¹

Woods Bluff marl (in Bashi formation) ¹

Paleocene

†Black Bluff group, clay or series ¹

Chattahoochee ¹ (formation)

Clayton formation ¹

Coal Bluff member (of Naheola formation); (as beds or series ¹)

McBryde limestone member (of Clayton formation) ²

†Matthews Landing group or series ¹

Matthews Landing marl ¹

Midway formation or group ¹

†Midway series or limestone ¹

Naheola formation ¹

†Naheola marl ¹

†Oak Hill-Pine Barren group ¹

Oak Hill member (of Naheola formation) ²

Pine Barren member (of Clayton formation); (as beds ¹)

†Rutledge limestone ¹

†Succarnochee clay ¹

Upper Cretaceous

Arcola limestone member (of Mooreville chalk) ²

Coker formation ²

†Cottondale formation ²

Demopolis chalk (as division ¹)

Eoline member (of Coker formation) ²

†Eufaula sands ¹

Eutaw formation ¹

Gordo formation ²

McShan formation ²

Perote member (of Providence sand) ²

†Portland division (of Selma chalk) ²

United States—Continued

Alabama—Continued

Upper Cretaceous—Continued**Prairie Bluff chalk**²**Selma chalk**¹ or group†Selma division (of Selma chalk)¹†Tombigbee chalk¹**Tuscaloosa formation**¹ gravel, or group*Lower Cretaceous***Vick formation**¹*Paleozoic* (see also *Precambrian* or *Paleozoic*)Dempsey marble¹ (in Talladega slate)*Probably Paleozoic***Jumbo dolomite member** (of Talladega slate)¹*Probably Paleozoic (pre-Devonian)***Butting Ram sandstone member** (of Talladega slate)¹**Cheaha sandstone member** (of Talladega slate)¹*Post-Carboniferous*†Bluff Springs granite¹Millerville green schist¹**Pinckneyville granite**¹*Post-Carboniferous(?)***Hillabee chlorite schist**¹Iwana green schist¹*Carboniferous* (see *Precambrian* to *Carboniferous*; and *Cambrian* to *Carboniferous*)*Carboniferous (probably Lower Pennsylvanian)***Erin shale**¹*Pennsylvanian*Black Creek coal group¹Brookwood coal group¹Cobb coal group¹Dogwood coal group¹Fayette gas sand¹ (subsurface)Gould coal group¹Gwin coal group¹Horse Creek coal group (in Pottsville formation)¹Mary Lee coal group¹†Montevallo conglomerate¹Nunnally coal group¹Pratt coal group¹†Sand Mountain conglomerate¹Straven coal group¹*Lower Pennsylvanian***Boyles sandstone member** (of Pottsville formation)¹**Bremen sandstone member** (of Pottsville formation)¹**Camp Branch sandstone member** (of Pottsville formation)¹**Chestnut sandstone member** (of Pottsville formation)¹**Lick Creek sandstone member** (of Pottsville formation)¹**Lookout sandstone**¹**Pine sandstone member** (of Pottsville formation)¹

United States—Continued

Alabama—Continued

Lower Pennsylvanian—Continued**Razburg sandstone member** (of Pottsville formation)¹**Rocky Ridge sandstone member** (of Pottsville formation)¹**Shades sandstone member** (of Pottsville formation)¹**Straight Ridge sandstone member** (of Pottsville formation)¹**Straven conglomerate member** (of Pottsville formation)¹**Wolf Ridge sandstone member** (of Pottsville formation)¹*Mississippian*Burgess oolite (in Bangor limestone)¹Dorans Cove sandstone¹†Huntsville¹ (formation)†La Grange sandstone¹†Lauderdale chert¹†Monte Sano limestone; also group¹†Oxmoor sandstone and shales¹Rockwood oolite¹Spout Spring oolite (in Bangor limestone)²*Upper Mississippian*Allsboro sandstone¹**Alsobrook member** (of Pride Mountain formation); (as formation)¹**Bangor limestone**¹**Floyd shale**¹ (see p. 622)**Hartselle sandstone**¹Little Shades sandstone member (of Parkwood formation)²**Parkwood formation**¹**Pride Mountain formation** (S.W. Welch, 1958, U.S. Geol. Survey Oil and Gas Inv. Chart OC-58)Southward Bridge formation¹Southward Pond formation¹**Tuscumbia limestone**¹*Lower Mississippian***Fort Payne chert**¹*Devonian* (see also *Cambrian—Devonian*)**Yellow Leaf quartz schist**¹*Middle Devonian***Ragland sandstone**¹*Lower or Middle Devonian***Frog Mountain sandstone**¹*Lower Devonian***Clear Branch sandstone**¹**Jemison chert**¹*Silurian* (see also *Cambrian—Devonian*)**Red Mountain formation**¹*Ordovician* (see also *Cambrian—Devonian*)†Pelham limestone¹*Middle Ordovician***Little Oak limestone**¹

United States—Continued

Alabama—Continued

Lower Ordovician

Attalla chert conglomerate member (of Chickamauga limestone)¹

†**Birmingham breccia**¹

Chepultepec dolomite¹

Longview limestone¹ or **dolomite**

Newala limestone¹ or **formation**

Odenville limestone¹

†**Salem breccia**¹

Cambrian to Carboniferous

Wedowee formation¹

Cambrian—Devonian

†**Red Mountain group**¹

Upper Cambrian

Bibb dolomite¹

Brierfield dolomite¹

Ketona dolomite¹

Middle and Upper Cambrian

†**Coosa shale**¹

†**Flatwoods shale**¹

Middle or Upper Cambrian

†**Aldrich limestone**¹

Lower Cambrian

†**Choccolocco shale**¹

Ladiga sandstone¹

†**Montevallo formation**¹

Weisner quartzite or formation¹

Precambrian to Carboniferous

Talladega slate¹ 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 slate¹

Waxahatchee slate¹

Precambrian

Ashland mica schist¹

Chewacla marble¹

Hollis quartzite¹

Lundy Mountain type¹ (mica schist)

Age(?)

Sougahatchee granite¹

Alaska

Quaternary (see also **Tertiary** and **Quaternary**)

Arch Point basalt²

Black Point basalt²

Dushkin basalt²

East Cape volcanics²

Little Pavlof agglomerate²

Mount Emmons volcanics²

Mount Hague volcanics²

Okmok volcanics²

Pavlof volcanics²

Pavlof Sister volcanics²

Tanak volcanics²

Volcano Bay basalt flow²

Quaternary(?)

Buldir volcanics²

United States—Continued

Alaska—Continued

Pleistocene or Recent

Crater Creek basalt²

Pleistocene (see also **Pliocene** or **Pleistocene**)

Bristol Bay silts and gravels¹

Cook Inlet gravels¹

Copper River silts and gravels¹

Ester ash bed²

Flaxman formation¹

Gubik formation (as sand)¹

Kanektok silts and gravels¹

Kowak clay¹

†**Kuskokwim gravels and silts**¹

Togiak gravels¹

Yukon silts¹

Tertiary and Quaternary

Ashishik basalt²

Great Sitkin volcanics²

Idak basalt²

Tulik basalt²

Tertiary (see also **Cretaceous** or **Tertiary**)

Andrew Bay volcanics²

Hayes River beds¹

Holokuk basalt²

Nenana gravel¹

Porcupine beds¹

Sand Bay volcanics²

Twelvemile beds¹

Waterboat basalt²

†**Yentna beds**¹

Zeto Point basalt porphyry²

Tertiary(?)

Tok sandstone¹

Tertiary, upper, to Recent

Wrangell lava¹

Tertiary, upper

Belkofski tuff²

Cathedral Valley agglomerate²

Tertiary, lower

Sagavanirktok formation²

Pliocene or Pleistocene

Pinnacle¹ (system)

Pliocene

Nuwok formation²

Pliocene(?)

Palisades conglomerate¹

Miocene or Pliocene

Nushagak formation¹

Miocene and Pliocene(?)

Yakataga formation¹

Miocene

Unga conglomerate¹

Miocene(?)

†**Eska conglomerate**¹

Oligocene or Miocene

Meshik formation¹

Oligocene and Miocene

Poul Creek formation¹

Oligocene

Basin Creek member (of Katalla formation)²

United States—Continued

Alaska—Continued

Oligocene—Continued

Burl Creek shale member¹ (of Katalla formation)

Katalla formation¹

Puffy member (of Katalla formation); (as member of Redwood formation¹)

Redwood formation¹

Oligocene, Upper

Point Hey member (of Katalla formation); (as member of Redwood formation¹)

Oligocene, lower and middle

Split Creek sandstone member¹ (of Katalla formation)

Eocene

Getmuna rhyolite group²

Kushataka formation¹

Stepovak series¹

Stillwater formation¹

Tokun formation¹

Tyonek formation¹

Eocene, upper

Gakona formation¹

Kenai formation¹

Eocene or Paleocene(?)

Chickaloon formation¹

Paleocene(?) or Eocene, lower(?)

Wishbone formation²

Mesozoic, Tertiary, and Carboniferous(?)

†Oklune series¹

*Mesozoic (see Paleozoic and Mesozoic)**Mesozoic(?)*

Cedar Bay granite¹

Eshamy granite¹

Nellie Juan granite¹

Upper Mesozoic(?)

Orca group¹

Valdez group¹

Cretaceous or Tertiary

Agattu beds²

Cretaceous (see also Jurassic or Cretaceous)

†Cape Beaufort coal measures¹

Upper Cretaceous and Paleocene(?)

Iditarod basalt²

Upper Cretaceous

Cantwell formation¹

Chignik formation¹

Colville group (as series¹)

†Holiknuk series¹

Kaltag formation¹

Kogosukruk tongue (of Prince Creek formation)²

Matanuska formation¹

Melosi formation¹

Niakagon tongue (of Chandler formation)²

Nulato formation¹

Prince Creek formation²

Schrader Bluff formation²

Seabee formation²

United States—Continued

Alaska—Continued

Upper Cretaceous—Continued

Sentinel Hill member (of Schrader Bluff formation)²

Shaktolik group¹

Thetis group¹

†Tuluga member (of Schrader Bluff formation)²

Tuluvak tongue (of Prince Creek formation)²

Ungalik conglomerate¹

Upper(?) Cretaceous

Bergman group¹

Yakutat group¹

Lower and Upper Cretaceous

Chandler formation²

Corwin formation¹

Ignek formation¹

Kuskokwim group²

Nanushuk group (as formation¹)

Lower Cretaceous

Anaktuvuk group¹

†Hatbox tongue (of Chandler formation)²

Herendeen limestone¹

Kandik formation¹

Kennicott formation¹

Koyukuk group¹

Nelchina limestone¹

Okpikruak formation²

Staniukovich shale¹

Topagoruk formation²

Torok formation²

Tuktu formation²

Lower and Lower(?) Cretaceous

†Umiat formation²

Lower Cretaceous(?)

Jualin diorite¹

Lower Cretaceous to Carboniferous(?)

Gemuk group²

Cretaceous and Jurassic(?)

Susitna slate¹

Jurassic, Cretaceous, and Tertiary

†Matanuska series¹

Jurassic or Cretaceous

Boundary granodiorite¹

Coast Range intrusives¹

Hyder quartz monzonite¹

Kotsina conglomerate¹

Texas Creek granodiorite¹

Jurassic(?) to Lower Cretaceous(?)

Douglas Island volcanic group¹

Treadwell slate¹ or formation

Jurassic(?)

Skwentna group¹

Upper Jurassic

Chinitna shale¹, **siltstone**, or formation

Chisik conglomerate member (of Naknek formation)¹

†Katmai series¹

Naknek formation¹

Pomeroy member (of Naknek formation)²

Sheilikof formation¹

United States—Continued

Alaska—Continued

Upper Jurassic—Continued

 Tigrupuk formation ²

 Tonnie siltstone member (of Chinitna formation) ²

Middle and Upper Jurassic

 †Enochkin formation ¹

Middle Jurassic

 Bowser member (of Tuxedni formation) ²

 Cynthia Falls sandstone member (of Tuxedni formation) ²

 Gaikema sandstone member (of Tuxedni formation) ²

 Kialagvik formation ¹

 Tordrillo formation ¹

 Tuxedni formation (as sandstone) ¹

Lower-Upper Jurassic

 Kingak shale ¹

Lower or Middle Jurassic(?)

 Thane volcanic group ¹

Lower Jurassic

 Aleuts member (of Kialagvik formation) ²

 Bidarka formation ²

 Kolosh member (of Kialagvik formation) ²

 Talkeetna formation ¹

Triassic, Jurassic, and probably Paleozoic

 †Berners formation ¹

Triassic

 Skolai volcanics ¹

Upper Triassic and Jurassic or Cretaceous

 †Gravina series ¹

Upper Triassic (see also Carboniferous and Upper Triassic)

 Chitstone limestone ¹

 Gastineau volcanic group ¹

 Kamishak formation (as chert) ¹

 Kuskulana formation ¹

 McCarthy shale or formation ¹

 Nabesna limestone ¹

 Nizina limestone ¹

Middle and Upper Triassic

 Shublik formation ¹ (see p. 621)

Triassic or older

 Perseverance slate ¹

Paleozoic, Cretaceous, and Tertiary

 Mission Creek series ¹

Paleozoic and Mesozoic

 †Sunrise group ¹ or series ¹

Paleozoic and infolded Triassic(?)

 Clark Peak schist ¹

Paleozoic (see also Precambrian or Paleozoic; and Precambrian and Paleozoic)

 Kanuti group ¹

Paleozoic(?) and Tertiary(?)

 Finger Bay volcanics ²

Paleozoic(?)

 Esther granite ¹

 Sheep Bay granite ¹

United States—Continued

Alaska—Continued

Upper Paleozoic to Tertiary(?)

 †Kolmakof series ¹

Lower Paleozoic

 William Henry Bay marble ²

Lower Paleozoic(?)

 †Totsen group ¹ or series ¹

Lower Paleozoic or older

 Kigluaik group ¹

 †Lake quartzite schist ¹

 Nome group ¹

 †Rapids schist ¹

 Tigaraha schist ¹

Permian and Lower Triassic

 Saderochit formation (as sandstone) ¹

Permian and Triassic(?)

 Nikolai greenstone ¹

Permian

 Mankomen formation ¹

 Tahkandit limestone ¹

Pre-Permian

 Jacksina formation ¹

Pre-Permian(?)

 Monte Cristo diorite ¹

Carboniferous and Upper Triassic

 †Ketchikan series ¹

Carboniferous (see also Silurian, Devonian, and Carboniferous)

 Ahtell diorite ¹

 Chisna formation ¹

 Suslota limestone ¹

 Tetelna volcanics ¹

Carboniferous and older, and Jurassic

 †Nutzotin series ¹

Carboniferous or older

 Klutina group ¹

Pennsylvanian(?)

 Nation River formation ¹

Mississippian

 Dadina schist ¹

 Lisburne group (as limestone) ¹

 Livengood chert ¹

 Strelina formation ¹

 Wellesley formation ¹

Mississippian(?)

 Totatlanika schist ¹

Upper Mississippian

 Calico Bluff formation ¹

Lower Mississippian

 Circle volcanics ¹

Mississippian (probably Lower Mississippian)

 Rampart group ¹

Devonian and Mississippian

 Noatak sandstone (as formation) ¹

Devonian, Mississippian, and Silurian(?)

 †Fickett series ¹

Devonian (see Silurian, Devonian, and Carboniferous; and Lower and Upper Ordovician, Silurian, and Devonian)

United States—Continued

Alaska—Continued

Devonian(?)†Kasaan greenstone ¹**Kuzitrin formation** ¹*Upper Devonian or Mississippian***West Fork formation** ¹*Upper Devonian***Kanayut conglomerate** (A. L. Bowsher and J. T. Dutro, Jr., 1957, U.S. Geol. Survey Prof. Paper 303-A, pt. 3, p. 3, 5, 7-12, figs. 2, 3, 4.)**Stuver member** (of Kanayut conglomerate); (as series ¹)*Upper Devonian or older***Neurokuk formation** (as schist ¹)*Middle Devonian***Salmontrout limestone** ¹**Takotna formation** ¹**Vallenar formation** ¹**Woodchopper volcanics** ¹*Pre-Devonian***Mentasta schist** ¹*Silurian, Devonian, and Carboniferous***Tonzona group** ¹*Silurian*†Bettles group ¹ or series ¹**Skajit limestone** ¹**Tolovana limestone** ¹*Middle or Upper Silurian***Holitna group** ²*Post-Ordovician(?)***Hurrah slate** ¹**Puckmummie schist** ¹*Ordovician, Silurian, and Devonian(?)*†Kugruk group ¹**Terra Cotta series** ¹*Ordovician and Silurian***Porcupine group** ¹*Ordovician and Silurian(?)***Tatina group** ¹*Ordovician(?)***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(?)***Solomon schist** ¹*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(?)***Tindir group** ¹

United States—Continued

Alaska—Continued

*Precambrian, Cambrian(?), and**Lower Ordovician*†Tatalina group ¹*Precambrian***Birch Creek schist** ¹**Fortymile granite** ¹**Nilkoka group** ¹†Tanana schist ¹**Yukon group** ¹*Age(?)***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(?)***Atascosa formation** ²**Blacktail formation** ²**Montana Peak formation** ²*Quaternary***Blue Mountain gravel** ²**Cameron beds** (of Tolchaco gravels) ²**Jeddito formation** ²**Naha formation** ²**Robbers Roost gravel** ²**Tolchaco gravels** ²**Tsegi formation** ²*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** ²**Camelback formation** ²**Cat Mountain rhyolite** ²**Galiuro rhyolite** ¹**Kingman series** ²**Murdock breccia** ¹**Rillito andesite** ²**Safford dacite** ²**Safford tuff** ²**Shorts Ranch andesite** ²**Warrens Ranch latite** ²*Tertiary(?)***Antelope rhyolite** ¹**Whitetail conglomerate** ¹

United States—Continued

Arizona—Continued

Tertiary(?) (pre-Pliocene)

Tassai Wash group ²

Probably Tertiary

Schultze granite ¹

Tertiary, upper

Greggs breccia ¹

Nogales division ¹

Tertiary, middle or upper

Alcyone trachyte ¹

Cottonwood rhyolite ¹

Esperanza trachyte ¹

Flag Spring trachyte ¹

Gold Road latite ¹

Meadow Creek trachyte ¹

Moss porphyry ¹

Oatman andesite ¹

Sitgreaves tuff ¹

Times porphyry ¹

Tertiary, middle(?)

Ajo volcanics ²

Daniels conglomerate ²

Locomotive fanglomerate ²

Sneed andesite ²

Tertiary, lower(?)

Cornelia quartz monzonite ²

Granite Mountain porphyry ¹

Teapot Mountain porphyry ¹

Pliocene(?) or Pleistocene

Verde formation ¹

Pliocene and Pleistocene

Gila conglomerate ¹

San Pedro Valley formation ²

Pliocene

Bidahochi formation ¹

San Pedro group ²

(?)Pliocene

Batamote andesite ²

Childs latite ²

Hualpai limestone ²

Pliocene, upper(?)

Sandtrap conglomerate ²

Pliocene, lower or middle

Milk Creek beds ²

(?)Pliocene, lower

Chapin Wash formation ²

Cobwebb basalt ²

Miocene, upper

Duncan group ²

Eocene(?) to lower Pliocene(?)

Stronghold granite ²

Eocene, lower(?)

Artillery formation ²

Laramide

Amole granite ²

Amole latite ²

Amole quartz monzonite ²

Mesozoic

Oro Blanco conglomerate ²

Mesozoic(?)

Chico Shunie quartz monzonite ²

Ithaca Peak granite ²

Pajarito lavas ²

Mesozoic, lower(?)

Lost Gulch monzonite ¹

United States—Continued

Arizona—Continued

Cretaceous or Tertiary

Sugarloaf quartz latite (see p. 622)

Cretaceous or lower Tertiary

Bronco volcanics ²

Cretaceous

Recreation red beds ²

Cretaceous(?)

Canelo redbeds ²

Upper Cretaceous or Tertiary

Schieffelin granodiorite ²

Upper Cretaceous or lower Tertiary

Solitude granite ¹

Uncle Sam porphyry ²

Willow Spring granodiorite (as granite ¹)

Upper Cretaceous

Amole arkose ²

Fort Buchanan formation ²

Fort Crittenden formation ²

Orabai sandstone ¹

Pinkard formation ¹

Santa Cruz group ²

Sonoita group ²

Zillhlejini formation ¹

Upper Cretaceous(?)

Concentrator volcanics ²

Lower Cretaceous

Arkill limestone (in Saavedra member of Lowell formation) ²

Baga shale and limestone (in Joserita member of Lowell formation) ²

Barata limestone (in Saavedra member of Lowell formation) ²

Barberian series ²

Bisbee group ¹

Black Knob dolomite (in Pacheta member of Lowell formation) ²

Black Knob quartzite (in Pacheta member of Lowell formation) ²

Chapparal sandstone (in Saavedra member of Lowell formation) ²

Cholla member (of Lowell formation) ²

Cienda limestone (in Pacheta member of Lowell formation) ²

Cintura formation ¹

Cinturan series ¹

Cochise limestones ¹

Corta sandstone (in Joserita member of Lowell formation) ²

Dixie shale ¹

Espinal grit (in Joserita member of Lowell formation) ²

Forrest shale ¹

Glance conglomerate ¹

Hay Flat limestone ²

Joserita member (of Lowell formation) ²

Lancha limestone (in Pacheta member of Lowell formation) ²

Lowell formation ²

Mexican sandstone ¹

United States—Continued

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
- Saavedra 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
- Nazlini 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

- Adamana shales ¹
- Agathla sandstone ¹
- Agathla shale ¹
- Holbrook sandstone ¹
- Moqui member (of Moenkopi formation) ²

United States—Continued

Arizona—Continued

Lower Triassic—Continued

- Rock Canyon conglomerate member** (of Moenkopi formation) ¹
- Salt Creek member (of Moenkopi formation) ¹
- Tanner shale ¹
- Tolchico shale ¹
- Winslow member (of Moenkopi formation) ²
- Winslow shale ¹
- Wupatki member** (of Moenkopi formation) ²

Permian (see also *Pennsylvania and Permian*)

- †Aubrey limestone ¹
- †Aubrey sandstone ¹
- Chiquito sandstones ¹
- Chiricahua limestone ¹
- Coconino 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
- Kinishba beds (in Supai formation) ¹
- †Monument Valley shale ¹
- Rainvalley formation ²
- Scherrer formation** ²
- Seligman limestone ¹
- Shiwits shale ¹
- Snyder Hill formation ¹
- Toroweap formation** ²
- Wompats limestone ¹
- Yampai sandstone ¹

Lower Permian

- Pakoon limestone ²
- Queantoweap sandstone ²

Carboniferous

- Aubrey series ¹
- Kanab limestone ¹
- Malagan series ²
- Mescalera series ²
- Supaian 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**

United States—Continued

Arizona—Continued

Pennsylvanian and Permian—Con.
Supai formation¹
Pennsylvanian (see also *Mississippian and Pennsylvanian*)

 †Galiuro limestone¹
Horquilla limestone²

 Oak Creek member (of Supai formation)²

 Packard Ranch member (of Supai formation)²
Pennsylvanian(?)

 Huethawali limestone¹

 Pierce shales¹
Upper Pennsylvanian
Earp formation²
Mississippian and Pennsylvanian
Tule Spring limestone¹
Mississippian

 Elden limestones¹

 †Gray Cliff limestone¹

 Simon limestone¹

 Truxton limestone¹
Upper Mississippian or Lower Pennsylvanian(?)
Black Prince limestone²
Upper Mississippian

 Paradise formation¹
Lower Mississippian and Lower Pennsylvanian

 †Tornado limestone¹
Lower and Upper(?) Mississippian
Escabrosa limestone¹
Lower Mississippian
Modoc limestone¹
Redwall limestone¹
Devonian and Carboniferous

 †Globe limestone¹
Devonian

 East Verde limestone²

 Escacado limestone²

 Espinal formation²

 O'Carroll member (of Martin limestone)²

 Patagonia limestone²

 Picacho de Calera formation¹

 Tombstonian series²

 Vecol limestone²
Upper Devonian

 Crook formation²

 Island Mesa beds¹

 Jerome formation¹
Martin limestone¹ in southeast Arizona; as **formation** in north-east Arizona; and as **Middle(?)** and **Upper Devonian formation** in central Arizona.

Morenci shale¹

 Mount Elden formation²

 Sycamore Creek sandstone¹
Upper(?) Devonian
Temple Butte limestone¹
Middle(?) Devonian

 Santa Rita limestone¹

 Santa Ritan series¹

United States—Continued

Arizona—Continued

Ordovician(?)

 Lucky Cuss limestone¹
Upper Cambrian and Lower Ordovician
Longfellow limestone¹
Upper Cambrian

 †Apache sandstone¹

 Copper Queen limestone¹
Coronado quartzite¹

 Peppersauce Canyon sandstone¹

 Rincon limestone¹
Middle or Upper Cambrian

 †Emerald limestone¹

 †Emerald series¹
Middle and Upper Cambrian
Abrego limestone¹ or **formation**
Middle Cambrian

 †Ajax quartzite¹
Bright Angel shale¹
Bolsa quartzite¹

 Chediski white sandstone member (of Troy quartzite)¹

 Cochise formation¹

 †Draagoon quartzite¹

 Havasu member (of Muav formation)²

 Mead limestone²
Muav limestone¹

 Pima sandstone¹

 Santa Catalina formation¹

 Southern Belle quartzite¹
Tonto group¹

 †Tonto limestone¹

 †Tonto sandstone¹

 †Tonto shale¹

 Tontoan series¹
Troy quartzite¹

 Yaquian series²

 Whetstonian series²
Lower and(or)-Middle Cambrian

 Boucher tongue²

 Elves Chasm tongue²

 Flour Sack member (of Bright Angel shale)²

 Garnet Canyon tongue²

 Gateway Canyon member (of Muav formation)²

 Kanab Canyon member (of Muav formation)²

 Lava Falls tongue²

 Meriwitica tongue²

 Parashant tongue²

 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 tongue²
Lower Cambrian
Tapeats sandstone¹

United States—Continued

Arizona—Continued

Precambrian

- Aguja sandstone ²
- Alder group** ²
- Apache group** ¹
- †Arizona slates ¹
- Barnes conglomerate** ¹
- Bass limestone** ¹
- Bradshaw granite** ¹
- Carbon Butte shales ²
- Cardenas lava series ²
- Cerbat complex ²
- Chuar group** ¹
- Chuarian series ¹
- City Creek series ²
- Cleopatra quartz porphyry ¹
- Chiquito sandstone ²
- Crooks complex** ¹
- Deadman quartzite ²
- Deception porphyry ¹
- Diana granite ²
- Dox sandstone ¹
- Dripping Spring quartzite** ¹
- Echo limestone or formation ²
- Final shales ²
- †Grand Canyon group ¹
- †Grand Canyon schist ¹
- Grand Canyon series** ¹
- Gunther dolomite ²
- Hakatai shale** ¹
- Hotaui conglomerate** ¹
- Katherine granite ¹
- Jupiter shales ²
- Kwaguntan series ²
- Madera diorite** ¹
- Marble limestone ²
- Maverick shale ²
- Mazatzal quartzite** ¹
- Mescal limestone** ¹
- Mount Ord pyroxenite ²
- Nankoweap group ²
- Newberry formation ²
- Nunkoweap sandstone ²
- Oracle granite ²
- Oso beds ²
- Oveja formation ²
- Phantom migmatite ²
- Pinal schist** ¹
- Pine Mountain porphyry ²
- Pioneer shale** ¹
- Red Rock rhyolite ²
- Roosevelt member ²
- Ruin granite** ¹
- Santa Catalina gneiss ¹
- Scanlan conglomerate** ¹
- Shea diabase ²
- Shinumo quartzite** ¹
- Solitude limestone ²
- United Verde diorite ¹
- Unkar group** ¹
- Venus formation ²
- Vishnu schist** ¹
- Vishnuan series ¹
- Walhalla formation ²
- Yavapai schist** ¹ or series

United States—Continued

Arizona—Continued

Precambrian—Continued

- Yeager greenstone ²
- Zoroaster granite ²

Precambrian(?)

- Cardigan gneiss** ²

- Chloride granite** ²

Age(?)

- Luck-Sure series ¹
- Mesa formation ¹
- Ruby diorite ²
- Ruby Road formation ²
- Silver King quartz monzonite porphyry ²
- Tappan lava flow ²

Arkansas

Quaternary

- Plateau gravel phase ¹

Pleistocene

- Carrigan black sands ¹
- Center Point division ¹
- Prairie d'Ane clay ¹
- Prairie de Roan division ¹
- Red River loess ¹
- White Prairie d'Ane clay ¹

Eocene

- Cleveland County red lands ¹
- L'Eau Frais shale ¹
- Little Missouri lignites or ligneous shales ¹
- Manchester shale ¹

Eocene, upper

- Caney Point marl member (of White Bluff formation) ²
- Marks-Mills red beds ¹
- Pastoria sand member (of White Bluff formation) ²
- Redfield formation ²
- Rison clay member (of White Bluff formation) ²
- White Bluff marl ¹

Cretaceous

- Brazil Branch breccia ¹
- Centerpoint volcanic facies (of Eagleford formation) ²

Upper Cretaceous and Eocene

- †Camden series ¹

Upper Cretaceous

- Arkadelphia clay ¹
- Arkadelphia marl** ¹
- †Big Decipher calcareous sands ¹
- †Big De Gray horizon ¹
- †Bingen formation or sand ¹
- Brownstown marl** ¹ or formation
- Buckrange sand lentil** (of Ozan formation) ¹
- †Clark County littorals ¹
- †Columbus marl ¹
- Crain sand ¹ (subsurface)
- Graves sand ¹ (subsurface)
- Gregory sand ¹ (subsurface)
- †High Bluff blue sands ¹
- †High Bluff greensand ¹
- Koster joint clays ¹

United States—Continued

Arkansas—Continued

Upper Cretaceous—Continued

Louann sand ¹ (subsurface)

Marlbrook marl ¹

Meakin sand ¹ (subsurface)

Morris Ferry greensand ¹
Nacatoch sand ¹
Ozan formation ¹

Primm sand ¹ (subsurface)

†Rocky Comfort chalk ¹
Saratoga chalk ¹

Tokio formation ¹

†Tokio sand member ¹ (of Bingen formation)

†Washington greensand ¹

†White Cliffs chalk ¹

Probably Middle Cretaceous

Opello breccia ¹

Lower Cretaceous

Cerro Gordo clay ¹
Delight sand ²
DeQueen limestone (as member of Trinity formation ¹)

Dierks limestone (as lentil of Trinity formation ¹)

Ferry Lake anhydrite ¹ (subsurface)

Holly Creek formation (as clay ¹)

James limestone ² (subsurface)

Little River ¹ (limestone)

Mooringsport formation ² (subsurface)

Pike gravel (as member of Trinity formation ¹)

Pine Island shale ² (subsurface); shale member (of Pearsall formation in south Texas) ²
Ultima Thule gravel member (of Holly Creek formation); (as lentil of Trinity formation ¹)

Upper Little River limestone ¹

Upper Jurassic

Buckner member (of Haynesville formation) ² (subsurface); formation in Mississippi ²
Dorcheat member (of Schuler formation) ² (subsurface)

Schuler formation ² (subsurface)

Smackover formation ² (subsurface)

Wesson tongue ² (of Dorcheat member of Schuler formation) (subsurface)

Permian

Louann salt ² (subsurface)

Norphet formation ² (subsurface)

Werner formation ² (subsurface)

Permian(?)

Eagle Mills formation ² (subsurface)

Carboniferous

Yellian series ¹

Pennsylvanian

Appleton stage ¹

†Arkansan series ¹

United States—Continued

Arkansas—Continued

Pennsylvanian—Continued

Belya shale ¹

Booneville stage ¹

Cabin Creek sandstone ¹ (subsurface)

Cross Plains sandstone ¹

Danville stage ¹

†Fork Mountain slate ¹

†Fort Smith formation ¹

Greenwood sandstone ¹

Hartwell sandstone ¹

†Norristown stage ¹

Ozark sandstone ¹

†Paris shale ¹

Parker Hill sandstone member (of Stanley formation) ²

†Polk County ash bed (in Stanley shale) ¹

†Poteau stage ¹

†Sebastian stage ¹

†Spadra shale ¹

†Tennessee sandstone ¹

Tomlinson shale ¹

†Tomlinson stage ¹

Washburn sandstone ¹

†Washington shale and sandstone ¹

†Winslow formation ¹

Pennsylvanian(?)

Gilbert shale ¹

Pennsylvanian (Atoka)

Greenland sandstone member (of Atoka formation) ²

Pennsylvanian (Morrow)

Bloyd shale ¹ or formation

Brentwood limestone member (of Bloyd shale) ¹
Cane Hill member (of Hale formation) ²
Gap Ridge sandstone member (of Stanley shale) ²
Hale formation; †member (of Morrow formation) ¹
Kessler limestone member (of Bloyd shale) ¹
Morrow series (as group or formation) ¹
Prairie Grove member (of Hale formation) ²
Woolsey member (of Bloyd shale) ²

Mississippian and Pennsylvanian

†Boston group ¹

Mississippian

†Carrollton limestone ¹

Dotson black sheety shale ¹
Hatton tuff lentil (of Stanley shale) ¹
Hot Springs sandstone ¹

†Marshall shale ¹
St. Joe limestone member (of Boone formation) ¹

†Spring Creek limestone (in Moorefield shale) ¹

United States—Continued

Arkansas—Continued

Mississippian—Continued†Wyman sandstone ¹*Upper Mississippian*Batesville sandstone ¹Fayetteville shale ¹Hindsville limestone member (of
Batesville sandstone) ¹Moorefield formation (as shale) ¹Pitkin limestone ¹Ruddell shale ²Wedington sandstone member
(of Fayetteville shale) ¹*Lower and Upper Mississippian*Boone formation, ¹ 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 ¹Sylamore sandstone member (of
Chattanooga shale) ¹*Middle Devonian*Clifty limestone ¹*Lower or Middle Devonian*Penters chert ¹*Silurian*†Cason limestone ¹Lafferty limestone ¹St. Clair limestone ¹†Slatington 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 ¹Cason shale ¹Polk Creek shale ¹*Middle and Upper Ordovician*†Polk Bayou limestone ¹*Middle Ordovician*Bigfork chert ¹Calico Rock sandstone member
(of Everton formation) ¹Everton formation (as limestone) ¹Jasper limestone ¹ member (of
Everton formation)Kings River sandstone member
(of Everton formation) ¹Newton sandstone member (of
Everton formation) ¹Sneeds limestone lentil (of Ever-
ton formation) ¹

United States—Continued

Arkansas—Continued

Lower and Middle Ordovician†Caddo shale ¹†Izard limestone ¹†Ouachita shale ¹Womble shale ¹ or formation;
schistose sandstone in Okla-
homa*Lower Ordovician*Big Buffalo series ¹Black Rock formation ¹Blakely sandstone ¹Bull Shoals Mountain chert beds
(in Powell dolomite) ²Cotter dolomite ¹Jenkins Branch chert bed (in
Cotter formation) ²Mazarn shale ¹Powell limestone or dolomite ¹Smithville formation ¹†Yellville limestone ¹*Cambrian*Collier shale ¹

California

Quaternary (see also *Tertiary* or
Quaternary; and *Pliocene*, *up-*
per, and *Quaternary*)Bay mud ²Bodega Bay deposits ¹Boggs Mountain flows ²Burnt Canyon breccia ²Cabezon fanglomerate ¹China Ranch beds ²Clear Lake volcanic series (J. C.
Brice, 1953, Calif. Div. Mines
Bull. 166, p. 12, 34-35)Cobb Mountain volcanics ²Deep Canyon fanglomerate ¹Heights fanglomerate ¹Kagel fanglomerate ¹Konocti volcanics ²Lindavista terrace material ¹Lopez fanglomerate ¹Perini Hill flows ²Posey formation ²*Quaternary(?)*Atlas formation ¹Cable formation or lake beds ¹Tank volcanics ¹Tehachapi formation ¹*Recent*Big Glass Mountain complex ¹Burnt Lava flow ²Callahan flow ²Cucamonga fan deposits ²Glass Mountain lava ²Hat Creek basalt ²Hoffman flow ²Medicine flow ²Modoc basalt ¹Paint Pot Crater flow ²Plutos Cave basalt ²*Recent(?)*Chalk Mountain dacite ¹

United States—Continued

California—Continued

Pleistocene and Recent

Dos Picachos gravels ²
Pleistocene or Recent

Beehive Mesa alluvium ²

Paynes Creek basalt ¹
Pleistocene to Recent(?)

Mount Hoffmann complex ²
Pleistocene

Aeolian Buttes till ²

Alameda formation ¹

Arroyo Seco gravel ¹

Battery formation ¹

Bautista beds ¹

Bay Point formation ²

Bishop tuff ²

Blackhawk breccia ¹

Brawley formation ²

Campus formation ¹

Carpinteria formation ¹

Casitas formation ²

Centinela gravels ¹

Clear Lake sediments ¹

Coahuila silt ¹

Deadman Island beds ¹

Dripping Springs formation ²

Huichica formation ²

June Lake basalt ²

Kalorama member ¹ (of Las

Posas formation)

Klamath gravels ¹

Las Posas formation ¹

Long Canyon member (of Las

Posas formation) ¹

Los Cerritos beds ¹

Manix lake beds ¹

Merritt sand ¹

Millerton formation ¹

Mono Craters obsidian ²

Montezuma formation ²

Nigger Canyon volcanics ²

Pala conglomerate ¹

Pauba formation ²

Pie Knob andesite ¹

Pinto formation ¹

Pittsburg formation ²

Red Bluff formation ¹

Red Shale Butte complex ²

San Antonio formation ¹

San Benito gravels ¹

Santa Cruz Island formation ¹

Shoemaker gravel ²

Temecula arkose ²

Temescal formation ¹

Timms Point silt or silt member
(of San Pedro formation); (as
formation ¹)

Tomas Bay deposit ¹

Victor formation ¹
Pleistocene and Pliocene(?)

Glen Ellen formation ²

Schumann formation ¹
Pleistocene, upper

Harold formation ²

Hookton formation ²

United States—Continued

California—Continued

Pleistocene, upper—Continued

La Habra formation (as conglomerate¹)

Lake Coahuila deposits ²

Orcutt formation ¹ or sand

Pacoima formation ²

Palos Verdes sand ¹

Peckham formation ²

Rohnerville formation ²

San Dimas formation ¹

Timber Canyon conglomerate ¹

Tomas formation ¹

Wilmington group ¹
Pleistocene, upper(?)

Nadeau gravel ²
Pleistocene, middle

Aromas red sands ²
Pleistocene, lower or middle

Leona rhyolite ¹
Pleistocene, lower

Barlow Ranch beds ²

Fox Canyon member (of San
Pedro formation) ²

Grimes Canyon sand and gravel
member (of Santa Barbara
formation) ²

Hall Canyon formation ¹

Lomita marl or member (of San
Pedro formation); (as forma-
tion) ¹

San Pedro sand ¹ or formation

Signal Hill beds ²
Tertiary or Quaternary

Black Mountain basalt flow ¹

Jacumba volcanics ¹

Table Mountain formation ¹

Tolenas marble ¹
Tertiary

†Lang division ¹

Meyer oil zone ¹ (subsurface)

Skooner Gulch basalt ²

Warner basalt ¹

Wymer beds ¹
Tertiary(?)

Sulphur Springs Mountain ande-
site ²
Tertiary, upper

Butte gravel ¹ member (of Sutter
formation)

Sutter formation ¹
Tertiary, lower

Grapevine conglomerates ¹
Pliocene to Recent

High Cascade series ²
Pliocene or Pleistocene

Tassajero formation ¹
Pliocene and Pleistocene

Carlotta formation ²

Packwood gravels ²

San Jacinto series ¹

Santa Clara formation ¹

†Santa Maria formation ¹

Saugus formation ¹

Ventura sands ¹

United States—Continued

California—Continued

*Pliocene and later(?)*Kern River group, formation, or series ¹*Pliocene and Pleistocene(?)*McKittrick group (as formation)¹Merced formation ¹Tulare 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)¹Wilbur zone ¹ (subsurface)*Pliocene and Pleistocene, lower(?)*Paso Robles formation ¹*Pliocene* (see also *Miocene and Pliocene*; and *Miocene or Pliocene*)Alamo formation ²Asphalto lake bed ¹Bald Hill agglomerate member (of Tuscan formation)²Bald Peak basalt ¹Berkeley group ¹Buckbee oil zone ¹ (subsurface)Canebrake conglomerate ²Chanac formation ¹Clarke oil zone ¹ (subsurface)†Contra Costa lake bed ¹Etchegoin formation ¹Falor formation ²†Grizzly Peak andesite ¹Horsethief formation ²Iron Canyon agglomerate member (of Tuscan formation)²King City formation ²Mark West andesite ¹Moraga formation ¹ or tuffMount Eden formation ¹Nordstrom oil zone ¹ (subsurface)Northbrae rhyolite ¹O'Connell oil zone ¹ (subsurface)Orinda formation ¹Paicines formation ¹Painted Hill formation ²Petaluma formation ¹Pico formation ¹Pinole tuff ¹Putean series ¹Purissima formation ¹Putnam Peak basalt ²Sacramento tuff and sand member (of Tuscan formation)²St. George formation ¹St. Helena rhyolite ¹ member (of Sonoma volcanics)San Ardo group ²San Diego formation ¹Santa Ana sandstone ¹Seven-Mile tuff and sand member (of Tuscan formation)²Shasta lavas ²

United States—Continued

California—Continued

*Pliocene—Continued*Siesta formation ¹Sonoma tuff ¹Sonoma volcanics ¹Stony Creek basalt ²Sunshine Ranch member (of Saugus formation)²Supan tuff and sand member (of Tuscan formation)²Tehama formation ¹Truckhaven rhyolite ²Tuscan formation (as tuff ¹)Wildcat series ¹Wilson Ranch beds ¹Wolfskill formation ²*Pliocene(?)*Cuyama formation ¹Duarie conglomerate ²Funeral fanglomerate (as conglomerate)¹Kettleman lake bed ¹Laguna formation ¹Lake basalt ²Ridge Route formation ²Saddleback basalt ²San Mateo formation ¹Sweitzer formation ²†Tassajara lake(?) bed ¹*Pliocene, upper, or Pleistocene, lower*Cache formation ¹Coso formation ²Hathaway formation ¹Ocotillo conglomerate ²Pipes fanglomerate ¹*Pliocene, upper, and Quaternary*Bitterwater formation ²*Pliocene, upper*Alturas formation ¹Borrego formation ²Careaga sand or sandstone ²Cascajo conglomerate member (of San Joaquin formation)²Cebada 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 Geologists Bull., v. 38, no. 11, p. 2357-2371)

Ferndale sandstone ²Graciosa coarse-grained member (of Careaga sandstone)²Hungry Valley formation ²Livermore gravel ¹Nomlaki tuff member (of Tehama and Tuscan formations)¹San Joaquin formation ¹Santa Barbara formation (as beds ¹)San Timoteo beds ¹Scotia 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
Mulholland formation ²
Oro Loma formation ²
Tinaquaic sandstone member (of Sisquoc formation) ²
Pliocene, lower (see also *Miocene, upper, and Pliocene, lower*)
Awawatz 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 ¹ (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
Tolay 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

- Mehrtens 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
Carneros sandstone member ¹ (of Temblor formation)
†Carrizo formation ¹
Casimiala gypsiferous shale or red beds ¹
Castaic formation ²
Cedarville andesite ¹
Cedarville series ¹
Conejo volcanics ¹
El Modena volcanics ²
Elsinore sand ¹ (subsurface)
Fish Creek gypsum 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
Mecca formation ²
Media shale ¹
Olcese sand ² (subsurface)
Pasadena formation ¹
Poso Creek sand ¹ (subsurface)
Quercan sandstone ¹
Redhill sandstone ¹
Round Mountain silt ¹ (subsurface and surface)
Tequapis sandstone ¹
Walker formation ¹ (subsurface and surface)
Walker Plain basalt ²
Miocene(?)
Bouquet Cañon breccia ¹
Dos Palmas rhyolite ²
†Escondido series ¹
Fountain Peak rhyolite ²
Furnace series ¹
Laird sandstone ²
Millet clay ¹
Negra clay ¹
Pinnacles formation ²
Potato sandstone ¹

United States—Continued

California—Continued

Miocene(?)—Continued†Rosamond series ¹Valley Springs formation ¹*Miocene, upper, and Pliocene, lower*Capistrano formation ¹French Flat sandstone ²Ridge Basin group ²Towsley formation ²*Miocene, upper, to Pliocene, middle*Contra Costa group ²Sisquoc formation ¹*Miocene, upper, to Pliocene, lower*(?)Pullen formation ²*Miocene, upper*Antelope shale member (of Monterey formation) ²Apache formation ²Belridge diatomite ²Blanco sandstone (in Puente formation) ²Bopesta formation ¹Briones sandstone ¹Central Fee unit (in Sycamore Canyon member of Puente formation) ²Cierbo sandstone ¹Cubierto shale (in Puente formation) ²Hercules shale member (of Briones sandstone) ¹; (see also †Herculean shale member ¹)Hoover conglomerate unit (in Sycamore Canyon member of Puente formation) ²Hunter sandstone and conglomerate (in Puente formation) ²Kramer Lake beds (in Ricardo formation) ²La Vida member (of Puente formation) ²McDonald shale member (of Monterey formation) ²McLure shale member (of Monterey formation) ¹Mahala sandstone and conglomerate ²Malaga mudstone member (of Monterey formation) ¹†Mellenia series ¹Mint Canyon formation ¹Modelo formation ¹Mohawk lake beds ¹Morales member (of Santa Margarita formation) ¹Neroly formation ¹ or sandstonePapel Blanco shale ²Peculiar shale (in Puente formation) ²Point Arena beds ²Puente formation ¹Punchbowl formation ²Quatal red clay member (of Santa Margarita formation) ¹Red Mountain andesite ¹

United States—Continued

California—Continued

Miocene, upper—ContinuedRed Rock Canyon sandstone member (of Santa Margarita formation) ¹Reef Ridge shale ¹St. Paul sand ¹ (subsurface)San Pablo group ¹ or formation ¹Santa Margarita formation (as sandstone) ¹†Soledad divisions ¹Soquel member (of Puente formation) ²Sycamore Canyon member (of Puente formation) ²Tice shale ¹†Trampan formation ¹Valmonte diatomite member (of Monterey shale) ¹Yorba member (of Puente formation) ²Whiterock Bluff shale member (of Santa Margarita formation) ¹(?) *Miocene, upper*Nova formation ²*Miocene, middle or upper*Coachella fanglomerate ¹†Indio formation ¹Palm Spring formation ¹*Miocene, middle and upper*Altamira shale member (of Monterey shale) ¹Alverson Canyon formation ²Barstow formation ¹†Maricopa shale ¹Monterey group, ¹ formation, or shaleTwisselmann sandstone member (of Monterey formation) ²*Miocene, middle*Alferitz formation ²Big Blue serpentinous member (of Temblor formation) ¹Buzzard Peak conglomerate member (of Topanga formation) ²Caliente formation ²Claremont shale ¹Escudo sandstone ²Felix siltstone ¹ (subsurface)Gould shale member (of Monterey shale) ¹Hambre sandstone ¹Hollycrest formation ²Kinnick formation ¹Miraleste tuff bed ¹ (in Altamira shale member of Monterey shale)†Ocoya Creek beds ¹Oursan sandstone ¹Point Sal formation ²Portugese tuff bed ¹ (in Altamira shale member of Monterey shale)Rench sand ¹ (subsurface)

United States—Continued

California—Continued

Miocene, middle—Continued

 Rodeo shale ¹

 †Salinas shale ¹

 San Onofre breccia ¹

 Topanga formation ¹

 Whepley shale ¹ (subsurface)

Miocene, middle(?)

 Quien Sabe volcanics ²
Miocene, middle or older

 Elephant Hill breccia ²

 [Johnstone] Johnson Peak tuff breccia ²

 Spadra felsophyre ²
Pre-middle Miocene

 Witnet formation ¹
Miocene, lower and middle

 Sandholdt shale ²

 Split Mountain formation ²

 Temblor 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 Monterey formation) ²

 Painted Rock formation ²

 Pato red member (of Vaqueros formation) ¹

 Pulaski sand ¹ (subsurface)

 Rincon shale ¹ or mudstone

 Santos shale ¹

 Sauer Dough sand ¹ (subsurface)

 Sobrante sandstone ¹

 Soda Lake formation ²

 Tecuya beds ¹

 Tick Canyon formation ²

 Tranquillon volcanics ²

 Vaqueros sandstone ¹ or formation

 Vedder sand ¹ (subsurface)

 Yuha reefs ¹

 (?) *Miocene, lower*

 Catalina schist breccia ¹

 Ilmon basalt ²

 Lospe formation ²
Oligocene and Miocene(?)

 Artist Drive formation ²
Oligocene or Miocene, lower

 Soledad group ¹
Oligocene and Miocene, lower(?)

 Vasquez formation (as series ¹)

Oligocene (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

Oligocene—Continued

 Pinecate formation ¹

 †Pleito formation ¹

 †San Emigdio formation ¹

 San Juan Bautista formation ¹

 San Lorenzo formation ¹

 †San Lorenzo series ¹

 San Ramon sandstone ¹

 Simmler formation ²

 Tumey formation ¹
Oligocene(?)

 Lillis formation ¹

 Wagonwheel formation ¹
Oligocene, lower

 Titus Canyon formation ¹
Eocene to Miocene, lower

 Berry formation ²

 Goler formation ²
Eocene or Oligocene

 Butano sandstone ¹

 †Cantua shale ¹
Eocene to Oligocene

 Church Creek beds ²
Eocene and Oligocene(?)

 Gaviota formation ¹

 Kreyenhagen formation (as shale ¹)

Eocene

 Alberhill clay ¹

 Arroyo Hondo formation ²

 Arroyo Hondo shale member (of Lodo formation) ²

 Arenal sandstone ¹

 Ballena gravel ¹

 Canoas siltstone member (of Kreyenhagen formation) ²

 Cantua member ¹ (of Lodo formation)

 Capita shale member (of Domengine formation) ²

 †Carquinez series ¹

 Chaney Ranch sandstone formation ²

 Coldwater sandstone member (of Tejon formation) ¹

 Cozy Dell shale ² member (of Tejon formation)

 Creston (formation) ²

 Delmar sand ¹

 Dry Creek formation ¹

 Dunns Peak sandstone ²

 Edwin clay ¹

 Indart sandstone ²

 Ione formation ¹

 Irvine shale (in Santiago formation) ²

 Jameson shale member (of Markley sandstone) ²

 Junipero sandstone ²

 La Jolla formation ¹

 Liveoak member (of Tejon formation) ²

 Lucia shale ²

United States—Continued

California—Continued

Eocene—ContinuedMatilija sandstone member ¹ (of Tejon formation)Metralla sandstone member (of Tejon formation)²Montgomery Creek formation ¹Nonada sand member (of Domengine formation)²Piru formation ²Ragged Valley shale member (of Arroyo Hondo formation)²Reed Canyon silt member (of Tejon formation)²Rose Canyon shale ¹**Santiago formation ²**†Stewartsville group ¹The Rocks sandstone ²†Topatopa formation ¹Torrey sand ¹Tres Pinos sandstone ¹Uvas conglomerate member (of Tejon formation)²Walkup clay ¹Weaverville formation ¹Yokut sandstone ²*Eocene(?)*Carmelo series ¹Indian conglomerate ¹†Mohave formation ²Mono shale ¹†San Pedro shales ¹*Eocene, upper, and Oligocene***Sespe formation ¹***Eocene, upper*Alhambra formation ²Bear Canyon sandstone member (of Kreyenhagen formation)²Castro shale member (of Alhambra formation)²Echo Falls shale ²Escobar sandstone ²Gredal formation ²Kellogg shale ²**Markley sandstone ¹ member** (of Kreyenhagen formation)**Nortonville shale member** (of Kreyenhagen formation)²Pereira shale member (of Alhambra formation)²Point of Rocks sandstone ²**Poway conglomerate ¹**Roop sandstone member (of Alhambra formation)²Sidney shale member (of Markley formation)²Sierra Blanca limestone ¹**Tejon formation ¹**Welcome formation ²**Wheatland formation ²***Eocene, middle*Anita shale ²Camino Cielo sandstone member (of Juncal formation)²

United States—Continued

California—Continued

Eocene, middle—ContinuedCapay formation ¹**Domengine formation ¹ or sandstone****Hawkhill formation ²**Juncal formation ²Llajas formation ¹Los Muertos Creek formation ²Mabury formation ²Muir sandstone ²Sacate formation ²Santa Susana formation ¹Sisar black shale ²**Tesla formation ²**Vacaville shale ²Wheeler sandstone member (of Juncal formation)²*Eocene, middle, to Oligocene, lower*Reeds Creek andesite 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)²Laguna Seca formation ²**Lodo formation ²***Paleocene***Claymont clay bed** (in Silverado formation)²Dip Creek formation ²Las Virgenes sandstone ¹**Martinez formation ¹****Serrano clay bed** (in Silverado formation)²**Silverado formation ²**Simi conglomerate ¹Vine 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 ¹Indian Gulch ¹ (formation)Mariposa group ¹Mount Ord series ²*Mesozoic(?)*Little Chief porphyry ¹**Mountain Meadows dacite porphyry ²**Ravenna plutonic series ¹*Upper Mesozoic*Darwin quartz diorite ²Coso 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)¹
Post-Cretaceous

 Alum Rock rhyolite ²
Probably post-Cretaceous

 Rattlesnake granite ¹
"Between late Cretaceous and Oligocene"

 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

 Novato 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 ²
Upper Cretaceous and Paleocene

 Moreno formation or shale ¹

United States—Continued

California—Continued

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 group)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

Moreno Grande formation (N. L. Taliaferro, 1944, Am. Assoc. Petroleum Geologists Bull., v. 28, no. 4, p. 472)

 Mustang Creek formation ²

 Oakland conglomerate member (of Chico formation) ¹

 Orestimba group ²

 Pacheco group ²

 Panoche formation ¹

 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—ContinuedRomero conglomerate (in Debris Dam sandstone) ²Salt Creek conglomerate ²**Schulz Ranch sandstone member** (of Williams formation) ²Sites formation ²Sunol series ²Tierra Loma shale member (of Moreno formation) ²Venado formation ²Volta formation ²†Wallala beds ¹ or group ¹ [Gualala correct spelling]**Williams formation** ²Yolo formation ²*Upper Cretaceous*(?)**Cuyamaca gabbro** (as basic intrusive) ¹*Pre-Upper Cretaceous*Cucamonga complex ²Deer diorite ²*Lower Cretaceous* (see also *Upper Jurassic or Lower Cretaceous*)Cottonwood beds ²**Cuesta diabase** ¹†Headlight porphyry ¹**Horsetown formation** ¹Hulen beds ²Marmolejo formation ²**Paskenta formation** ¹**Shasta series** ¹†Toro formation ¹Wisenor formation ²*Pre-Cretaceous*Placerita formation ¹Rubio diorite and metadiorite ¹San Gabriel formation ¹Santa Lucia granite or quartz diorite ²**Tamarack formation** ¹†Trinity formation ¹*Pre-Cretaceous*(?)Feliz granodiorite ²Lar quartz diorite ²Vermont quartz diorite ²*Post-Cretaceous*Rainbow series ¹Walker Ridge sandstones ¹Walker Ridge shales ¹*Jurassic or Cretaceous*San Jacinto granodiorite ²*Jurassic and Cretaceous***Bonita sandstone** ¹ member (of Franciscan formation)**Cahil sandstone** ¹ member (of Franciscan formation)**Calera limestone member** (of Franciscan formation); (as member of Cahil 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 ²Cove quartz monzonite ²Elder Creek group ²Grindstone group ²Newville group ²Plumas series ¹Ship Mountain granite ²Siskiyou granodiorite ¹*Jurassic*(?)**Atolia quartz monzonite** ¹Bollinas sandstone ¹†Bully Hill rhyolite ¹Corral Hollow shales ¹Gavilan Peak gabbro ²†Golden Gate series ¹Lebec quartz monzonite ²Liebre quartz monzonite ²Oakridge sandstone ¹**Osos basalt** ¹Pilarcitos sandstone ¹**Pinyon Ridge granodiorite** ²San Bruno sandstone ¹†San Luis formation ¹†San Miguel cherts ¹**Santiago Peak volcanics** ²School Canyon granite ²†Silver Terrace sandstone ¹**Stonewall quartz diorite** ¹ or formationTejon Lookout granite ²†Telegraph Hill sandstone ¹**Temescal Wash quartz latite porphyry** ²Val Verde tonalite ²White Tank monzonite ²*Pre-Franciscan*Bodega diorite ¹Coast complex ¹**Gabilan limestone** ¹Santa Lucia series ¹*Upper Jurassic or Lower Cretaceous*Alpine quartz diorite ¹Descanso granodiorite ¹Harbison quartz diorite ¹La Posta quartz diorite ¹Mount Lowe granodiorite ¹Mount Wilson quartz diorite ¹Viejas gabbro-diorite ¹*Upper Jurassic or Lower Cretaceous*(?)Bishop Creek granite ²*Upper Jurassic***Bicknell sandstone** ¹Bradley granodiorite ²Colfax formation ¹

United States—Continued

California—Continued

Upper Jurassic

- Combe sandstone ¹
- Cooks Canyon agglomerate ¹
- Fargo Canyon diorite ²
- Foreman argillite ¹
- Foreman formation** ¹
- Hinchman sandstone** ¹
- Honda formation ²
- Hull meta-andesite** ¹
- Inyo granite ¹
- Knoxville formation** ¹
- Lucky S argillite ¹
- Mariposa slate** ¹ or **formation**
- Monte de Oro formation** ¹
- North Ridge agglomerate ¹
- Oroville beds ¹
- Victorville quartz monzonite ²

Upper Jurassic(?)

- Bald Rock granite ²
- Bucks granodiorite ²
- Cactus granite ¹
- Cajalco quartz monzonite ¹
- Coxcomb granodiorite ²
- Estelle quartz diorite ¹
- Isabella granodiorite ¹
- Lakeview quartz-hornblende diorite ¹
- Merrimac granodiorite ²
- †Montara granite ¹
- Parker quartz diorite ¹
- Steele Valley granodiorite ¹
- Temescal porphyry ¹
- Virginia quartz hypersthene
- Virginia quartz hypersthene norite ¹

Middle or Upper Jurassic

- Cosumnes formation** ²
- Dufresne slate ²
- Logtown Ridge formation** ²
- Mountain Spring volcanics** ²
- Newton Mine volcanics** ²
- Sunnybrook volcanics** ²

Middle and Upper Jurassic
Amador group ²
Middle Jurassic

- Hardgrave tuff ¹
- Hull agglomerate ¹
- Moonshine conglomerate ¹
- Mormon sandstone** ¹
- †Morrison sandstone ¹
- Thompson limestone** ¹
- Thompson red shale ¹

Lower and Middle Jurassic

- †Bend formation ¹
- Potom formation** ¹

Lower Jurassic

- Arvison formation ²
- Fant meta-andesite** ¹
- Hardgrave sandstone ¹
- Lilac argillite ¹

Lower (?) Jurassic
Bagley andesite ¹
Jurassic or older

- Kernville series ¹
- Pampa schist ²

United States—Continued

California—Continued

Triassic and Jurassic
Milton formation ¹
Probably Triassic and Jurassic

- Bean Canyon formation or series ¹
- Tuolumne group ¹

Triassic
Bedford Canyon formation ²

- Elsinore metamorphic series ¹
- Genesee Valley limestone and shales ¹
- Santa Ana limestone ¹

Triassic(?)

- Clear Creek volcanic series ¹
- Homer quartzite ²
- Kaweah series ²
- Lemon Cove schist ²
- Mineral King beds ¹
- Ord Mountain group ²
- Sanford quartzite ²
- Santa Monica slate** ¹
- Sebrina complex ²
- Sidewinder volcanic series ²
- Three Rivers schist ²
- Yokohl amphibolite ²

Triassic(?) or older
Julian schist ¹
Upper Triassic and Lower Jurassic
Sailor Canyon formation ¹
Probably Upper Triassic or Jurassic
Black Mountain volcanics ¹
Upper Triassic
Brock shale ¹
Cedar formation ¹

- Devils Canyon member (of Modin formation) ²

- Hawkins Creek member (of Modin formation) ²

Hosselkus limestone ¹

 Hosselkus series ¹

- Kosk member (of Modin formation) ¹

Modin formation ¹
Swearinger slate ¹
Trail formation ¹
Middle and Upper Triassic
Pit shale ¹ or **formation**
Middle Triassic

 Pitt series ¹
Lower and Middle Triassic

 Inyo series ¹
Lower Triassic

 Inyoan series ¹
Paleozoic and Mesozoic

 Diamond Valley complex ²

 Maria plutonic complex ²
Pleasant View complex ²
Paleozoic(?) or Mesozoic(?)

 Sacatar quartz diorite ²

 Summit gabbro ²
Paleozoic

 Furnace limestone ¹

 Laurel Canyon formation ²
Paleozoic or older

 Palm Canyon complex ²

United States—Continued

California—Continued

Paleozoic or older—ContinuedTumco formation ²Vitrefrax formation ²*Paleozoic(?)*Anzar phase (of Santa Lucia series) ¹Chino Quarry limestone ¹Chino Quarry quartzite ¹Jurupa series ¹Preston hornblende diorite ¹Sky Blue Quarry limestone ¹Sur series ¹*Upper Paleozoic or Triassic*McCoy Mountains formation ²*Upper Paleozoic*Calaveras formation ¹Sidewinder Valley metavolcanics ²*Upper Paleozoic(?)*Hodge volcanic series ²Waterman gneiss ²*Lower Paleozoic(?)*Death Valley formation ¹Hanaupah formation ¹Marvel limestone ¹Middle Park formation ¹Mountain Girl conglomerate-quartzite ¹Radcliff formation ¹Redlands limestone ¹Sentinel dolomite ¹Sour Dough limestone ¹Surprise formation ¹Telescope group ¹Wildrose formation ¹*Permian*Dekkas andesite ¹Fairview Valley formation ²Garlock series ²McCloud limestone ¹†McCloud shales ¹Mokelumne formation ²Nosoni formation ¹

Owens Valley formation (see p. 621)

Owenyo limestone ¹ member (of Owens Valley formation)Reward conglomerate ¹ member (of Owens Valley formation)Wildwood limestone ¹*Lower Permian*Mount Edgar limestone ²*Carboniferous*Hall City limestone ¹Nix porphyrite ²*Carboniferous(?)*Nordheimer formation ¹Saragossa quartzite ¹*Pre-Carboniferous(?)*Chicopee formation ²*Pennsylvanian*†Keddie formation ¹Kettle meta-andesite ¹†Little Grizzly Creek beds ¹Providence Mountains limestone ²Reeve meta-andesite ¹

United States—Continued

California—Continued

Pennsylvanian—ContinuedRobinson formation ¹Tihviah limestone ²*Pennsylvanian(?)*Rest Spring shale ²*Mississippian and Permian(?)*†McCloud formation ¹*Mississippian*Arlington formation ¹Baird shale ¹Bass Mountain diabase ¹Blue Canyon formation ¹Bragdon formation ¹Cape Horn slate ¹†Caribou formation ¹Delhi formation ¹Duncan chert ¹Kanaka formation ¹Mass Mountain ¹ (basalt flows)Peale formation ¹Perdido formation ²Relief quartzite ¹Shoofly formation ¹†Spanish formation ¹Stewart Valley limestone ²Taylor meta-andesite ¹Tightner formation ¹Tin Mountain limestone ²*Probably Mississippian*Clear Creek greenstone ¹Clear Creek series ¹Clipper Gap formation ¹*Devonian*Grayback formation ¹Taylorsville formation ¹*Devonian(?)*Chancelulla formation ¹Copley greenstone (as meta-andesite ¹)*Middle(?) and Upper Devonian*Lippincott member (of Lost Burro formation) ²Lost Burro formation ²*Middle Devonian*Balaklala rhyolite ¹Kennett formation ¹†Sacramento formation ²*Pre-Devonian*Kerr Ranch schist ²*Silurian and Lower Devonian*Hidden Valley dolomite ²*Silurian*Montgomery limestone ¹*Silurian(?)*Grizzly formation ¹*Pre-Silurian*Abrams mica schist ¹*Middle Ordovician*Barrel Spring formation ¹*Lower Ordovician*Mazourka formation ¹*Post-Cambrian*Maria formation ²

United States—Continued

California—Continued

Cambrian

Barrelian series ¹

Panamintan series ¹

Pintoan series ¹

Upper Cambrian

Nopah formation ²

Middle and Upper Cambrian

Racetrack dolomite ²

Middle Cambrian and later(?)

Cornfield Springs formation ¹

Middle Cambrian

Bonanza King formation ¹

Cadiz formation ¹

Silver king dolomite member ¹
(of Bonanza King formation)

Lower and Middle Cambrian

Tecopa shale ²

Lower Cambrian

Campito sandstone ¹

Chambless limestone ²

Inyo marble ¹

Kelso shale ²

Latham shale ²

Mono series ¹

Noonday dolomite ²

Oro Grande series ¹

Pandernitan series ¹

Tough Nut quartzite ²

Zabriskie quartzite member (of
Wood Canyon formation) ²

Probably Lower Cambrian

Arrastre quartzite ¹

Precambrian and Lower Paleozoic(?)

Panamint metamorphic complex ¹

Precambrian

Beck Spring dolomite ²

Berdoo granite ²

Chubbuck marble member (of
Essex series) ²

Chuckwalla complex ²

Crystal Spring formation ²

Deep Spring formation ¹

Essex series ²

Fenner granite gneiss ²

Gold Park gabbro-diorite ²

Halloran complex ²

Hinkley Valley complex ²

Hodge complex ²

Johannesburg gneiss ¹

Kilbeck granite gneiss ²

Kingston Peak formation ²

Needles complex ²

Orocopia schist ²

Pahrump series ²

Palms granite ²

Pinto gneiss ²

Rand schist ¹

Reed dolomite ¹

Roberts formation ¹

Wyman formation ¹

Precambrian(?)

Baldwin gneiss ²

Box Springs complex ²

Echo granite ¹

United States—Continued

California—Continued

Precambrian(?)—Continued

†Klamath schists ¹

Mesquite schist ²

Pelona schist ¹

Salmon hornblende schist ¹

San Emedio series ¹

Siskiyou terrane ¹

World Beater porphyry ¹

Age(?)

Aurela Ridge group ²

Boundary Peak granite ¹

Brokeoff andesite ¹

Carson Creek formation ¹

Crescent Crater dacites ¹

Cucamonga Canyon group ²

Divide Peak andesite ¹

Eastern basalts ¹

East Ridge group ²

El Dorado Ridge gneissose quartz
diorite ²

El Luis Ridge group ²

Flatiron andesites ¹

Huckleberry andesites ¹

Juniper andesites ¹

Lassen dacites ¹

Loomis Peak dacites ¹

Manzanita dacites ¹

Marjo Canyon diorite ²

Pellisier granite ¹

Rainbow Flat group ²

Raker Peak pyroxene andesites ¹

Red Mountain pyroxene basalts ¹

San Antonio Canyon group ²

Sarc Ridge group ²

Stoddard Canyon quartz mon-
zonite ²

†Suisun marble ²

Table Mountain andesite ¹

Tehachapi marble ¹

Temeacula Canyon granite ¹

Twin Lakes andesites ¹

Weitchpec schists ¹

West Prospect basalt ¹

West Ridge group ²

Willow Lake basalts ¹

Colorado

Cenozoic (probably Quaternary)

Brush Hollow limestone ²

Quaternary

Grayback wash ¹

Recent

Piney Creek alluvium ²

Pleistocene

Florida gravel ¹

Oxford gravel ¹

Pleistocene (pre-Wisconsin)

Cerro till ¹

Durango till ¹

Pleistocene(?)

Porphyry Peaks conglomerate ²

Tertiary

Baker Lake porphyry ²

Bald Mountain dacite ¹

Basin rhyolite ²

United States—Continued

Colorado—Continued

Tertiary—Continued

- 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
- Eshe porphyry ²
- Fairview diorite ¹
- Golden member (of Arapahoe-Denver formation) ²
- Grizzly Mountain rhyolite ¹
- Grizzly Peak rhyolite ¹
- Hayden Peak latite ¹
- Lake Agnes quartz monzonite ²
- Pleasant View member (of Arapahoe-Denver formation) ²
- Porphyry Peak rhyolite ¹
- Porphyry Peaks rhyolite ¹
- Pringle andesite ¹
- Red Mountain rhyolite ¹
- Squirrel Gulch latite ¹
- Table Mountain formation ²
- Twin Lakes quartz monzonite porphyry ¹
- Utica quartz monzonite porphyry ¹

*Tertiary, upper, or lower Pleistocene(?)*Little Union quartz latite ²*Tertiary, middle or upper*

- Alborto rhyolite (as quartz latite ¹)
- Conejos formation (as andesite ¹)
- Creede formation ¹
- Fisher quartz latite (as latite-andesite ¹)
- Potosi volcanic series ¹
- Treasure Mountain rhyolite (as quartz latite ¹)

Tertiary, lower (see also Upper Cretaceous or Tertiary, lower)

- Eagle River porphyry ¹
- Pando porphyry ²
- Sacramento porphyry ¹

Tertiary, lower, or Upper Cretaceous(?)

- Elk Mountain porphyry ¹
- Evans Gulch porphyry ¹
- Gray porphyry group ¹
- Iowa Gulch porphyry ²
- Johnson Gulch porphyry ¹
- Lincoln porphyry ¹
- White porphyry ¹

Pliocene

- Trump conglomerate ²
- Wray channel beds (in Ash Hollow formation) ²

United States—Continued

Colorado—Continued

Pliocene(?)

- Bayfield gravel ¹
- Bridgefirmer gravel ¹
- Hinsdale 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 ¹ 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
- Picayune quartz latite (as volcanic group ¹)
- Piedra rhyolite or group ¹
- Rat Creek quartz latite ¹
- Sheep Mountain quartz latite (as andesite ¹)
- Silverton volcanic series ¹
- †Summitville andesite ¹
- Sunshine Peak rhyolite ¹
- Willow Creek rhyolite ¹
- Windy Gulch rhyolite breccia ¹

Miocene(?)

- Beidell latite-andesite ¹ or quartz latite
- Browns Park formation ¹
- Canyon Creek member (of San Juan tuff) ¹
- †Cropsy Peak type ¹ (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 ¹ (latite)
- Tracy Creek quartz latite (as andesite ¹)
- Weller horizon or sandstone ¹
- West Elk breccia ¹

*Miocene, upper or Pliocene*Alnwick lake beds ¹*Miocene, upper and Pliocene*†Arkansas marls ¹*Miocene, upper*

- Governor diorite ²
- Stony Mountain diorite ²

United States—Continued

Colorado—Continued

Miocene, upper—Continued

 Wagontongue formation ²
Miocene, middle, and Pliocene, lower

 †Pawnee Creek beds ¹
Oligocene

 Antero formation ¹

 †Castle conglomerate ¹

 Chumway rhyolite ²

 Guffey volcanics ²

 Troublesome formation ²

 Vista member (of White River formation) ²
Oligocene(?)

 Blanco Basin formation ¹

 Telluride conglomerate ¹ or formation

Oligocene(?) or Miocene(?)

 Canby latite ¹
Oligocene, upper, and Miocene, lower

 †Martin Canyon beds ¹
Oligocene, upper

 Florissant lake beds ¹
Oligocene, middle

 †Cedar Creek beds ¹
Oligocene, lower

 Balfour formation ²

 Castle Rock conglomerate ¹

 †Horsetail Creek beds ¹

 Thirty-nine Mile volcanic series ²
Eocene or Oligocene

 Vallejo formation ²
Eocene and Oligocene

 †Monument Creek group ¹
Post-Eocene, pre-Miocene

 Green Mountain conglomerate ²
Eocene

 †Bazoo porphyry ¹

 Brainerd quartz monzonite ¹

 Bunker andesite ¹

 Chalk Mountain nevadite ¹

 †Copper Mountain porphyry ¹

 Cuchara formation ¹

 †Gold Hill porphyry ¹

 †Green Mountain beds ¹

 †Huerfano series ¹

 McNulty Gulch rhyolite ¹

 Modoc quartz monzonite ¹

 Montezuma quartz monzonite ¹

 Mosquito porphyry ¹

 Mount Alto quartz monzonite ¹

 Mount Zion porphyry ¹

 Rosita andesite ¹

 †Ruby formation ¹

 †San Miguel conglomerate ¹

 †Silverheels porphyry ¹

 White Raven quartz monzonite ¹
Eocene(?)

 †Animas River beds ¹

 Silver Mountain monzonite porphyry ¹
Eocene, middle

 Anvil Points member (of Green River formation) ²

United States—Continued

Colorado—Continued

Eocene, middle—Continued

 Douglas Creek member (of Green River formation) ¹

 Garden Gulch member (of Green River formation) ¹

Gunnison tillite (W. W. Atwood and W. R. Atwood, 1926, Jour. Geology, v. 34, no. 7, pt. 1, p. 612-622)

 Parachute Creek member (of Green River formation) ¹
Eocene, lower and middle

 Huerfano formation ¹
Eocene, lower

 Calumet granodiorite ²

 Hiawatha member (of Wasatch formation) ¹

 Plateau Valley beds ¹
Paleocene and Eocene, lower

 DeBeque formation ²
Paleocene

 Coalmont formation ¹

 Poison Canyon formation ¹

 Ridgway till ¹

 †Tiffany beds ¹
Paleocene(?) to Oligocene(?)

 Mount Aetna quartz monzonite porphyry (as Etna quartz monzonite porphyry) ¹

 Mount Pomeroy quartz monzonite (as Pomeroy quartz monzonite) ¹

 Mount Princeton quartz monzonite ¹; see also Princeton quartz monzonite ¹
Paleocene(?)

 Ohio Creek conglomerate ¹
Cretaceous

 Coloradan series ¹

 Trinidad lignitic group ¹
Cretaceous(?)

 Albion monzonite ²

 Greenwich shale ¹
Upper Cretaceous or Tertiary, lower

 Quail porphyry ¹
Upper Cretaceous and Paleocene

 Animas formation ¹

 Dawson arkose ¹

 Denver formation ¹

 Middle Park formation ¹

 Morley coal group ¹

 †Raton Hills group ¹

 Raton Pass coal group ¹

 Wootton coal group ¹
Upper Cretaceous

 American Nettie quartzite ¹

 Anchor Mine tongue (of Mancos shale) ¹

 Apache sandstone ¹

 Apishapa shale ¹

 Arapahoe formation ¹

 Baldwin sandstone member (of Mesaverde formation) ²

United States—Continued

Colorado—Continued

Upper Cretaceous—Continued

- Beecher Island shale member (of Pierre shale)¹
- Black Diamond coal group¹
- Bowie shale member (of Mesaverde formation)²
- Cameo member (of Price River formation)²
- Canyon City group¹
- Carlile shale¹
- Cliff House sandstone¹
- †Colorado series¹
- Corcoran member (of Price River formation)²
- Cozzette member (of Price River formation)²
- Engle coal group (in Vermejo formation)¹
- †Fairfield coal group¹
- †Goff coal group (in Williams Fork formation)¹
- †Golden formation or group¹
- Greenhorn limestone¹
- Haybro formation¹
- Hayden Gulch sandstone member (of Haybro formation)¹
- Holderness formation¹
- Hunter Canyon formation¹
- Hygiene sandstone member (of Pierre shale)¹
- Iles formation¹
- Laramian series¹
- Laramie formation¹
- Larimer sandstone member (of Pierre shale)¹
- Lead King lime¹
- Lewis shale¹
- 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 sandstone¹
- Mancos shale¹; where Mowry member is recognized Mancos shale is Lower and Upper Cretaceous
- Mancosian series¹
- Menefee formation¹
- Mesaverde group or formation¹
- Milliken sandstone member (of Fox Hills sandstone)¹
- Milner formation¹
- Morapos sandstone member (of Mancos shale)¹
- Mount Garfield formation¹
- Mount Harris formation¹
- Paonia shale member (of Mesaverde formation)¹
- Patterson sand¹ (subsurface)
- †Piedra formation¹
- †Platte series¹
- Point Lookout sandstone¹

United States—Continued

Colorado—Continued

Upper Cretaceous—Continued

- 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 formation¹ 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 limestone¹
- Tow Creek sandstone¹ member (of Iles formation)
- Trinidad sandstone¹
- Trout Creek sandstone or sandstone member (of Iles formation)¹
- Twentymile coal group¹
- Twentymile sandstone member (of Williams Fork formation)¹
- Williams Fork formation¹
- †Willow Creek beds¹
- Lower and Upper Cretaceous*
- Colorado group¹, formation, or shale
- Graneros shale¹
- Lower Cretaceous*
- Burro Canyon formation²
- Dry Creek Canyon member (of Dakota sandstone)²
- Glencairn shale member (of Purgatoire formation)¹
- Kassler sandstone member (of South Platte formation)²
- Lytle sandstone member (of Purgatoire formation)¹
- Plainview sandstone member (of South Platte formation)²
- Purgatoire formation¹
- South Platte formation²
- Van Bibber shale member (of South Platte formation)²
- Jurassic*
- †Gunnison formation¹
- Montezuma shales¹
- Ralston formation²
- Jurassic(?)*
- Garo sandstone²
- Upper Jurassic*
- Bilk Creek sandstone member (of Wanakah formation)²
- Black Girl limestone¹
- Bright Diamond limestone (in Morrison formation)¹
- Bright Diamond quartzite (in Morrison formation)¹
- Doctor Bond sandstone¹
- Junction Creek sandstone²

United States—Continued

Colorado—Continued

Upper Jurassic—Continued

 †La Plata sandstone¹

 †McElmo formation¹
Morrison formation¹

 Morrisonian series¹
Pony Express limestone member
(of Wanakah formation); (as
beds in Morrison formation¹)

Wanakah formation (as member
of Morrison formation¹)

Triassic

 †Doloresian series¹

 Strain shale member (of Lykins
formation)²

Triassic(?)

 Chaquagua member¹ (of Lykins
formation)

 Gold Hill conglomerate¹

 Red Canyon member¹ (of Lykins
formation)

Upper Triassic

Dolores formation¹

Permian and Pennsylvanian(?)

Kangaroo formation¹

Permian

 Bath sandstone sub-member (of
Pony Spring siltstone member¹
[of Maroon formation])

 Bergen shale member (of Lykins
formation)²

 Chubb siltstone member (of
Maroon formation)¹

 Creston conglomerate phase¹
Cutler formation¹

 Falcon limestone member (of
Lykins formation)²

 Glennon limestone member (of
Lykins formation)²

 Harriman shale member (of
Lykins formation)²
Lyons sandstone¹

 Owl Canyon formation²

 Pony Spring siltstone member (of
Maroon formation)¹
**South Canyon Creek dolomite
member** (of Maroon forma-
tion)²

Permian(?)

 Rock Creek conglomerate mem-
ber (of Maroon formation)²

 State Bridge siltstone member (of
Maroon formation)²

Permian(?) and Triassic(?)

Lykins formation¹

Middle Permian

 Schoolhouse sand²

Carboniferous and Triassic(?)

 Tarryall formation¹

Carboniferous

 Rican series¹

 Pennsylvanian, Permian, and Tri-
assic(?)

 †Wyoming formation or group¹

United States—Continued

Colorado—Continued

Pennsylvanian and Permian

 †Arkansas sandstone¹

 Glenwood tongue (of Weber
sandstone)²
Maroon formation (as conglom-
erate or formation)¹
Sangre de Cristo formation¹

Pennsylvanian and Permian(?)

Badito formation¹
**Jacque Mountain limestone mem-
ber** (of Minturn formation);
(as member of Maroon forma-
tion)¹
Minturn formation²
Rico formation¹
White Quail limestone member
(of Minturn formation)²

Pennsylvanian

 Battle Mountain formation²
Belden shale or formation²
Elk Ridge limestone member (of
Minturn formation)²
Fountain formation¹

 Garfield formation¹
Glen Eyrie shale member (of
Fountain formation)¹

 Gothic formation²

 Hells Canyon formation²
Hermosa formation²
Hornsilver dolomite member (of
Minturn formation)²
Ingleside formation¹
Kerber formation¹

 McCoy formation¹
Molas formation¹

 Newett limestone member (of
Weber? formation)¹
Paradox member (of Hermosa
formation); (as formation)¹

 Pinkerton Trail limestone²
Robinson limestone member (of
Minturn formation); (as mem-
ber of Maroon formation)¹
Resolution dolomite member (of
Minturn formation)²

 Swissvale gypsum member (of
Minturn formation)²

 Veta Pass limestone member¹
(of Lower Sangre de Cristo
conglomerate)

Wearyman dolomite member (of
Minturn formation)²

 †Weber grits¹

 †Weber shales¹

 Whiskey Creek Pass limestone
member (of Madera forma-
tion)²

 Youghall formation²

Pennsylvanian(?)

 Coffman conglomerate member
(of Maroon formation)¹

Mississippian

Beulah limestone¹
Hardscrabble limestone²

United States—Continued

Colorado—Continued

Mississippian—Continued**Williams Canyon limestone** ¹*Lower Mississippian***Gilman sandstone member** (of Leadville dolomite) ²**Leadville limestone** ¹ or dolomite†**Millsap limestone** ¹*Devonian or Mississippian*(?)**Flat-top limestone** ¹*Upper Devonian*†**Cement shale** ¹**Chaffee formation** ¹**Dyer dolomite member** (of Chaffee formation) ²**Elbert formation** ¹†**Fairview shale** ¹**Ouray limestone** ¹**Parting quartzite member** (of Chaffee formation) ¹*Ordovician*†**Tomichi limestone** ¹†**Yule limestone** ¹*Upper Ordovician***Fremont limestone** ¹**Priest Canyon member** (of Fremont formation) ²*Middle Ordovician***Harding sandstone** ¹ or quartzite*Lower Ordovician***Dead Horse conglomerate member** (of Manitou formation) ²**Manitou limestone**, ¹ dolomite, or formation**Tie Gulch dolomite member** (of Manitou formation) ²†**Ute Pass dolomite** ¹*Cambrian to Upper Devonian*†**Yulean series** ¹*Cambrian***Lodore formation or shale** ¹*Upper Cambrian***Clinetop algal limestone member** (of Dotsero formation) ²**Dotsero formation** ²**Glenwood Canyon member** (of Dotsero formation) ²**Ignacio quartzite** ¹**Peerless formation** (as shale member of Sawatch quartzite ¹)**Sawatch quartzite** ¹†**Sawatchian series** ¹*Precambrian***Big Thompson schist** ¹**Black Canyon schist** ¹**Boulder Creek granite** (as granite gneiss) ¹**Broncho Mountain granite** ¹**Clear Creek gneiss** ¹**Coal Creek quartzite** ¹**Cripple Creek granite** ¹**Curecanti granite** ¹**Dubois greenstone** ¹**Emmons Peak quartzite** ¹**Eolus granite** ¹

United States—Continued

Colorado—Continued

Precambrian—Continued**Estes Park beds** ²**Falcon granite gneiss** ²**Front Range granite group** ¹**Gunnison River series** ¹**Hell Gate porphyry** ¹**Holy Cross schist** ¹**Idaho Springs formation** ¹**Indian Creek granite** ²**Irving greenstone** ¹**Longs Peak granite** ¹**Longs Peak-St. Vrain granite** ²**Mazatzal granite** ²**Mount Evans quartz monzonite** ²**Mount Morrison formation** ²**Mount Olympus granite** ¹**Mount Rosa granite** ¹**Needle Mountains group** ¹**Overland Mountain granite** ²**Pikes Peak granite** ¹**Pikian series** ¹**Powderhorn granite** ¹**Ralston formation** ¹**Raspberry Mountain granite** ¹**River Portal mica schist** ¹†**Rosalie granite** ¹**Salida schists** ¹**Sangre de Cristo granite** ¹**Sawatch schist** ¹**Silver Plume granite** ¹**Spring Creek granite** ¹**Summit type** (of granite) ¹**Swandyke hornblende gneiss** ¹**Tenmile granite** ¹**Trimble granite** ¹**Twilight granite** ¹†**Uinta sandstone or quartzite** ¹**Uncompahgre formation** ¹**Vallecito conglomerate** ¹**Vernal Mesa granite** ¹**Westwater gneisses and schists** ¹**Whitehead granite** ¹**Windy Point granite** ¹**Womack gneiss** ¹*Precambrian*(?)**Bear Mountain granite** ¹**Central City granite** ¹**Evans granite** ¹**Glendale granite** ¹**Santa Fe granite** ¹**Troutdale granite** ¹*Probably Precambrian***Mount Champion quartz monzonite** ¹*Age*(?)**Bull-Domingo agglomerate** ²**Specimen Mountain volcanics** ²

Connecticut

*Pleistocene***Berlin clay** ¹**Clayton clay** ¹**Hartford clay** ¹**Middletown clay** ¹

United States—Continued
Connecticut—Continued

Pleistocene, upper

New Haven clay ¹

Triassic

New Haven arkose ²

Portland arkose ²

Upper Triassic

†Connecticut shales,¹ sandstone,¹
conglomerate and group ¹

Meriden ash bed ¹

South Britain conglomerate ¹

Talcott diabase ¹

Pre-Triassic

Orange phyllite ¹

Prospect porphyritic gneiss ¹

Stony Creek granite gneiss ¹

Paleozoic

Hartland formation (as schist)¹

Mount Tom hornblende gneiss ¹

Nonewaug granite ²

Paleozoic(?)

Haddam granite gneiss ¹

Hebron gneiss ¹

Middletown gneiss ¹

Carboniferous or post-Carboniferous

Canterbury granite gneiss ¹

Eastford granite gneiss ¹

Glastonbury granite gneiss ¹

Lyme granite gneiss ¹

New London granite gneiss ¹

Preston gabbro ¹

Putnam gneiss ¹

Scotland schist ¹

Sterling granite gneiss ¹

Willimantic gneiss ¹

Carboniferous

Killingworth leucotonalite ²

Pomfret phyllite ¹

Woodstock quartz schist ¹

Pennsylvanian(?)

Redstone granite ¹

Pre-Pennsylvanian

Stonington gneiss ¹

Mississippian(?) or older

Bolton schist ¹

Maromas granite gneiss ¹

Ordovician

†Riga schist ¹

Waterbury gneiss ¹

Ordovician(?)

Bristol granite gneiss ¹

Brookfield diorite ¹

Collinsville granite gneiss ¹

†Salisbury schist ¹

Upper Ordovician

Thomaston granite (as granite
gneiss ¹)

Cambrian and Ordovician

†Canaan limestone and dolomite ¹

Precambrian

Branford granite gneiss ¹

Dalton gneiss ¹

East Haven granite ¹

Light House granite ¹

Mamacoke gneiss ¹

United States—Continued
Connecticut—Continued

Precambrian—Continued

†Milford chlorite schist ¹

Plainfield quartz schist ¹

Precambrian(?)

Barrack Mountain granite gneiss ¹

Danbury granodiorite gneiss ¹

†Greenwich formation ¹

Hawleyville granite gneiss ¹

Sharon Mountain quartz diorite ¹

Waramaug formation ²

†Wilton formation ¹

Age(?)

Lantern Hill quartz rock ¹

Litchfield norite ¹

Delaware

Pleistocene

†Delaware River gravels and
clays ¹

District of Columbia

Pleistocene

Columbia group ¹

Pliocene(?)

Good Hope formation ¹

Tenley formation ¹

Lower and Upper Cretaceous

Potomac group ¹

Precambrian

Broad Branch series ¹

†Piedmont crystallines,¹ gneiss,¹
or granite ¹

Florida

Recent(?)

Van Valkenburg beds ²

Pleistocene and Recent

Lake Flirt marl ¹

Pleistocene

Anastasia formation ¹

Coffee Mill Hammock marl ¹
member (of Fort Thompson
formation)

†Everglades limestone ¹

Fort Thompson formation ¹

Key Largo limestone ¹

†Key West oolite ¹

Melbourne bone bed ¹ facies (of
Pamlico sand)

Miami oolite ¹

†Palm Beach limestone ¹

Pliocene and Pleistocene

†Lostmans River limestone ¹

Pliocene

†Bristol formation ¹

Caloosahatchee marl ¹ or forma-
tion

†Nashua marl ¹

Pliocene, middle

Bone Valley gravel ¹ or formation

Pliocene, lower

Alachua formation ¹

†Arcadia marl ¹

†Archer beds ¹

†De Soto beds ¹

†Dunnellon formation ¹

United States—Continued

Florida—Continued

Pliocene, lower—Continued†Floridian group or series ¹†Peace Creek beds ¹*Miocene, upper*†Buckingham marl ²†Jacksonville formation ¹**Tamiami formation** ²*Miocene, probably upper*†Euclhee phase ¹*Miocene, middle and upper*†Alum Bluff series ¹†Choctawhatchee formation ¹*Miocene, middle*†Alaqua phase ¹**Oak Grove sand** ¹ member (of Shoal River formation)Permenters Farm beds ²**Shoal River formation** ¹Whites Creek bed member (of Shoal River formation) ²*Miocene, lower and middle***Alum Bluff group** ¹†Apalachicola group ¹**Hawthorn formation** ¹†Tampa group ¹*Miocene, lower*†Aspalaga clay or marl ¹†Ballast Point silex bed ¹†Chattahoochee formation ¹**Chipola formation** ¹†Ocheesee beds ¹St. Marks facies (of Tampa stage) ²†Sopchoppy limestone ¹**Tampa limestone** ¹†Tampa silex bed ¹†Wakulla formation ¹†Waldo formation ¹White Beach sandrock ¹*Miocene, lower or later*†Manatee River marl ¹*Oligocene, upper***Suwannee limestone** ¹*Oligocene, middle***Marianna limestone** ¹*Eocene, upper*Bumpnose limestone member (of Crystal River limestone) ²Crystal River formation ²Gadsden limestone ²Inglish member (of Moody's Branch formation) ²†Levyville formation ¹**Ocala limestone** ¹†Peninsular limestone ¹Williston member (of Moody's Branch formation) ²*Eocene, middle or upper*Gulf Hammock limestone ²*Eocene, middle***Avon Park limestone** ² (subsurface and surface)**Lake City limestone** ² (subsurface)

United States—Continued

Florida—Continued

Eocene, middle—Continued**Tallahassee limestone** ² (subsurface)*Eocene, lower***Oldsmar limestone** ² (subsurface)*Paleocene***Cedar Keys limestone** ² (subsurface)*Upper Cretaceous***Lawson limestone** ² (subsurface)

Georgia

Pleistocene†Okefenokee formation ¹**Penholoway formation** ¹†Satilla formation ¹*Pliocene***Charlton formation** ¹*Miocene, lower*†Altamaha formation or grit ¹Griffin bed ¹Jacksonboro limestone ¹†Marks Head marl ¹†Parachucla marl or shale ¹Wileys Landing bed ¹*Oligocene and Miocene*†Bainbridge residual beds ¹†Brier Creek marl ¹*Oligocene, upper***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)**Blufftown 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

United States—Continued

Georgia—Continued

Carboniferous

 †Lookout Mountain sandstone ¹
Mississippian

 Lavender shale member (of Fort Payne chert) ²
Lower and Middle Devonian

 Armuchee chert ¹
Silurian

 †Rockwood sandstone ¹
Ordovician or Silurian

 Taylors Ridge ¹ (formation)

Middle Ordovician

 Deaton formation or series ¹

 Rockmart slate ¹
Cambrian (see also *Precambrian* or *Cambrian*)

 Mineral Bluff formation ²

 †Oostanaula shales or series ¹

 Salem Church granite ¹
Probably Cambrian

 High Tower granite ¹
Upper Cambrian

 †Fairmount slate ¹
Middle and Upper Cambrian

 Conasauga shale, limestone, ¹ formation, or group

Lower Cambrian

 †Cartersville formation ¹

 Pinelog conglomerate ¹

 Rome formation ¹

 †Rome sandstone ¹
Probably Lower Cambrian

 Cohutta conglomerate ¹
Precambrian or Cambrian

 Canton schist ¹

 Pine Mountain formation ¹

 Tallulah Falls quartzite ¹

 Toccoa quartzite ¹
Precambrian

 Acworth gneiss ¹

 Amicalola gneiss ²

 Cohutta schist ²

 Corbin granite ¹

 Cunningham granite ²

 Dean formation ²

 Fort Mountain gneiss ²

 Hothouse formation ²

 Hughes Gap formation ²

 Manchester schist ²

 Oglethorpe formation ²

 Snelson granite ²

 Sparks schist ²

 Woodland gneiss ²
Precambrian(?)

 Austell granite ²

 Jeff Davis granite ²

 Lithonia granite-gneiss ²
Age(?)

 Panola granite ²

Hawaii. See p. 618

Idaho

Pleistocene

 American Falls lake beds ¹

 Bliss basalt ¹

United States—Continued

Idaho—Continued

Pleistocene—Continued

 Burley lake beds ¹

 Cedar Butte basalt ¹

 Emmett formation ¹

 McKinney basalt ¹

 Madson basalt ¹

 Malad basalt ¹

 Menan tuff ²

 Minidoka basalt ¹

 Sand Springs basalt ¹

 Thousand Springs basalt ¹

 Wendell Grade basalt ¹
Tertiary, upper, or Pleistocene

 Gentile Valley group ¹
Pliocene to Recent

 Snake River basalt ¹
Pliocene

 Edie School rhyolites ²

 Idaho formation ¹

 Mink Creek conglomerate ²
Pliocene(?)

 Boise sandstone ¹

 Cache Valley group ¹

 Donkey fanglomerate ²

 Malade Valley group ¹

 Marsh Creek group ¹

 Poison Creek formation ¹
Pliocene, upper

 Banbury volcanics ¹

 Hagerman lake beds ¹
Pliocene, upper(?)

 Raft lake beds ¹
Pliocene, middle(?)

 Rockland Valley basalt ¹
(?) Pliocene, lower

 Eagle Rock tuff ¹

 Massacre volcanics ¹

 Neely lake beds ¹
Miocene, Pliocene, and Pleistocene

 †Nampa beds ¹
Miocene and Pliocene(?)

 Payette formation ¹
Miocene(?)

 Medicine Lodge beds ²
Miocene, upper, or Pliocene, lower

 Owyhee rhyolite ¹
(?) Miocene, upper

 Pillar Falls mud flow ¹

 Shoshone Falls andesite ¹
Miocene, middle, or upper

 Latour formation ¹
Oligocene(?)

 Mount Bennett rhyolite ¹
Probably Oligocene and Miocene

 Kamiah volcanics ¹
Oligocene, upper, or Miocene, lower

 Challis volcanics ¹

 Germer tuffaceous member (of Challis volcanics) ¹

 Yankee Fork rhyolite member (of Challis volcanics) ¹
Cretaceous

 Tygee sandstone ¹

United States—Continued

Idaho—Continued

*Lower and Upper(?) Cretaceous*Wayan formation ¹*Lower Cretaceous*Bechler conglomerate ¹ or shaleDraney limestone ¹Ephraim conglomerate ¹Gannett group ¹Peterson limestone ¹*Lower(?) Cretaceous*

Homer limestone member (of

Wayan formation) ¹*Jurassic or Cretaceous*Boise granite ¹*Probably Jurassic or Cretaceous*Bayview granodiorite ¹Granite Creek granodiorite ¹Packsaddle Mountain granodiorite ¹*Upper Jurassic*Preuss sandstone ¹ or redbedsWolverine Canyon limestone member (of Preuss sandstone) ²*Triassic*Lanes tongue (of Ankareh formation) ²Wood shale ¹ tongue (of Ankareh formation)*Triassic(?)*Higham grit ¹*Upper Triassic*Deadman limestone ¹Lucile series ²Stump sandstone ¹*Lower Triassic*Fort Hall formation ¹Portneuf limestone ¹ member (of

Thaynes formation)

Ross Fork limestone ¹Timothy sandstone ¹ or sandstone member (of Thaynes formation)*Permian and Upper Triassic*Seven Devils volcanics ¹*Permian*Phosphoria formation ¹

Rex chert member or tongue (of

Phosphoria formation) ¹*Permian(?)*Casto volcanics ¹Snake River series ¹*Pre-Permian*Blacklead limestone ¹*Carboniferous*Pittsburg formation ²*Upper Carboniferous(?)*Sandpoint conglomerate ¹*Pennsylvanian*Wells formation ¹Wood River formation ¹*Mississippian and Devonian(?)*Milligan formation ¹*Upper Devonian*Grand View dolomite ¹

United States—Continued

Idaho—Continued

*Silurian*Trail Creek formation ¹*Ordovician*Phi Kappa formation ¹*Upper Ordovician*Fish Haven dolomite ¹Kinnikinic quartzite ¹Saturday Mountain formation ¹*Lower Ordovician*Ramshorn slate ¹*Cambrian(?)*Bannock volcanic formation ¹Bayhorse dolomite ¹Garden Creek phyllite ¹*Upper Cambrian*Ovid formation ²St. Charles limestone ¹Worm Creek quartzite member (of St. Charles limestone) ¹*Middle and Upper Cambrian*Nounan limestone ¹*Middle Cambrian*Bloomington formation ¹Lakeview limestone ¹Langston limestone ¹Rennie shale ¹Spence shale member (of Ute limestone) ¹*Middle(?) Cambrian*Gold Creek quartzite ¹*Lower Cambrian(?)*Black Rock limestone ¹*Precambrian*Blacktail formation ¹Burke formation ¹Cataldo quartzite ¹†Coeur d'Alene series ¹†Harrison series ¹Hoodoo quartzite ¹Lemhi quartzite ²Orofino series ¹Pocatello formation ²Prichard slate or formation ¹Revett quartzite ¹St. Regis formation ¹Striped Peak formation ¹Swauger quartzite ²Wallace formation ¹Yellowjacket formation ¹*Precambrian(?)*Albion Range group ¹East Fork formation ¹Hyndman formation ¹*Age(?)*Silver City granite ¹

Illinois

*Pleistocene*Cairo till ¹Florence gravel ¹Florencia formation ¹Freeport gravel ¹Joliet conglomerate ¹Kankakee torrential deposits ¹

United States—Continued

Illinois—Continued

Pleistocene—Continued

 Mahomet beds ¹

 Peru beds ¹

 †Prairie formation ¹

 Seignelay till ¹

 Silveria formation ¹

 Tazewell loess ¹
Pleistocene (Wisconsin)

 Deer Plain formation ²

 Farmdale loess ²

 Kickapoo beds ¹

 Peorian loess ¹

 Rockdale drift ²
Pleistocene (pre-Wisconsin)

 Pecatonica till ¹
Pleistocene (Sangamon? and Illinoisan)

 Brussels formation ²
Pleistocene (Illinoisan)

 Illinoisian drift ¹

 Lemont drift ²
Pleistocene (Nebraskan)

 Sankoty sand ²
Pennsylvanian

 Abingdon cyclothem ²

 Absher limestone ²

 Ava shale (in Pottsville formation) ¹

 Avon shale and limestone (in Pottsville formation) ¹

 Aylesworth limestone member (of Pottsville formation) ¹

 Babylon cyclical formation ¹

 Bald Hill limestone (in Trade-water formation) ¹

 Bald Hill sandstone (in Trade-water formation) ¹

 Baldwinville limestone (in McLeansboro formation) ¹

 Bankston Fork limestone (in McLeansboro formation) ¹

 Bernadotte cyclical formation ¹

 Bernadotte sandstone (in Pottsville formation) ¹

 Big Creek shale (in Carbondale formation) ¹

 Bogota cyclothem (including Bogota limestone and shale) ²

 Boskydell marine horizon (in Pottsville formation) ²

 Brereton cyclical formation ¹

 Brereton limestone (in McLeansboro formation) ¹

 Bridgeport sand ¹ (subsurface)

 Browning sandstone (in Carbondale formation) ²

 Brushy Creek sandstone (in McLeansboro formation) ¹

 Bunje cyclothem ²

 Burroughs beds ²

 Canton shale member (of Carbondale formation) ¹

 Carlinville cyclical formation ¹

 Carlinville sand ¹ (subsurface)

United States—Continued

Illinois—Continued

Pennsylvanian—Continued

 Centralia limestone (in McLeansboro formation) ¹

 Claypool sand ¹ (subsurface)

 Cohn cyclothem ²

 Collinsville limestone ¹

 Copperas Creek shale and sandstone (in McLeansboro formation) ¹

 Covell conglomerate (in Summum cyclothem) ²

 Craborchard cyclothem (including Craborchard limestone) ²

 Crows Mill limestone (in McLeansboro formation) ¹

 Cuba sandstone (in Carbondale formation) ¹

 Cutler limestone member (of McLeansboro formation) ¹

 Davis formation or cyclothem (including Davis sandstone) ²

 Delong cyclical formation ¹

 Delwood formation or cyclothem (including Delwood sandstone) ²

 Divide cyclothem ²

 Drury shale and sandstone member (of Pottsville formation) ¹

 Dykstra sand ¹ (subsurface)

 Effingham terrane ¹

 Farmington shale (in McLeansboro formation) ¹

 Fairmount limestone (in McLeansboro formation) ¹

 Flannigan cyclothem ²

 Flat Creek cyclothem ²

 Flat Rock sand ¹ (subsurface)

 Francis Creek shale and limestone (in Carbondale formation) ¹

 Galatia sandstone (in McLeansboro formation) ¹

 Galum limestone member (of McLeansboro formation) ¹

 Gila cyclothem (including Gila limestone) ²

 Gilchrist shale (in Pottsville formation) ¹

 Gimlet cyclical formation ¹

 Gimlet limestone ¹

 Golden Eagle limestone ¹

 Goose Lake clay ²

 Greenbush cyclical formation ¹

 Greenup cyclothem (including Greenup limestone) ²

 Hall cyclothem (including Hall limestone) ²

 Hanging Rock sandstone ¹

 Hanover limestone (in Carbondale formation) ²

 Herrin limestone (in McLeansboro formation) ¹

 Hicks cyclothem (including Hicks limestone) ²

United States—Continued

Illinois—Continued

Pennsylvanian—Continued

- Ipava shale and sandstone (in Carbondale formation)¹
- Isabel sandstone¹
- Jamestown limestone member (of McLeansboro formation)¹
- Kickapoo sand¹ (subsurface)
- †La Salle formation¹
- Lawrenceville shale (in McLeansboro formation)²
- Lick Creek sandstone member (of Pottsville formation)¹
- Litchfield sand¹ (subsurface)
- Little Chain limestone (in McLeansboro formation)²
- Little Vermilion cyclothem (including Little Vermilion limestone)²
- Little Wabash sandstone (in McLeansboro formation)²
- Liverpool cyclical formation¹
- Livingston limestone (in McLeansboro formation)¹
- Lusk formation or cyclothem²
- Macedonia formation or cyclothem²
- Macoupin cyclical formation¹
- Macoupin limestone (in McLeansboro formation)¹
- McWain sandstone²
- Makanda sandstone member (of Pottsville formation)¹
- Marietta limestone and shale (in Carbondale formation)¹
- Marshall limestone (in McLeansboro formation)¹
- Martinsville limestone¹
- Maxwell limestone (in McLeansboro formation)¹
- Millersville cyclothem (including Millersville limestone)²
- Murray Bluff sandstone (in Macedonia formation)²
- Newton cyclothem (including Newton limestone)²
- Oak Grove member¹ (of Carbondale formation)
- Omega limestone (in McLeansboro formation)¹
- Palzo sandstone²
- Park-Creek limestone (in Pottsville formation)¹
- Petro oil sand¹ (subsurface)
- Piasa limestone (in McLeansboro formation)²
- Pleasantview sandstone (in Carbondale formation)¹
- Pokeberry limestone (in McLeansboro formation)²
- Pontiac limestone (in McLeansboro formation)¹
- Pope Creek cyclical formation¹
- Pounds formation, sandstone, or cyclothem²

United States—Continued

Illinois—Continued

Pennsylvanian—Continued

- Purinton shale¹
- Quarry Creek limestone¹
- Reel limestone²
- Ridgely sand¹ (subsurface)
- Robinson sands¹ (subsurface)
- Rolls Ford shale member (of McLeansboro formation)¹
- Ryans Ford limestone (in McLeansboro formation)¹
- St. David cyclical formation¹
- St. David shale and limestone (in Carbondale formation)¹
- Scottville cyclothem (including Scottville limestone)²
- Seahorne cyclical formation¹
- Seahorne limestone¹
- Sellers limestone (in Caseyville formation)²
- Seville cyclical formation¹
- Seville limestone (in Pottsville formation)¹
- Shaw Point cyclothem²
- Sheffield shale (in McLeansboro formation)²
- Shelby cyclothem²
- Shoal Creek cyclical formation¹
- Shumway cyclothem (including Shumway limestone)²
- Siggins sand¹ (subsurface)
- Somerset member (of Pottsville formation)¹
- Sorento cyclothem²
- Sparland cyclical formation¹
- Spoon River sandstone and shale (in Pottsville formation)¹
- Spring Valley limestone (in McLeansboro formation)¹
- Summum cyclical formation¹
- Summum sandstone (in Carbondale formation)¹
- Tartar cyclothem²
- Tresner limestone²
- Trivoli cyclical formation¹
- Turner cyclothem (including Turner limestone)²
- Unionville sandstone¹
- Utica clay²
- Waupecan sandstone¹
- Wiley cyclical formation¹
- Wilson sand¹ (subsurface)
- Woodbury cyclothem (including Woodbury limestone)²
- Upper Pennsylvanian*
- Murphys Bluff sandstone²
- Middle and Upper Pennsylvanian*
- Carlville limestone (as member of McLeansboro formation)¹
- La Salle limestone (as member of McLeansboro formation)¹
- Lonsdale limestone (as member of McLeansboro formation)¹
- McLeansboro group (as formation¹)

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)¹

Shoal Creek limestone (as member of McLeansboro formation)¹

Middle Pennsylvanian

Carbondale group; formation¹ in Kentucky

Grindstaff sandstone; member (of Tradewater formation¹ in Kentucky)

Stonefort limestone; member (of Tradewater formation¹ 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 sandstone¹

Chartresan series¹

Elko gravel¹

Hartline chert²

Hoffner member (of Ste. Genevieve limestone)²

Jonesboro limestone¹

†Kaskaskia limestone, formation, or group¹

Kaskaskian series¹

McClosky sand¹ (subsurface)

McKerney limestone member (of Hannibal shale)¹

Marigold oolite¹

Martinsville sand¹ (subsurface)

†Plum Creek beds¹

Rockwood sandstone¹

†Ruma formation¹

Shetlerville formation¹

Sonora sandstone¹

Spar Mountain sandstone (in Fredonia member of Ste. Genevieve formation)²

Springville shale¹

Swan Creek sandstone¹

Valmeyer series¹

Westfield lime¹ (subsurface)

Upper Mississippian or Pennsylvanian

Bellair sands¹ (subsurface)

Buchanan sands¹ (subsurface)

Upper Mississippian

Allendale sand¹ (subsurface)

Baldwin formation²

Benoist sand¹ (subsurface)

Bielh sand¹ (subsurface)

Carlyle sand¹ (subsurface)

United States—Continued

Illinois—Continued

Upper Mississippian—Continued

†Chester sandstone¹

Chester series (as group)¹

Clore limestone¹

Cypress sandstone¹

Degonia sandstone¹

Denny sand¹ (subsurface)

Downeys Bluff member (of Renault formation)²

Elvira group²

Fraileys shale²

Golconda formation¹

Haney limestone²

Homberg group²

Kinkaid limestone¹

Klein sand¹ (subsurface)

Lindley sand¹ (subsurface)

Lusk¹ [limestone]

Menard limestone¹

New Design group²

Okaw formation¹

Paint Creek formation¹ or shale

Palestine sandstone¹

Renault formation¹

Ridenhower shale¹

Rosiclare sandstone member (of Ste. Genevieve limestone)¹

St. Francisville sand¹ (subsurface)

Sparta sand¹ (subsurface)

Stein sand¹ (subsurface)

Tracey sand¹ (subsurface)

Vienna limestone¹

Waltersburg sandstone¹

Warsaw shale, limestone¹ or formation

Yankeetown chert¹

Lower Mississippian

Darty limestone²

†Hamburg oolite¹

Kinderhook series (as group)¹

McCraney limestone²

Oshawan series¹

Devonian and Mississippian

Carper sand¹ (subsurface)

Kaskaskia sequence²

Devonian

Backbone limestone¹

Hoing sand¹ (subsurface)

Upper Devonian

Alto formation¹

Mountain Glen shale¹

Middle Devonian

Dutch Creek sandstone¹

Grand Tower limestone¹

Lingle limestone¹

Misenheimer shale¹

Lower or Middle Devonian

Clear Creek limestone¹ or chert

Lower Devonian

Grassy Knob chert¹

Silurian

Athens marble¹

Essex limestone¹

Winston dolomite¹

United States—Continued

Illinois—Continued

Middle Silurian

- Bellwood dolomite ²
- Chicago formation ¹
- Coe group ²
- Cordova dolomite ²
- Joliet limestone** ¹
- Markgraf member (of Joliet formation) ²
- Port Byron limestone ¹
- Rockdale dolomite ²
- Romeo member (of Joliet formation) ²
- Thorn group ²

Lower Silurian

- Alexandrian series** ²
- Channahon limestone ¹
- Cyrene member (of Edgewood limestone) ¹
- Kankakee limestone** ¹
- Orchard Creek shale** ¹
- Sexton Creek limestone ¹

Upper Ordovician

- Aux Sable limestone ¹
- Cape limestone ²
- Divine limestone ¹
- Du Page limestone ¹
- Millsdale limestone ¹
- Rock Run limestone ¹
- Thebes sandstone** ¹
- Treat limestone ¹
- Wilmington limestone ¹

Middle Ordovician

- Ancell group ²
- Beecher member (of Dunleith formation) ²
- Boarman member (of Mifflin formation) ²
- Brickeys member (of Mifflin formation) ²
- Briton member (of Mifflin formation) ²
- Buckhorn member (of Dunleith formation) ²
- Chana member (of Pecatonica formation) ²
- Clement member (of Grand Detour formation) ²
- Dane member (of Pecatonica formation) ²
- Daysville formation ²
- Dement member (of Grand Detour formation) ²
- Dunleith formation ²
- Eagle Point member (of Dunleith formation) ²
- Eldena member (of Nachusa formation) ²
- Elm member (of Nachusa formation) ²
- Establishment member (of Mifflin formation) ²
- Everett member (of Nachusa formation) ²

United States—Continued

Illinois—Continued

Middle Ordovician—Continued

- Fairplay member (of Dunleith formation) ²
- Foreston member (of Grand Detour formation) ²
- Galena dolomite** ¹
- †Galena series ¹
- Garnavillo member (of Guttenberg formation) ²
- Glenhaven member (of Guttenberg formation) ²
- Grand Detour formation ²
- Harmony Hill formation ²
- Hazel Green member (of Quimbys Mill formation) ²
- Hazelwood member (of Mifflin formation) ²
- Hely member (of Grand Detour formation) ²
- Hennepin member (of Pecatonica formation) ²
- Kingdom formation ²
- Loughridge formation ²
- Lowell Park member (of Platteville limestone) ¹
- Medusa member (of Pecatonica formation) ²
- Mortimer member (of Dunleith formation) ²
- Nachusa formation ²
- New Glarus member (of Pecatonica formation) ²
- Oglesby member (of Pecatonica formation) ²
- Pecatonica dolomite member** ¹
(of Platteville formation)
- Rivoli member (of Dunleith formation) ²
- St. James member (of Dunleith formation) ²
- Sherwood member (of Dunleith formation) ²
- Shullsburg member (of Quimbys Mill formation) ²
- Sinsinawa member (of Wise Lake formation) ²
- Stillman member (of Grand Detour formation) ²
- Strawbridge member (of Quimbys Mill formation) ²
- Victory member (of Grand Detour formation) ²
- Walgreen member (of Grand Detour formation) ²
- Wall member (of Dunleith formation) ²
- Wise Lake formation ²
- Wyota member (of Dunleith formation) ²

Lower Ordovician

- †Cap au Gres sandstone ¹

Upper Cambrian

- Charter member (of Mt. Simon formation) ² (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

- Hawpatch glacial gravel and sand¹
- Indianan till¹
- Wabash beds¹

Post-Carboniferous

- Ohio River formation¹

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

- Arthur limestone (in Carbondale formation)¹
- Buffkin formation¹
- Cannelton sandstone¹
- Claypole Hills sandstone (in McLeansboro formation)²
- Coxville sandstone¹
- Double Horseshoe cyclothem²
- Ferdinand limestone²
- †Fort Knox sandstone¹
- Friendsville formation¹
- Fulda limestone²
- Grandview limestone²
- Grayville formation¹
- Hanging Rock sandstone¹
- High Rock sandstone¹
- Hindustan whetstone¹
- Holland limestone²
- †Lady Washington sandstone¹
- McClearys Bluff formation¹
- McRoberts sand¹ (subsurface)
- †Martha Washington sandstone¹
- †Merom group¹
- †Millersburg formation¹
- Mumford formation²
- Mumford Hills sandstone (in McLeansboro formation)²
- New Harmony sandstone (in McLeansboro formation)²
- Parker formation¹
- Rockport sandstone¹
- St. Wendells limestone (in McLeansboro formation)²
- St. Wendell sandstone¹
- Shelton Cliff sandstone¹
- Silverwood cyclothem (including Silverwood limestone)²
- †Somerville limestone¹
- Velpen limestone²
- Wabash formation¹
- †Wabash group¹

United States—Continued

Indiana—Continued

Pennsylvanian—Continued

- West Princeton sand¹ (subsurface)

Upper Pennsylvanian

- Busseron sandstone member¹ (of Shelburn formation)
- Dicksburg Hills sandstone²
- †Ditney formation¹
- Hayden Branch formation²
- Hazleton Bridge formation²
- Inglefield sandstone¹
- Maria Creek limestone member (of Shelburn formation)²
- Merom sandstone¹
- Rabens Branch bed (in Parker formation)²
- Shelburn formation¹
- Staunton formation¹
- Vigo limestone member (of Shelburn formation)²
- West Franklin limestone¹

Middle Pennsylvanian

- Alum Cave¹ limestone member (of Petersburg formation)
- Brazil formation¹
- Dugger formation²
- Linton formation²
- Petersburg formation¹
- Universal limestone member (of Dugger formation)²

Lower Pennsylvanian

- Mansfield formation (as sandstone¹)

Mississippian or *Pennsylvanian*

- Davidson sands¹ (subsurface)

Mississippian

- Beaver Bend limestone¹
- †Bedford limestone¹
- Beech Creek limestone¹
- Beech Creek shale¹
- Bristow shale and sandstone¹
- Brown oil sand¹ (subsurface)
- Brownstown Hills sandstone member¹ (of Edwardsville formation)
- Bryantville breccia (in Levias member of Ste. Genevieve limestone)²
- Cataract Falls sandstone (in Ste. Genevieve formation)²
- Cutright sandstone member¹ (of Edwardsville formation)
- Dry Creek sandstone member¹ (of Edwardsville formation)
- Elwren sandstone¹
- Finley Knob shale member¹ (of Carwood formation)
- French Lick stone¹
- Gennet Creek formation¹
- Guthrie Creek member (of Harrodsburg limestone)¹
- †Harrodsburg limestone¹
- †Huron group¹
- Indiana oolitic limestone¹

United States—Continued

Indiana—Continued

Mississippian—Continued

- Indian Springs shale ¹
- Lampkins sandstone member ¹
(of Carwood formation)
- Leesville limestone member (of Harrodsburg limestone) ¹
- Lost River chert ¹
- Mitchell limestone** ¹
- Mooretown sandstone ²
- Mount Ebel sandstone member ¹
(of Edwardsville formation)
- Mount Pleasant shales and sandstones ¹
- Negli Creek limestone ¹
- Nixon sand ¹ (subsurface)
- Oakland City sand ¹ (subsurface)
- Orange-Martin limestone ¹
- Paoli limestone ¹
- Petersburg sand ¹ (subsurface)
- Ramp Creek member (of Harrodsburg limestone) ¹
- †St. Joseph formation ¹
- Siberia limestone ¹
- Solsberry formation ¹
- Stevens Creek limestone ¹
- Stobo limestone lens (in Borden group) ¹
- Weed Patch member ¹ (of Edwardsville formation)
- Wickliff sandstone ¹
- †Williamsport sandstone ¹

Upper Mississippian

- Barker sand ¹ (subsurface)
- Brandy Run sandstone ¹
- Colvin sand ¹ (subsurface)
- Cunningham sand ¹ (subsurface)
- Gibson sand ¹ (subsurface)
- Hightower sands ¹ (subsurface)
- Hoover gas sand ¹ (subsurface)
- Hunt sand ¹ (subsurface)
- Hyneman sand ¹ (subsurface)
- Kirkwood sand ¹ (subsurface)
- Loveless sand ¹ (subsurface)
- Mount Olympus sand ¹ (subsurface)
- Reelsville limestone ¹
- Salem limestone** ¹
- Snyder sands ¹ (subsurface)
- †Spergen limestone ¹
- Tracy sand ¹ (subsurface)
- Vierling sand ¹ (subsurface)
- West Baden (in Chester group) ¹
- Willis sand ¹ (subsurface)
- Zimmerman sand ¹ (subsurface)

Lower Mississippian

- Allens Creek facies ¹ (of Edwardsville formation)
- Bearwallow facies ¹ (of Edwardsville formation)
- Belmont facies ¹ (of Locust Point formation)
- Bennettsville facies ¹ (of Carwood formation)
- Borden group** ¹

United States—Continued

Indiana—Continued

Lower Mississippian—Continued

- Broomhill facies ¹ (of New Providence formation)
- Carwood formation** ¹
- Cisco Branch facies ¹ (of Floyds Knob formation)
- Delaneys Creek facies ¹ (of Carwood formation)
- Dowell Hill facies ¹ (of New Providence formation)
- Edwardsville formation** ¹
- Evans Landing facies ¹ (of Carwood formation)
- Falling Run member (of Sanderson formation) ²
- Fleener facies ¹ (of Carwood formation)
- Floyds Knob formation** ¹
- Fordyce Knob sandstone facies ¹
(of Floyds Knob formation)
- Gent facies ¹ (of Carwood formation)
- Goss Mill limestone facies ¹ (of Floyds Knob formation)
- Henryville formation ²
- Jacobs Chapel shale ²
- Kelly Hill facies ¹ (of Carwood formation)
- Knob Creek facies ¹ (of Carwood formation)
- Locust Point formation** ¹
- Medora Knob facies ¹ (of Edwardsville formation)
- Nelson Hill facies ¹ (of Locust Point formation)
- New Providence shale** ¹
- Riverside sandstone** ¹
- Rockford limestone** ¹
- Rosewood shale** ¹
- Sanderson formation ²
- Schooner Hill facies ¹ (of Locust Point formation)
- Silver Hill facies ¹ (of New Providence formation)
- Sparksville facies ¹ (of Carwood formation)
- Spickert Knob facies ¹ (of Locust Point formation)
- Springler Knob facies ¹ (of Edwardsville formation)
- Stewarts Landing facies ¹ (of Edwardsville formation)
- Underwood formation ²

Devonian

- Little Rock Creek limestone ²

Upper Devonian

- Blackiston formation ²
- †Delphi black shale ¹
- New Albany shale** ¹

Middle Devonian

- Blocher formation ²
- Deputy formation ²
- Geneva limestone** ¹ or dolomite
- Jeffersonville limestone** ¹

United States—Continued

Indiana—Continued

Middle Devonian—Continued

 Logansport limestone ²

 New Chapel chert bed (in Silver Creek limestone) ¹

 North Vernon limestone ¹

 Pendleton sandstone ¹

 Rocky Branch bone bed (in Jeffersonville limestone) ²

 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 ¹; as dolomite¹; 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; ¹ 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 ¹; 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 ¹ (till)

 Boyer till ¹

 Dallas deposits ¹

 †East Iowan formation ¹

 Gregorian series ¹

 †Iowan loess ¹

 Loveland loess ¹

 Malaskan till ¹

 Moingona till ¹

Pleistocene (Wisconsin)

 Iowan drift ¹

Pleistocene (pre-Wisconsin)

 Wapellian series ¹

Pleistocene (Kansan)

 Buchanan gravel ¹

Miocene(?)

 Riverside sand ¹

Cretaceous or Tertiary

 Rockville conglomerate ¹

Cretaceous

 Bentonian series ¹

 Yanktonian series ²

Cretaceous(?)

 Pine Creek conglomerate ¹

Upper Cretaceous or Miocene(?)

 Dodge gypsum ¹

 Dodge shale ¹

Upper Cretaceous

 Crill terrane ¹

 †Dixon chalk or limestone ¹

 Hawarden shale ¹

 Nishnabotna sandstone ¹

 Saxian series ¹

 Sergeant shale ¹

 †Wodbury formation ¹

Permian(?)

 Fort Dodge gypsum ¹

Pennsylvanian

 †Appanoose beds ¹

 Eldora sandstone ¹

 Haynies limestone ¹

 †McNroe beds ¹

 Munterville cyclothem (including Munterville limestone) ²

 Muscatine sandstone ²

 Platte shale ¹

 †Raccoon River beds ¹

 Red Rock channel sandstone ¹

 Truro limestone ¹

Pennsylvanian (Virgil)

 †Braddyville limestone (in Shawnee formation) ¹

 Burroak shale ¹

 McKissick Grove shale ¹

 Stennett 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†Earlham limestone (in Kansas
City formation)¹Westerville limestone member (of
Kansas City formation)¹**Winterset limestone member** (of
Kansas City formation)¹;
limestone¹ in Kansas*Pennsylvanian (Des Moines)*Coal City limestone²Cooper Creek limestone²**Des Moines series** (as group)¹Exline cyclothem (including Ex-
line limestone)²*Mississippian*Alden limestone¹†Augusta limestone, group, or
stage¹†Belfast beds¹Bonaparte marble¹Chapin beds¹Croton limestone (in St. Louis
limestone)¹Eagle City beds¹English River sandstone member
(of Hannibal shale)¹Hampton formation¹Humboldt oolite¹Iowa marble¹Iowa series¹Iowa Falls dolomite¹Keosauqua sandstone¹Le Grand beds¹Maple Mill shale¹†Marshalltown shale¹Mayne Creek formation¹†Montrose chert¹North Hill member¹ (of Hamp-
ton formation)Pella beds¹Prospect Hill sandstone member
(of Hannibal shale)¹†St. Louis marls¹†Springvale beds¹Verdi beds (in St. Louis lime-
stone)¹Wassonville limestone¹*Lower Mississippian*Aplington formation²**Burlington limestone**¹**Gilmore City limestone**¹**Keokuk limestone**¹*Devonian*Amana beds²Hutchinson limestone¹Linnian series²Raymond Quarry beds¹*Upper Devonian or Mississippian***Sweetland Creek shale**¹*Upper Devonian*Bloody Run zone¹Cedarian series¹

United States—Continued

Iowa—Continued

*Upper Devonian—Continued*Coralville limestone¹Floyd limestone¹Hackberry shale¹Juniper Hill formation¹**Lime Creek shale**¹Linwood member (of Cedar Val-
ley limestone)¹Littleton member (of Cedar
Valley limestone)¹Mason City limestone or dolo-
mite¹Nora limestone¹Owen substage or beds¹Rockfordian series¹†Rockford shale¹Rock Grove substage¹**Sheffield formation**¹**Shell Rock limestone**¹**State Quarry limestone**¹*Middle and Upper Devonian*†Cedar limestone¹Davenport beds¹*Middle Devonian*Cedar Rapids phase (of Otis
limestone)¹**Cedar Valley limestone**¹Coggon limestone¹**Fayette breccia**¹**Independence shale** (as member
of Wapsipinicon limestone)¹Kenwood beds¹Lucas limestone¹Otis limestone¹Rapid limestone¹Spring Grove member (of Wapsi-
pinicon limestone)¹Vinton phase (of Otis limestone)¹**Wapsipinicon limestone**¹Westfield phase (of Otis lime-
stone)¹*Middle(?) Devonian*Montpelier sandstone¹Solon limestone¹*Silurian*Hoing sandstone¹ (subsurface)*Silurian(?)*Bertram dolomite¹*Upper Silurian*Goweran series¹*Middle Silurian*Anamosa dolomite¹Colesburg dolomite¹†Delaware limestone¹Gower dolomite¹Hartwick dolomite¹**Hopkinton dolomite**¹Leclair dolomite¹Monticello dolomite¹†Mount Vernon beds¹Sabula dolomite¹Waucoma limestone¹

United States—Continued

Iowa—Continued

Ordovician

 †Maquoketa series ¹

 Murray Iron Works member (of Platteville formation)² (sub-surface)

 †Platteville stage ¹
Upper Ordovician

 Brainard member (of the Maquoketa shale) (as shale ¹)

 Clermont shale ¹

 Colmar shales ¹

 †Elgin limestone ¹

 Fort Atkinson limestone ¹

 Maquoketa shale ¹

 Maquoketan series ¹

 Volga shales ¹
Middle or Upper Ordovician

 Dubuque shaley member (of Galena dolomite); (as formation ¹)

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

 Winneshiek limestone ¹
Cambrian

 Hanoverian series ¹
Upper Cambrian

 Albin shale ¹

 Allamakee dolomite ¹

 Hull porphyry ¹

 Waukon sandstone ¹
Precambrian

 Ragg quartzite ²

 Siouan series ¹

 Split-Rock slate ¹
Precambrian(?)

 Tipton sandstone ¹

Kansas

Quaternary

 Gerlane formation ¹
Pleistocene and Recent

 Sanborn group (as formation ¹)

Pleistocene

 Atchison formation ¹

Ballard formation (C. W. Hibbard, 1958, Am. Jour. Sci., v. 256, no. 1, p. 55, 56)

 Belleville formation ¹

 Chase Channel formation ²

 Crooked Creek formation ²

United States—Continued

Kansas—Continued

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 ²)

 Odee formation ²

 Pearllette ash ¹ member (of Sappa formation)

 Peoria silt member (of Sanborn formation)²

 †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 ²
Pliocene, middle

 Delmore formation ²
Pliocene, lower

 Edson beds (in Ogallala formation)¹

 Rhinoceros Hill beds (in Ogallala formation)¹
Miocene, Pliocene, and Pleistocene

 †Plains marl ¹
Miocene or Pliocene

 Woodhouse clay (in Ogallala formation)¹
Cretaceous

 Brookville terrane ¹

 Bucksinian series ²

 Cawker terrane ¹

 Gove chalk ²

 †Medicine beds ¹

 Pete terrane ¹

 Rawlinsian series ²

 Terra Cotta clay member (of Dakota formation)²

United States—Continued

Kansas—Continued

Cretaceous—ContinuedWallace shale ²Wiskanian series ²*Cretaceous*(?)**Hills Pond peridotite** ²*Upper Cretaceous*†Arickaree shale ¹**Blue Hill shale member** (of Carlile shale ¹)**Bridge Creek limestone member** (of Greenhorn limestone) ¹Cockrum sandstone ²**Codell sandstone member** (of Carlile shale) ¹; **member** (of Benton shale in NE Colorado)†Downs limestone (in Greenhorn limestone) ¹Ellsworth formation ²**Fairport chalky shale member** (of Carlile shale) ¹†Fence-post limestone ¹†Fort Hays division or group ¹**Fort Hays limestone member** (of Niobrara formation) ¹†Graham jasper (in Niobrara formation) ¹**Hartland shale member** (of Greenhorn limestone) ¹**Janssen clay member** (of Dakota formation) ²**Jetmore chalky member** (of Greenhorn limestone) ¹Lake Creek shale member (of Pierre shale) ¹**Lincoln limestone member** (of Greenhorn limestone) ¹†Lisbon shale ¹Norton zone (in Niobrara formation) ¹†Osborne limestone ¹**Pfeifer shale member** (of Greenhorn limestone) ¹†Reeder sandstone ¹**Rocktown channel sandstone member** (of Dakota sandstone) ¹†Russell formation ¹Salt Grass shale member (of Pierre shale) ¹**Sharon Springs member** (of Pierre shale) ¹**Smoky Hill chalk or marl member** (of Niobrara formation) ¹Solomon formation ²†Trego zone (in Niobrara formation) ¹†Victoria formation, clays, or shale ¹Weskan shale member (of Pierre shale) ¹

United States—Continued

Kansas—Continued

Lower Cretaceous†Belvidere shale ¹Black Hill shale ¹Blue Cut shale ¹Champion shell bed (in Kiowa shale) ¹**Cheyenne sandstone** ¹; **member** (of Purgatoire formation in Oklahoma)†Corral sandstone (in Cheyenne sandstone) ¹†Elk Creek beds (in Cheyenne sandstone) ¹Fullington shale ¹†Greenleaf sandstone ¹Kent bed ¹Kiowa shale ¹†Kirby clay ¹†Lanphier beds (in Cheyenne sandstone) ¹Marquette member ¹ (of Belvidere formation)**Mentor formation** ¹Natural Corral member ¹ (of Belvidere formation)†Spring Creek clays ¹†Stokes sandstone (in Cheyenne sandstone) ¹†Walker beds ¹Windom member ¹ (of Belvidere formation)*Permian***Admire group** (as shale ¹)Afton limestone member (of Wellington formation) ²†Alma limestone ¹**Americus limestone member** (of Foraker limestone) ¹Annelly gypsum member (of Wellington formation) ²**Bader limestone** (as formation ¹)**Beattie limestone** (as formation ¹)Big Basin sandstone ¹Big Blue group or series ¹Bigelow formation ¹**Blue Rapids shale** ¹**Blue Springs shale** ¹ **member** (of Matfield shale)Bruno limestone ¹Buckeye shale ¹Carlton limestone ¹Cave Creek formation ¹Cedar Hills anhydrite ¹Cedar Hills sandstone ¹†Cedar Point shales and shaly limestones ¹**Chase group** ¹Chicago Mound formation ²Chikaskia member (of Harper sandstone) ²Chisholm Creek shale member (of Wellington formation) ²**Cimarron group** ¹†Cottonwood formation ¹

United States—Continued

Kansas—Continued

Permian—Continued

Cottonwood limestone¹ member
(of Beattie limestone); lime-
stone in Oklahoma

†Cottonwood shales¹

Council Grove group¹

Cresswell limestone¹ member
(of Winfield limestone)

Crisfield member (of Salt Plain
formation)²

†Crusher Hill alternating shales
and limestone¹

Day Creek dolomite¹; member
(of Cloud Chief formation in
Oklahoma)

Dog Creek shale¹

Donegal limestone¹

Doyle shale¹

Easy Creek shale¹

†Elmdale shale¹ or formation¹

Elmo limestone member¹ (of
Wellington shale)

†Enterprise shale¹

Esbridge shale¹

†Flint Hills division¹

Florena shale member (of Beat-
tie limestone); (as member of
Garrison shale¹)

†Florence limestone¹

Florence limestone member (of
Barneston limestone); (as
Florence flint¹)

Flower-pot shale¹

Fort Riley limestone¹ member
(of Barneston limestone)

Funston limestone¹

Gage shale¹ member (of Doyle
shale)

†Garrison shale¹

Geuda salt measures¹

Geuda Springs shale member (of
Wellington formation)²

Grant shale¹ member (of Win-
field limestone)

Greeley gypsum¹

Grenola limestone (as forma-
tion¹)

Hackberry shale¹

Harper sandstone¹

Havensville shale member (of
Wreford limestone)¹

Herington limestone¹ member
(of Nolans limestone); lime-
stone in Oklahoma

Highland shale member (of Well-
ington formation)²

Hollenberg limestone¹

Hooser shale¹ member (of Bader
limestone)

Hope gypsum¹

Hutchinson salt member (of
Wellington formation); (as
Hutchison salt bed¹)

United States—Continued

Kansas—Continued

Permian—Continued

Janesville shale (R. C. Moore
and M. R. Mudge, 1956, Am.
Assoc. Petroleum Geologists
Bull., v. 40, no. 9, p. 2273)

Jenkins clay¹

Kiger division¹

Kingman sandstone member (of
Harper sandstone)²

Legion shale member¹ (of
Grenola limestone)

†Luta limestone¹

†Manhattan beds¹

†Manhattan limestone¹

Marion concrectionary lime-
stone¹

Marion flint¹

†Marion formation¹

Matfield shale¹

Medicine Lodge gypsum¹ mem-
ber (of Blaine formation)

Milan limestone member (of
Wellington formation)²

Morrill limestone¹ member (of
Beattie limestone)

†Neosho shale member (of Gar-
rison shale)¹

Nescatunga gypsum member (of
Blaine formation)²

Neva limestone¹ member (of
Grenola limestone)

Newbern shale¹

Ninnescah shale²

Nippewalla group²

Nolans limestone¹

Ogden flint¹

Oketo shale¹ member (of
Barneston limestone)

Onaga shale (as limestone¹)

†Pearl shale¹

Prairie Creek limestone lentil
(in Geuda Springs shale mem-
ber of Wellington formation)²

†Red Bluff sandstone¹

Runnymede sandstone member
(of Ninnescah formation)²

Sabetha limestone¹

Sallyards limestone member¹
(of Grenola limestone)

Salt Fork division¹

Salt Plain shale¹

Sanatorium limestone lentil (in
Geuda Springs shale member
of Wellington formation)²

Schroyer limestone¹ member
(of Wreford limestone)

Shimer gypsum member (of
Blaine formation)¹

Slate Creek limestone member
(of Wellington formation)²

Solomon gypsum¹

Stearns shale¹

Stone Corral¹ dolomite

United States—Continued

Kansas—Continued

Permian—Continued

Stovall limestone¹ member (of Winfield limestone)

Strickler limestone¹

†Strong flint¹

†Strong City beds¹

Sumner group¹

†Sun City marble¹

†Thrall limestone member (of Foraker limestone)¹

Threemile limestone¹ member (of Wreford limestone)

Towanda limestone member (of Doyle shale)¹

Towle shale¹ member (of Onaga shale)

Udall limestone lentil (in Geuda Springs shale member of Wellington formation)²

Wellington formation¹

†Wellington marble¹

West Point shale (in Admire shale)¹

Winfield limestone¹

Wreford limestone¹

Pennsylvanian

†Allen limestone member¹

Altoona limestone¹

†Americus beds¹

†Barclay limestone¹

Bourbon formation¹ or group¹

Boyer sand¹ (subsurface)

†Burlingame shale¹

†Burlington limestone¹

†Buxton formation¹

†Calhoun limestone¹

Caneyville shale¹

†Carlyle limestone¹

Cave Springs sandstone¹

†Chautauqua sandstone¹

†Coffeyville limestone¹

Columbia Ford limestone¹

Concreto shale¹

Dashner limestone¹

Dodge limestone¹ (subsurface)

Dun limestone¹

†Dunlap limestone¹

†Earlton limestone¹

Einstine sandstone¹

Elk Falls limestone¹

Elm Branch shale¹

†Emporia blue limestone¹

†Emporia reservoir shales¹

†Erie limestone¹

Eudora limestone¹

†Eureka beds¹

†Eureka limestone¹

Fall River sandstone¹

Frenek shale¹

†Garnett limestone¹

Gorham sand¹ (subsurface)

Hancock sand¹ (subsurface)

Humboldt limestone¹

Humphrey shale¹

United States—Continued

Kansas—Continued

Pennsylvanian—Continued

Humphrey Creek shale¹

†Independence limestone¹

Institute limestone¹

†Iola shale¹

Kickapoo limestone¹

†Laneville shale¹

La Cygne shale member¹ (of Marmaton formation)

†Lecompton shale¹

Le Roy shale¹

Linwood shale¹

Linwood shales²

†Marais des Cygnes coal series¹

†Marais des Cygnes shales¹

Mission Creek shale (in Deer Creek limestone)¹

†Mound Valley limestone¹

†Mound Valley shale¹

Naish limestone¹

Neodesha sandstone¹

Neosho limestone¹

Olpe shale¹

Oswald lime¹ (subsurface)

†Oswego limestone¹

Ottawa limestone¹

†Painterhood limestone¹

†Parsons formation¹

†Pawnee limestone series¹

Peacock sand¹ (subsurface)

†Piqua limestone member¹

†Pottawatomie formation¹

†Pottawatomie series¹

Rainbow Bend sand¹ (subsurface)

Redd sand¹ (subsurface)

Reserve shale member¹ (of Falls City formation)

Robinett flags¹

Rosville shales and sandstones¹

Schubert Creek limestone¹

†Shawnee sandstone¹

Shunganunga shale¹

Sni Mills limestone¹

Sooy conglomerate¹ (subsurface)

†Spring Rock limestone¹

Stalnaker sand¹ (subsurface)

†Stanton limestone series¹

Stokes sand¹ (subsurface)

†Strawn limestone¹

Tennison Creek shale¹

Uniontown limestone¹

†Walnut shale¹

†Waverly flags¹

†Wilson formation¹

Wolf River limestone¹

Wyandotte group¹

†Wyckoff limestone¹

*Upper Pennsylvanian**Kawvian series*²*Pennsylvanian (Virgil)*

Aarde shale¹ member (of Howard limestone)

United States—Continued

Kansas—Continued

Pennsylvanian (Virgil)—Continued

Auburn shale¹
Bachelor Creek limestone¹ member (of Howard limestone)

Bern limestone (R. C. Moore and M. R. Mudge, 1956, Am. Assoc. Petroleum Geologist, v. 40, no. 9, p. 2276–2277.

Big Springs limestone (in Lecompton limestone)¹
Burlingame limestone member (of Bern limestone); (as member of Wabaunsee formation)¹
Calhoun shale (as member of Shawnee formation)¹
Caneyville limestone¹
Cedarvale shale member (of Scranton shale)¹
Clay Creek limestone (in Kanwaka shale)¹
Coal Creek limestone member (of Topeka limestone)¹
Deer Creek limestone (as member of Shawnee formation)¹
Doniphan shale (in Lecompton limestone)¹
Douglas group¹
Dover limestone¹ member (of Stotler limestone)

Dry shale¹ member (of Stotler limestone)

Du Bois limestone member (of Topeka limestone)¹
Elgin sandstone¹ member (of Vamoosa formation in Oklahoma)

Elmont limestone¹ member (of Emporia limestone)

Emporia limestone¹
French Creek shale¹ member (of Root shale)

Friedrich shale¹ member (of Root shale)

Grandhaven limestone¹ member (of Stotler limestone)

Happy Hollow limestone member (of Scranton shale)¹

 †**Hartford limestone** (in Shawnee formation)¹
Harveyville shale¹
Haskell limestone¹ member (of Stranger formation)

Howard limestone¹; †member (of Shawnee formation)¹
Iowa Point shale (in Calhoun shale)¹
Ireland sandstone¹ member (of Lawrence shale)

Jackson Park shale member (of Kanwaka shale)¹
Jim Creek limestone¹ member (of Root shale)

United States—Continued

Kansas—Continued

Pennsylvanian (Virgil)—Con.

Jonesburg sandstone member (of Lawrence shale; of Vamoosa formation in Oklahoma); (as member of Nelagoney formation)¹
Kanwaka shale¹; †member (of Shawnee formation)¹
Kereford limestone †member (of Oread limestone)¹
Lawrence shale¹; member (of Douglas formation)¹
Leavenworth limestone member (of Oread limestone)¹
Lecompton limestone¹; †member (of Shawnee formation)¹
Maple Hill limestone¹ member (of Zeandale limestone)

Oread limestone¹; limestone member (of Vamoosa formation in Oklahoma)

 †**Osage limestone** (in Shawnee formation)¹

 †**Osage City limestone**¹

 †**Osage City shale** (in Shawnee formation)¹
Oskaloosa shale (in Deer Creek limestone)¹
Ozawkie limestone (in Deer Creek limestone)¹
Reading limestone¹ member (of Emporia limestone)

Robbins shale member¹ (of Stranger formation)

Root shale (R. C. Moore and M. R. Mudge, 1956, Am. Assoc. Petroleum Geologist, v. 40, no. 9, p. 2274 (fig. 1), 2275)

Sac-Fox subgroup¹
Scranton shale¹; †member (of Shawnee formation)¹
Severy shale¹; †member (of Shawnee formation)¹
Shawnee group¹; †formation in Missouri and Iowa¹
Silver Lake shale member (of Scranton shale)¹
Soldier Creek shale¹ member (of Bern limestone)

Spring Branch limestone (in Lecompton limestone)¹
Stormont limestone member (of Pierson Point shale)²
Stranger formation¹
Stull shale (in Kanwaka shale)¹
Tarkio limestone member (of Zeandale limestone); (as member of Wabaunsee formation)¹
Tecumseh shale¹ or formation; †member (of Shawnee formation)¹
Topeka limestone¹; †member (of Shawnee formation)¹

United States—Continued

Kansas—Continued

Pennsylvanian (Virgil)—Con.**Tonganoxie sandstone**¹ member (of Stranger formation)**Toronto limestone**¹ member (of Oread limestone)**Utopia limestone**¹ member (of Howard limestone)**Vinland shale**¹ member (of Stranger formation)**Virgil series**¹**Wabaunsee group** (as formation)¹**Wakarusa limestone**¹ member (of Bern limestone)**Wamego shale member** (of Zeandale formation); (as shale)²**Westphalia limestone**¹ member (of Stranger formation)**White Cloud shale**¹ member (of Scranton shale)**Willard shale**¹**Winzeler shale**¹ member (of Howard limestone)**Zeandale formation** (R. C. Moore and M. R. Mudge, 1956, Am Assoc. Petroleum Geologists Bull., v. 40, no. 9, p. 2276)*Pennsylvanian (Missouri)***Argentine limestone**¹**Block limestone**¹**Bonner Springs shale**¹**Bronson formation**¹ or group¹**Canville limestone**¹**Captain Creek limestone member** (of Stanton limestone)¹**Chanute shale**¹; **shale member** (of Kansas City formation in Missouri)¹**Cherryvale shale**¹; **shale member** (of Kansas City formation in Missouri)¹**Coffeyville formation**¹**Corbin City limestone**¹**Cottage Grove sandstone**¹**Critzer limestone**¹†**Dennis limestone**¹**Dodds Creek sandstone**¹**Drum limestone**¹; **limestone member** (of Kansas City formation in Missouri)¹†**Dudley shale**¹ or **shale member** (of Pleasanton formation)¹**Eudora shale**¹ member (of Stanton limestone)**Fontana shale**¹**Frisbie limestone**¹**Galesburg shale**¹**Hepler sandstone formation**²**Hertha limestone**¹; **limestone member** (of Kansas City formation in Missouri)¹**Hickory Creek shale**¹**Hushpuckney shale**¹

United States—Continued

Kansas—Continued

Pennsylvanian (Missouri)—Con.**Iola limestone**¹; **limestone member** (of Kansas City formation in Missouri)¹**Island Creek shale**¹**Ladore shale**¹; **shale member** (of Kansas City formation in Missouri)¹**Lane shale**¹; **shale member** (of Lansing formation in Missouri)¹**Lansing group**¹; **formation** in Missouri¹**Linn subgroup**²**Little Kaw limestone member**¹ (of Stanton limestone)**Merriam limestone**¹**Middle Creek limestone**¹**Mound City shale**¹**Muncie Creek shale**¹**Noxie sandstone** lentil or member (of Chanute formation)²**Olathe limestone member**¹ (of Stanton limestone)**Paoli limestone**¹**Pedee group**¹**Pleasanton formation**¹**Quindaro shale**¹**Quivira shale** (in Kansas City formation)¹**Spring Hill limestone**¹**Stanton limestone**¹; **limestone member** (of Lansing formation in Missouri)¹**Stark shale**¹†**Thayer shale** (in Kansas City formation)¹**Vilas shale**¹; **shale member** (of Lansing formation in Missouri)¹**Victory Junction shale member**¹ (of Stanton limestone)**Wea shale**¹**Wyandotte limestone**¹**Zarah subgroup**²*Middle Pennsylvanian***Blankenship sand**¹ (subsurface)**Cattleman sand**¹ (subsurface)**Chetopa shales**¹**Colony sand**¹ (subsurface)**Fox Bush sand**¹ (subsurface)**Sallyards sand**¹ (subsurface)**Welch chert**¹ (subsurface)*Pennsylvanian (Des Moines)***Altamont limestone**¹; **limestone member** (of Oologah limestone in Oklahoma)**Anna cyclothem** (including Anna shale)²**Bandera shale**¹; **member** (of Oologah limestone in Oklahoma)

United States—Continued

Kansas—Continued

Pennsylvanian (Des Moines)—Con.

Bandera Quarry sandstone mem-
bera (of Bandera shale)²

Breezy Hill limestone member
(of Cherokee shale) of Senora
formation in Oklahoma)²

Cherokee shale¹

Coalvale cyclothem or formation²

†Columbus sandstone (in Chero-
kee shale)¹

Croweburg cyclothem or forma-
tion²

Englevale channel sandstone¹

Fleming cyclothem or formation²

†Fort Scott coal series¹

Fort Scott limestone¹; †limestone
member (of Henrietta forma-
tion)¹

†Fort Scott marble series (in
Cherokee shale)¹

Idenbro cyclothem (including
Idenbro limestone)²

Knifeton cyclothem or forma-
tion²

Laberdie cyclothem (including
Laberdie limestone)²

Labette shale¹; †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 limestone¹; member (of
Oologah limestone in Okla-
homa)

Perry Farm cyclothem (including
Perry Farm shale)²

Pilot cyclothem or formation²

Riverton cyclothem or formation²

Rowe formation or coal cycle²

Scammon cyclothem or forma-
tion²

Stice cyclothem²

Walter Johnson sandstone mem-
ber (of Nowata shale)²

Weir cyclothem or formation²

Pennsylvanian (Morrow)

Kearney formation² (subsurface)

Mississippian(?)

Stanhope sand¹ (subsurface)

Lower Mississippian

†Cherokee limestone¹

Cowley formation² (subsurface)

United States—Continued

Kansas—Continued

Lower Mississippian—Continued

Short Creek oolite member (of
Boone limestone)¹ or (of Keo-
kuk limestone)

Skelton shale¹ (subsurface)

Watchorn formation² (subsur-
face)

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 (in-
cluding Battery Rock sand-
stone or conglomerate)²

Beattyville shale¹

†Beaver sandstone¹

Bee Spring sandstone¹

Bee Tree shale²

Bald Hill shale (in Henshaw
formation)¹

Carthage limestone (in McLeans-
boro formation)¹

Corbin conglomerate lentil¹ (in
Lee formation)

†Curlew sandstone (in Trade-
water formation)¹

Deaneville 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

United States—Continued

Kentucky—Continued

Pennsylvanian—Continued

- Finnie Bluff sandstone ¹
- Flat Lick sandstone ¹
- Flat Top Mountain sandstone ¹
- Flint Ridge flint ¹
- Grundy Knob limestone ²
- Hartford limestone ¹
- High Rock sandstone ¹
- Horton sand ¹ (subsurface)
- Jolly limestone (in McLeansboro formation) ¹
- Kendrick shale ¹
- Kinchloe limestone ¹
- Lead Creek limestone ¹
- Lewisport limestone ¹
- Livingstone conglomerate ¹
- Lost Creek limestone ¹
- Magoffin beds ¹
- Mount Gilead sandstone (in Henshaw formation) ¹
- Mount Gilead shale (in Henshaw formation) ¹
- Mulford formation ¹
- Newburg limestone ¹
- Olive Hill fire clay (in Pottsville formation) ¹
- Peach Orchard sandstone ¹
- Pike sand ¹ (subsurface)
- †Pine Mountain group ¹
- Puncheon Creek sandstone ¹
- †Rockcastle group ¹
- Saltlick beds ¹
- Sebree sandstone (in Carbondale formation) ¹
- †Seven Sisters sandstone ¹
- South Carrollton limestone ¹
- Top Hill sandstone ¹
- Vanderburg sandstone (in Henshaw formation) ¹
- Wages sand ¹ (subsurface)
- Williamsburg sand ¹ (subsurface)
- Wild Cat Mountain conglomerate ¹

Upper Pennsylvanian

- Anvil Rock sandstone member** (of Lisman formation); (as member of McLeansboro formation) ¹

Henshaw formation ¹**Lisman formation** ¹

- Madisonville limestone** ¹ member (of Lisman formation)

- Providence limestone** ¹ member (of Lisman formation)

Middle Pennsylvanian

- Blacksnake sandstone** (of Hance formation) ¹

Catron formation ¹

- Cawood sandstone member** (of Hance formation) ¹

- Curlew limestone member** (of Tradewater formation) ¹

United States—Continued

Kentucky—Continued

Middle Pennsylvanian—Continued

- Fork Ridge sandstone member** (of Mingo formation) ¹
- Hance formation** ¹
- Harlan sandstone** ¹
- Hignite formation** ¹
- Jesse sandstone member** (of Catron formation) ¹
- Naese sandstone member** (of Lee formation) ¹
- Puckett sandstone member** (of Mingo formation) ¹
- Red Spring sandstone member** (of Hignite formation) ¹
- Reynolds sandstone member** (of Hignite formation) ¹
- Slater sandstone member** (of Mingo formation) ¹
- Tradewater formation** ¹; group in Illinois
- Whetstone Creek shale member** (of Breathitt formation) ¹
- Yellow Creek sandstone member** (of Hance formation) ¹

*Lower and Middle Pennsylvanian***Breathitt formation** ¹*Lower Pennsylvanian*

- Caseyville sandstone** ¹; group in Illinois
- Rockcastle sandstone or conglomerate member** (of Lee formation) ¹

Mississippian

- Atherton clay ¹
- Barlow lime ¹ (subsurface)
- Barlow sand ¹ (subsurface)
- Beaver Creek "sand" ¹
- †Birdsville formation or group ¹
- Brooks bed ¹
- Cloverport "sand" ¹ (subsurface)
- Corder "sand" ¹ (subsurface)
- Eggners Ferry chert ²
- Kentucky shale ¹
- Linietta clay ¹
- Major sand ¹ (subsurface)
- Mammoth Cave series ¹
- Morris Mountain shaly member** (of Logan formation) ¹
- Mount Pisgah sand ¹ (subsurface)
- †Ohara limestone member ¹ (of Ste. Genevieve limestone)
- Otter sand ¹ (subsurface)
- Pellville sand ¹ (subsurface)
- Petersville shale ¹
- †Princeton limestone ¹
- Rock House sandstone ¹
- †Shot Pouch sandstone ¹
- Slickford sand ¹ (subsurface)
- Vanceburg black shale ¹
- Vanceburg sandstone member ¹ (of Cuyahoga formation)
- Weir sand ¹ (subsurface)

United States—Continued

Kentucky—Continued

Mississippian—Continued

West Point member (of Warsaw formation)¹

Upper Mississippian

Bethel sandstone¹

†Big Clifty sandstone¹

Bradley sand¹ (subsurface)

Buffalo Wallow formation¹

Clover Creek limestone¹

Fredonia oolite member (of Ste. Genevieve limestone)¹

Garfield sandstone¹

Gasper formation or oolite¹

Girkin formation¹

Glen Dean limestone¹

Hardinsburg sandstone¹

Jett sand¹ (subsurface)

Leitchfield formation¹

Leitchfield marl¹

Levias sandstone member (of Ste. Genevieve limestone)¹

†Lockhart formation¹

Penrod sand¹ (subsurface)

Sample sandstone or sandstone member (of Gasper oolite)¹

†Sloan Valley limestone¹

Somerset shale member (of Warsaw formation)¹

Spann limestone member (of Pennington shale)¹

†Stephensport bed¹

Stephensport (broad usage)¹

Tar Springs sandstone¹

Tribune sandstone¹

Wildie sandstone member (of Warsaw formation)¹

Lower Mississippian

Athertonville facies (of Brodhead formation)²

Bluestone facies (of New Providence formation)²

Boone Gap facies (of New Providence formation)²

Brodhead formation²

Caney Creek member (of Brodhead formation)²

Christy Creek siltstone member (of Brodhead formation)²

Clay City siltstone member (of New Providence formation)²

Clements ville limestone member (of Brodhead formation)²

Combs Mountain siltstone member (of Brodhead formation)²

Conway Cut siltstone member (of Brodhead formation)²

Culver Springs shale member (of Brodhead formation)²

Cummins Station shale member (of Muldraugh formation)²

United States—Continued

Kentucky—Continued

Lower Mississippian—Continued

Dicks River facies (of New Providence formation)²

Farmers siltstone member (of New Providence formation)²

Forbush Creek facies (of New Providence formation)²

Frenchburg siltstone member (of Brodhead formation)²

Ginseng siltstone member (of Brodhead formation)²

Greasy Creek facies (of Fort Payne formation)²

Gum Sulphur siltstone member (of New Providence formation)²

Haldeman siltstone member (of Brodhead formation)²

Holtsclaw sandstone¹

Holtsclaw Hill facies (of Brodhead formation)²

Hummel facies (of Muldraugh formation)²

Indian Fort shale member (of Brodhead formation)²

Irvine facies (of Brodhead formation)²

Junction City facies (of New Providence formation)²

Keith Knob facies (of New Providence formation)²

Kenwood sandstone¹

Lebanon Junction siltstone member (of Brodhead formation)²

Liberty facies (of Brodhead formation)²

McKinney Knob member (of Brodhead formation)²

Maretburg facies (of Muldraugh formation)²

Morehead facies (of Brodhead formation)²

Muldraugh formation²

Olive Hill facies (of Muldraugh formation)²

Perry Branch siltstone member (of Brodhead formation)²

Pilot Knob facies (of Brodhead formation)²

Rolling Fork limestone member (of Brodhead formation)²

Rothwell shale member (of Muldraugh formation)²

Stanton facies (of New Providence formation)²

Steels Knob chert facies (of Muldraugh formation)²

Devonian

Campton sand¹ (subsurface)

Coralline Falls limestone¹

Irvine sand¹ (subsurface)

Menifee sand¹ (subsurface)

United States—Continued

Kentucky—Continued

*Upper Devonian*Duffin limestone ¹Ragland sand ¹ (subsurface)*Middle Devonian***Beechwood limestone member**(of Sellersburg limestone) ¹Boyle limestone ¹Casey limestone ¹Gainesville sand ¹ (subsurface)Harg shale facies (of Portwood formation) ²Kiddville limestone ¹Moulder sand ¹ (subsurface)Portwood formation ²Ravenna shale facies (of Portwood formation) ²*Silurian and Devonian*Panola formation ¹*Silurian*Holy Cross sandstone ²Oldham limestone ¹Olympia sand ¹ (subsurface)Plum Creek clay ¹Rodemar sand ¹ (subsurface)Scottsville sand ¹ (subsurface)Stanton sand ¹ (subsurface)*Middle Silurian*Alger formation ¹Boys Creek sand ¹ (subsurface)Crab Orchard shale ¹Estill clay ¹Flades clay ¹Indian Fields formation ¹**Louisville limestone ¹**Lulbegrud clay ¹Ribolt clay shale ¹Waco limestone ¹*Lower Silurian***Brassfield limestone ¹***Ordovician (see also Cambrian and Ordovician)*Devils Hollow division (of Lexington limestone) ²†Kentucky marble ¹Sulphur Well member (of Cynthiana formation) ²Sunnybrook sand ¹ (subsurface)*Upper Ordovician*Bardstown coral reef (in Liberty formation) ¹Caney sand ¹ (subsurface)Cumberland sandstone ¹Economy member (of Latonia shale) ¹Fisherville coral reef (in Waynesville limestone) ¹Fowler limestone ¹**Garrard sandstone ¹**Gilbert limestone (in McMillan formation) ¹Gratz shale ¹Haggard limestone (in Cumberland sandstone) ²**Latonia shale ¹**

United States—Continued

Kentucky—Continued

*Upper Ordovician—Continued***Maysville group ¹**Million shale ¹Oregonia division (in Arnheim formation) ¹Paint Lick limestone ¹Rennix limestone ¹Southgate member (of Latonia shale) ¹Sunset division (in Arnheim formation) ¹Tate member (of McMillan formation) ¹*Middle and Upper Ordovician***Winchester limestone ¹***Middle Ordovician***Benson limestone ¹**Blue Grass group ¹Bourbon series ¹**Brannon limestone member** (of Cynthiana formation); (as cherty member of Flanagan limestone) ¹

Bromley shale (See p. 622)

Camp Nelson limestone ¹Cornishville limestone member (of Perryville formation) ¹**Curdsville limestone ¹****Cynthiana formation ¹**Faulconer limestone member (of Perryville formation) ¹**Flanagan limestone ¹**Greendale limestone (in Cynthiana formation) ¹**Highbridge limestone or group ¹****Jessamine limestone ¹**Jessamine series ¹**Lexington limestone, ¹ formation or group****Logana formation** (as bed ¹)Millersburg limestone member (of Cynthiana formation) ¹**Nicholas limestone member** (of Cynthiana formation) ¹**Oregon limestone ¹**Paris formation ¹**Perryville formation ¹**Rogers Gap division (in Cynthiana formation) ¹Salvisa limestone member (of Perryville formation) ¹**Tyrone limestone ¹**†Wilmore limestone ¹**Woodburn limestone member** (of Cynthiana formation); (as phosphatic member of Flanagan limestone) ¹*Lower Ordovician*White Oak sand ¹ (subsurface)*Cambrian and Ordovician*Beech Bottom sand ¹ (subsurface)*Middle Cambrian*Lincoln sandstone ² (subsurface)

United States—Continued

Louisiana

Recent

Lebeau member (of Le Moyen formation)² (subsurface and surface)

Le Moyen formation² (subsurface and surface)

Mermentau member (of Le Moyen formation)² (subsurface and surface)

Pleistocene

Bentley formation²

Montgomery formation²

Pontchartrain clay¹

Port Hudson formation¹

Prairie formation²

Williana formation²

Tertiary

†**Sparta sands**¹

Pliocene

Foley formation² (subsurface)

Mamou member (of Foley formation)² (subsurface)

Steep Gully member (of Foley formation)² (subsurface)

Miocene

Blounts Creek member (of Fleming formation)²

Carnahan Bayou member (of Fleming formation)²

Cassel Hill member (of Catahoula formation)²

Castor Creek member (of Fleming formation)²

Chalk Hills member (of Catahoula formation)²

Dough Hills member (of Fleming formation)²

Lena member (of Fleming formation)²

Williamson member (of Fleming formation)²

Oligocene

Mosley Hill formation²

Eocene

†**Mansfield group**¹

Eocene, upper

Bayou Calamus lentil (in Verda member of Yazoo clay)²

Danville Landing group¹ or beds¹

Kimbrel bed¹

Montgomery bed (in Jackson formation)¹

Mossy Ridge lentil (in Verda member of Yazoo clay)²

Myatt lentil (in Verda member of Yazoo clay)²

Saddle Bayou lentil (in Verda member of Yazoo clay)²

Tullos clay member (of Yazoo clay)²

Union Church transition phase (in Tullos member of Yazoo clay)²

United States—Continued

Louisiana—Continued

Eocene, upper—Continued

Verda member (of Yazoo clay)²

Youngs Bluff bed¹

Zenoria lentil (in Verda member of Yazoo clay)²

Eocene, middle

†**Arcadia clays**¹

Cane River formation¹

Cockfield formation¹

†**Cockfield lignite**¹

Creola member (of Yegua formation)²

Dodson member (of Cook Mountain formation)²

Little Natches member (of Cook Mountain formation)²

Milams member (of Cook Mountain formation)¹

†**Minden formation**¹

†**Mount Lebanon formation**¹

†**St. Maurice formation**¹

Saline Bayou member (in Claiborne group)²

Sparta sand¹

Eocene, lower

Bayou Lenann member (of Pendleton formation)²

Beulah Church sand lentil (in Slaughter Creek member of Pendleton formation)²

High Bluff member (of Pendleton formation)²

Marthaville formation²

Pearson glauconite member (of Sabinetown formation)²

†**Sabine formation**¹

Slaughter Creek member (of Pendleton formation)²

Stone Coal Bluff lignite (in Slaughter Creek member of Pendleton formation)²

Paleocene

Benson facies (of Cow Bayou member of Logansport formation)²

Bisteneau member (of Hall Summit formation)²

Chemard Lake lignite lentil (of Naborton formation)²

Cow Bayou member (of Logansport formation)²

Dolet Hills member (of Logansport formation)²

Grand Bayou member (of Hall Summit formation)²

Hall Summit formation²

Lime Hill member (of Logansport formation)²

Logansport formation²

Loggy Bayou member (of Hall Summit formation)²

Lula facies (of Cow Bayou member of Logansport formation)²

Naborton formation²

United States—Continued

Louisiana—Continued

Cretaceous (?)St. Landry marble ¹*Upper Cretaceous*Haynesville sand ¹ (subsurface)Monroe gas rock ¹ (subsurface)Oakes sand ¹ (subsurface)Shreveport gas sand ¹ (subsurface)Vivien sand ¹ (subsurface)Zwolle marl ¹ (subsurface)*Upper Cretaceous* (?)Bayou Chicot limestone ¹†Winnfield limestone ¹*Lower Cretaceous*Bodecaw sand lens ¹ (subsurface)Davis oil and gas horizon ¹ (subsurface)Dillon gas horizon ¹ (subsurface)Dixie oil horizon ¹ (subsurface)Eubanks sand ¹ (subsurface)Herndon oil sand ¹ (subsurface)**Hosston formation** ² (subsurface)**Rodessa formation** ² (subsurface)**Sligo formation** ² (subsurface)Tillman sand lens ¹ (subsurface)Wickett oolitic zone ¹ (subsurface)*Upper Jurassic***Bossier formation** ² (subsurface)**Cotton Valley group** ² (subsurface)**Haynesville formation** ² (subsurface)**Shongaloo member** (of Schuler formation) ² (subsurface)*Pennsylvanian* (?)**Morehouse formation** ² (subsurface)

Maine

*Paleozoic*South Mapleton andesite ¹*Upper Paleozoic*Cadillac granite ²*Post-Carboniferous***Biddeford granite** ¹Burnt Meadow syenite ¹*Carboniferous* (?)Brave Boat Harbor biotite granite ¹**Cushing granodiorite** ¹Drews Lake granite ¹Katahdin granite ¹*Pre-Carboniferous* (?)**Falmouth pegmatite** ¹**Westbrook granite** ¹*Pennsylvanian* (?)**Cape Elizabeth formation** ¹**Casco Bay group** ¹**Diamond Island slate** ¹**Jewell phyllite** ¹**Mackworth slate** ¹**Scarboro phyllite** ¹**Spring Point greenstone** ¹**Spurwink limestone** ¹**Towow formation** ¹*Devonian or Carboniferous*Waldo granite ²

United States—Continued

Maine—Continued

*Devonian*Kineo rhyolite ¹†Mapleton granite ¹**Moose River group** (as sandstone) ¹Prettypmarsh diorite ²**Seboomook formation** (as slate) ¹*Devonian* (?)Agamenticus complex ¹Berwick quartz diorite ¹Cape Neddick gabbro ¹Castle Hill andesite ¹Castle Hill tuff ¹†Chapman trachyte ¹Edmunds Hill andesite ¹Haystack rhyolite ¹Hedgehog trachyte ¹Hobart Hill andesite ¹Rangeley conglomerate ¹York Harbor biotite granite ¹*Upper Devonian***Mapleton sandstone** ¹**Perry formation** ¹*Pre-late Devonian*Ore Mountain diorite ²*Lower Devonian***Chapman sandstone** ¹Fort Kent shale ²**Square Lake limestone** ¹*Silurian and Devonian*†Cobscook series ¹Cobscook Bay series ¹*Silurian***Aroostook limestone** ¹Ashland limestone ¹Ashland shale ¹†Campobello group ¹Chesuncook limestone ¹**Dennys formation** ¹Frenchmans Bay series ²†Leightons Cove series ¹**Lobster Lake formation** (as series) ¹Mars Hill conglomerate ¹†Moose Island shale ²**Pembroke formation** ¹Ripogenous series ¹Sheridan sandstone ¹Vassalboro sandstone ¹**Vinalhaven rhyolite** ¹Waterville shale (also slate) ¹Winthrop phyllite ²*Silurian* (?)Hope limestone ¹*Upper Silurian and Lower Devonian*Ireson felsite ²Penobscot Bay granite ¹*Upper Silurian***Eastport formation** ¹**Hersey red shale member** (of Pembroke formation) ¹**Leighton gray shale member** (of Pembroke formation) ¹Seigas sandstone ²**Thorofare andesite** ¹

United States—Continued

Maine—Continued

Middle and Upper Silurian
Edmunds formation¹
Middle Silurian
Ames Knob formation¹

 Danville injection gneiss²

 Deer Rips lime-silicate gneiss²

 Jay granite¹
Quoddy shale¹

 Taylor Brook injection gneiss²
Probably Ordovician and Silurian
Berwick formation (as gneiss¹)

Elliott formation (as slate¹)

Kittery quartzite¹
Cambrian or Ordovician
Rockland formation¹
Rockport limestone member (of

 Rockland formation)¹
Weskeag quartzite member (of

 Rockland formation)¹
Cambrian and Ordovician

 Taconic limestone¹
Cambro-Ordovician(?)

 Androscoggin gneiss and schist²

 Bates limestone²

 Hill Ridge biotite schist²

 Minwah limy gneiss²

 Sabattus garnet schist²

 Stetson Brook limestone²

 Tacoma series²

 Thorncrag limy gneiss²
Cambrian(?)
Battle quartzite¹
Calderwood formation¹
Castine volcanics¹
Coombs limestone member (of

 Islesboro formation)¹
Islesboro formation¹
North Haven greenstone¹
Pejepscot gneiss²
Penobscot formation¹
Lower Cambrian

Grand Falls formation (Rudolph

Ruedemann and E. S. C.

Smith, 1935, Am. Jour. Sci.,

5th ser., v. 30, no. 178, p. 354)

Cambrian or Precambrian(?)

 Cranberry Island series¹

 Schooner Head series¹

 Sutton Island series¹
Precambrian and Silurian

 Bar Harbor series¹
Precambrian or Cambrian
Ellsworth schists¹
Precambrian and later

 Bartlett Island series¹
Precambrian

 Branch Pond gneiss¹

 Hogback schist¹

 Knox gneiss¹
Age(?)

 Aroostook Falls diabase¹

 Brownville slate¹

 Byron schist²

 Mars Hill diabase¹

United States—Continued

Maine—Continued

Age(?)—Continued

 Noisy Brook gneiss²

 Phippsburg limestone¹

 Portland clays¹

 Quoggy Joe quartz trachyte¹

 Seawall metafelsite²

 Traveller rhyolite¹

 Tumbledown gneiss²

 Uncle Israel's granite²

 Winterport granite type²

 Woodland trachyte¹

Maryland

Pleistocene and Recent

 McHenry formation¹
Pleistocene
Beaverdam sand²

 Cornfield Harbor clays¹
Parsonsbury sand²
Sunderland formation¹
Talbot formation¹

 Walston silt²
Wicomico formation¹
Pliocene(?)
Brandywine formation¹ or gravel

Miocene(?)
North Keys sand²
Miocene, middle and upper
Chesapeake group¹
St. Marys formation¹
Miocene, middle
Calvert formation¹
Choptank formation¹
Fairhaven diatomaceous member

 (of Calvert formation)¹
Plum Point marl member (of

 Calvert formation)¹
Eocene (see also *Upper Cretaceous*

 and *Eocene*)

 †Piscataway sands¹
Eocene, upper
Piney Point formation² (subsur-

face)

Eocene, lower and middle
Marlboro clay member (of Nan-

 jemoy formation)¹
Nanjemoy formation¹
Potapaco clay member (of Nan-

 jemoy formation)¹
Eocene, lower
Piscataway indurated marl mem-

 ber (of Aquia formation)¹
Paleocene
Brightseat formation²
Upper Cretaceous and Eocene

 †Severn formation¹
Upper Cretaceous

 Albirupean black marl¹

 †Albirupean formation¹
Magothy formation¹
Patapsco formation¹

 †Sassafras River greensand¹
Lower Cretaceous
Arundel formation¹ or clay

 †Baltimorean formation¹

United States—Continued

Maryland—Continued

Lower Cretaceous—ContinuedFederal Hill beds (in Patapsco formation)¹Hawkins Point clays ¹**Patuxent formation** ¹*Upper Triassic*Buck Lodge diabase ¹Emmitsburg facies ¹†Potomac marble ¹Taneytown facies ¹*Upper Paleozoic*(?)Ellicott City granite ¹*"Post-Glenarm"*Guilford granite ²**Gunpowder granite** ¹Laurel migmatite ²**Port Deposit gneiss** ¹ or graniteSykesville granite ¹*Lower Paleozoic*(?)**Cockeysville marble** ¹**Glenarm series** ¹**Ijamsville phyllite** ²**Setters formation** ¹**Silver Run limestone** ²**Urbana phyllite** ²**Wakefield marble** ²*Permian*†Frostburg formation ¹*Carboniferous*(?)**Woodstock granite** ¹*Pennsylvanian*Barton limestone (in Conemaugh formation)¹Barton red shale (in Conemaugh formation)¹Barton sandstone (in Conemaugh formation)¹Bluelick limestone (in Conemaugh formation)¹Borden sandstone (in Monongahela formation)¹Clarysville sandstone (in Conemaugh formation)¹Ellerslie fire clay (in Allegheny formation)¹Ellerslie sandstone (in Allegheny formation)¹Friendsville black shale (in Conemaugh formation)¹Hoffman limestone (in Conemaugh formation)¹Hoffman sandstone (in Conemaugh formation)¹Lonaconing sandstone (in Conemaugh formation)¹Luke clay (in Allegheny formation)¹Meyersdale limestone (in Conemaugh formation)¹Montell sandstone (in Allegheny formation)¹Mount Savage fire clay (in Pottsville formation)¹

United States—Continued

Maryland—Continued

Pennsylvanian—ContinuedMount Savage sandstone (in Allegheny formation)¹Redstone sandstone (in Monongahela formation)¹Sampson Rock sandstone (in Pottsville formation)¹Savage formation ¹Thomas limestone (in Conemaugh formation)¹Thomas sandstone (in Conemaugh formation)¹Wellersburg limestone (in Conemaugh formation)¹Westernport sandstone (in Allegheny formation)¹Woods Run shale (in Conemaugh formation)¹*Upper Devonian*Avilton conglomerate ¹**Parkhead sandstone member** (of Jennings formation)¹*Lower Devonian*†Corrigan formation ¹**Shriver chert** ¹*Silurian*Cedar Cliff limestone lens (in Wills Creek shale)¹Cresaptown iron sandstone ¹Indian Spring red shales or sandstone (in Tonoloway limestone)¹Rabble 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** ¹Rose Hill formation ¹*Ordovician*(?)**Cardiff conglomerate** ¹*Post-Lower Ordovician*Baltimore gabbro ²*Middle Ordovician***Row Park limestone** ²**St. Paul group** ²*Lower Ordovician*Grove limestone ¹†Le Gore limestone ¹*Cambrian*(?)**Sugarloaf Mountain quartzite** ²*Upper Cambrian*Big Spring Station member (of Conococheague limestone)²**Frederick limestone** ¹*Lower Cambrian*Sugarloaf sandstone ¹**Weverton quartzite or formation** (as sandstone) ¹*Precambrian***Baltimore gneiss** ¹

United States—Continued

Maryland—Continued

Precambrian—Continued

 Cockeysville volcanics ¹

 Deer Creek quartzite ¹

 Hartley augen gneiss ¹

 Relay quartz diorite ¹

 †State line serpentine ¹

 †Susquehanna mica schist ¹

Precambrian(?)

 Catoclin metabasalt, greenstone,
or formation (as schist) ¹

 Ilchester granite ¹

 Libertytown metarhyolite ²

 Sams Creek metabasalt ²

Age(?)

 Bear Island granodiorite ²

 Frenchtown diorite ¹

 Kensington granite-gneiss ²

 Rowlandville granite ¹

Massachusetts

Pleistocene

 Aquinnah conglomerate ¹

 †Barnstable series ¹

 Dukes boulder bed ¹

 Middleboro clay ¹

 †Nashaquitsa series ¹

 Moshup till member (of Jameco
formation) ¹

 †Naushon series ¹

 Sankaty sand ¹

 †Sankaty Head beds ¹

 Taunton clays ¹

 †Tisbury beds or gravel ¹

 †Truro series ¹

 Weyquosque formation ¹

Tertiary and Quaternary

 Cape Cod series ¹

Upper Cretaceous

 Indian Hill series ¹

Triassic

 Turners Falls sandstone ²

Upper Triassic

 †Black Rock diabase ¹

 Chicopee shale ¹

 Deerfield diabase ¹

 Granby tuff ¹

 Greenfield bed ¹

 Hampden diabase ¹

 Holyoke diabase ¹

 Leverett breccia ¹

 Longmeadow sandstone ¹

 Medford diabase ¹

 Mount Toby conglomerate ¹

 Sugarloaf formation (as arkose) ¹

Pre-Triassic

 Amherst schist ¹

 Erving hornblende schist ¹

 Joshua schist ²

 Whately bed ¹

 Whitmores Ferry amphibolite ¹

Upper Paleozoic(?)

 Straw Hollow diorite ¹

Middle Paleozoic

 Dry Hill granite gneiss ²

 Poplar Mountain gneiss ²

United States—Continued

Massachusetts—Continued

Lower Paleozoic

 †Nahant gabbro ¹

 †New Bedford gneiss ¹

 †Saugus granodiorite or quartz
diorite ¹

Lower Paleozoic(?)

 Dedham granodiorite ¹

 Natick granite ¹

 Salem gabbro-diorite ¹

Carboniferous or Post-Carboniferous

 †Bolton gneiss ¹

 Coys Hill granite ¹

 Dana diorite ¹

 Dracut diorite ¹

 Fitchburg granite ¹

 Hardwick granite ¹

 Hubbardston granite ¹

 Middlefield granite ¹

 Millbury limestone ¹

 New Salem aplite ¹

 †New Salem serpentine ¹

 †North Amherst granite ¹

 †Pelham granite ¹

 †Pelham quartzite ¹

 Prescott diorite ¹

 †Swan Pond granite ¹

 †Vernon gneiss ¹

 †Wachusett gneiss ¹

 †Wilbraham gneiss ¹

 Carboniferous (see also Devonian or
Carboniferous)

 Andover granite ¹

 Attleboro sandstone ¹

 Beverly syenite ¹

 Boylston schist ¹

 Brimfield schist ¹

 Harvard conglomerate lentil (in
Worcester formation) ¹

 †Harvard granite ¹

 Nashoba formation ²

 †Norfolk Basin series ¹

 Oakdale quartzite ¹

 Oxford schist ¹

 Paxton quartz schist ¹

 Quabin quartzite ¹

 Rocky Woods conglomerate ¹

 †Salem syenite ¹

 Squam granite ¹

 †Wamsutta volcanics ¹

 Ware schist ¹

 Worcester formation (as phyl-
lite) ¹

 †Worcester quartzite ¹

Carboniferous(?)

 Belchertown tonalite ¹

 Williamsburg granodiorite ¹

Pre-upper Carboniferous(?)

 Dracut norite ¹

Pennsylvanian

 Bellingham conglomerate ¹

 Dighton conglomerate ¹

 Mansfield beds ¹

 Pondville conglomerate ¹

 Seekonk beds ¹

United States—Continued

Massachusetts—Continued

Pennsylvanian—ContinuedSeekonk conglomerate ¹Tenmile River beds ¹Wamsutta formation ¹Westville shale ¹*Mississippian*(?)Quincy granite ¹*Mississippian*(?) or olderMonson gneiss (as granodiorite ¹)

Devonian or Carboniferous

Blue Hill granite porphyry ¹Boston Bay group ¹Brighton melaphyre ¹Brookline conglomerate member
(of Roxbury conglomerate) ¹Cambridge slate ¹†Cape Ann granite ¹Dorchester slate member (of
Roxbury conglomerate) ¹Lynn volcanic complex ¹Mattapan volcanic complex ¹†Neponset conglomerate ¹†Peabody granite ¹Roxbury conglomerate ¹Shawmut group ¹†Somerville slate ¹†Squantum slates ¹Squantum tillite member (of
Roxbury conglomerate) ¹Tufts quartzite member (of Cam-
bridge slate) ¹†West Roxbury slate ¹*Devonian*(?)Ironstone quartz diorite ¹†Joes Rock granite ¹Milford granite ¹Sharon syenite ¹Wolfpen tonalite ¹*Upper Devonian*(?)Ayer granodiorite (as granite ¹)*Probably Lower Devonian*Newbury volcanic complex ¹*Silurian and Devonian*(?)Bernardston formation ¹*Silurian*Granville enstatite serpentine ¹†Greylock limestone ¹*Silurian*(?)Goshen schist ¹Leyden argillite ¹*Lower Silurian*Russell serpentine ¹*Ordovician and Silurian*Merrimack quartzite ¹*Ordovician and Silurian*(?)Conway formation (as schist ¹)*Ordovician*Bellowspice limestone ¹†Bellowspice quartzite ¹Chester amphibolite ¹†Everett schist ¹Greylock schist ¹Hawley schist ¹†Plainsfield schist ¹

United States—Continued

Massachusetts—Continued

Ordovician—ContinuedSavoy schist ¹Westfield serpentine ¹*Middle Ordovician*Berkshire schist ¹†Cheshire schist ¹*Cambrian and Ordovician*Egremont limestone ¹†Mount Washington series ¹Stockbridge limestone ¹ or group*Cambrian and younger and older*(?)†Blue Hills complex ¹*Cambrian*(?)Milton quartzite ¹*Upper Cambrian*Green Lodge formation ¹*Middle Cambrian*Braintree slate ¹*Lower Cambrian to Lower Ordo-
vician*†Berkshire limestone ¹*Lower Cambrian*Cheshire quartzite ¹Dalton formation ¹Hopplin slate ¹†Nahant limestone ¹†Nahant schist ¹†Shutesbury serpentine ¹Weymouth formation ¹*Lower Cambrian*(?)Hoosac schist ¹Rowe schist ¹*Precambrian or Upper Ordovician*Newburyport quartz diorite ¹*Precambrian or Cambrian*Lynnfield serpentine ¹*Precambrian*Becket granite gneiss ¹Berkshire County series ¹†Blanford limestone ¹Coles Brook limestone ¹†East Lee gneiss ¹†East Lee limestone ¹†Goose Pond limestone ¹†Grafton quartzite ¹†Greylock series ¹Hinsdale gneiss ¹†Hinsdale limestone ¹†Hop Brook limestone ¹Kendall Green slate ¹Lee quartz diorite ¹Lincoln slate ¹Marlboro formation ¹Northbridge granite gneiss ¹†Otis limestone ¹Quincy syenite ¹Stonybrook quartzite ¹†Sutton gneiss ¹†Tyringham gneiss ¹Waltham gneiss ¹Washington gneiss ¹Woburn formation ¹*Precambrian*(?)Westboro quartzite ¹

United States—Continued
Massachusetts—Continued

Age(?)

Blandford serpentine and pyroxenite ¹

†Naugus Head series ¹

†Pelham serpentine ¹

†Shelburne gneiss ¹

†Worcester County gneiss ¹

Michigan

Pennsylvanian

Eaton sandstone member (of Saginaw formation) ²

Grand Ledge cyclothem (in Saginaw formation) ²

Grand River formation ²

Ionia sandstone ¹ member (of Saginaw formation)

†Jackson formation ¹

Parma sandstone ¹

Saginaw formation ¹

Woodville member (of Saginaw formation); (as sandstone ¹)

Lower Pennsylvanian

Verne cyclical formation (including Verne limestone or shale member) ²

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

Bayport limestone ¹

Coldwater shale ²

Forestville shale ¹

Grand Rapids group ¹

†Grand Rapids limestone ¹

Huron gritstone ¹

Manistee limestone ¹

Marshall sandstone ¹ or formation

Michigan formation ¹

Napoleon member (of Marshall sandstone); (as sandstone ¹)

Point aux Barques sandstone ¹

Point aux Barques lighthouse ¹ (sandstone)

Point aux Gres limestone ¹

Port Austin sandstone ¹

Richmondville sandstone ¹

Rock Falls series ¹

Lower Mississippian

Hardwood Point shales and flags ²

Huron City sandstones and shales ²

Lighthouse conglomerate ²

Upper Devonian and Lower Mississippian

Antrim shale ¹

Ellsworth shale ¹

†Huron group ¹

Upper Devonian

†St. Clair shale ¹

Squaw Bay limestone ¹

Middle and Upper Devonian

Traverse formation ¹ or group

United States—Continued

Michigan—Continued

Middle and Upper(?) Devonian

Potter Farm formation ¹

Thunder Bay limestone ¹

Middle Devonian

Afton bed ²

Alpena limestone ¹

Amherstburg formation (as member of Detroit River dolomite¹)

Beebe School formation ²

Bell shale ¹

Black Lake lagunal facies ²

Bois Blanc formation ²

Charlevoix stage ¹

Detroit River group (as dolomite ¹)

Dock Street clays ¹

Dundee limestone ¹ or formation

Flat Rock dolomite member (of Lucas formation); (as member of Detroit River dolomite ¹)

Four Mile Dam formation ²

Ferron Point formation ¹

Filer sandstone lentil (in Amherstburg formation) ² (subsurface)

Genshaw formation ¹

Grand Lake member ¹ (of Presque Isle series)

Gravel Point stage ¹

Gorbut member (of Gravel Point formation) ²

Killians member (of Genshaw formation); (as limestone ¹)

Koehler limestone ²

Little Traverse Bay limestone ¹

Long Lake series ¹

Mackinac breccia (as limestone ¹); contains discrete blocks of rocks of Silurian to Middle Devonian ages

Mackinaw limestone ¹

Marvin Quarry bed ²

Newton Creek limestone ²

Norway Point formation ¹

Norwood shale ²

Partridge Point formation ¹

Petoskey limestone ¹

Presque Isle series ¹

Richfield member (of Lucas formation) ² (subsurface)

Rockport limestone ¹

Rockport Quarry limestone ²

Rogers City limestone or formation ²

Saginaw sand ¹ (subsurface)

Thunder Bay series ¹

Whitefish Bay member (of Alpena limestone stage) ²

Lower Devonian

Garden Island formation ²

Silurian and Lower Devonian

†Monroe beds, formation, or group ¹

United States—Continued

Michigan—Continued

*Silurian*Manitoulin limestone ¹Raber bed ²Toll Pit beds ¹*Upper Silurian*Point aux Chenes formation ²**Raisin River dolomite member**
(of Bass Islands dolomite) ¹**St. Ignace formation** ²*Middle Silurian***Burnt Bluff formation** ¹Cordell member ¹ (of Manistique
formation)**Engadine dolomite** ¹Fiborn limestone ¹Hendricks series ¹**Manistique series** ¹Schoolcraft member ¹ (of Man-
istique formation)*Upper Ordovician*Bay de Noc member (of Stoning-
ton beds) ¹Big Hill beds ¹Bills Creek beds ¹Ogontz member (of Stonington
beds) ¹Stonington beds ¹*Middle Ordovician*Bony Falls member (of Black
River formation) ²Chandler Falls member (of Tren-
ton formation) ²Escanaba limestone ¹Escanaba River group ²Haymeadow Creek member (of
Trenton formation) ²Groos Quarry member (of Tren-
ton formation) ²Sheridan formation ¹*Upper Cambrian and Lower
Ordovician***Hermansville limestone** ¹*Upper Cambrian*†Eastern sandstone ¹**Lake Superior sandstone** ¹**Munising sandstone** ¹Ste. Marie sandstone ¹St. Marys sandstone ¹*Precambrian or Cambrian***Jacobsville sandstone** ¹*Precambrian***Ajibik quartzite** ¹Albany conglomerate ¹**Albany and Boston amygdaloid** ¹†Albany and Boston conglomer-
ate ¹**Albany and Boston flow** ¹**Algolah amygdaloid** ¹**Algolah flow** ¹**Allouez conglomerate** ¹**Amasa formation** ²†Antoine dolomite ¹**Anvil ferruginous chert member**
(of Ironwood iron-formation) ¹

United States—Continued

Michigan—Continued

*Precambrian—Continued***Arcadian amygdaloid** ¹**Arcadian flow** ¹**Arnold amygdaloid** ¹**Arnold flow** ¹**Ashbed amygdaloid** ¹**Ashbed flow** ¹**Ashbed group** ¹**Atlantic amygdaloid** ¹**Atlantic flow** ¹**Baltic amygdaloid** ¹**Baltic conglomerate** ¹**Baltic flow** ¹**Baltic sandstone** ¹**Baltic West amygdaloid** ¹**Baltic West flow** ¹Bessemer sandstone or quartzite ²**Bijiki iron-formation member**
(of Michigamme slate) ¹**Bohemia conglomerate** ¹**Bohemia porphyrite** ¹**Bohemian Range group** ¹†Bone Lake crystalline schist ¹†Boston conglomerate ¹**Brier slate member** (of Vulcan
iron-formation) ¹Brule schists and volcanics ¹**Butler amygdaloid** ¹**Butler flow** ¹**Caledonia conglomerate** ¹**Calico amygdaloid** ¹**Calico flow** ¹**Calumet amygdaloid** ¹†Calumet conglomerate ¹**Calumet flow** ¹**Calumet and Hecla conglom-
erate** ¹†Cascade formation ¹†Central group ¹†Central Mine conglomerate ¹**Central Mine group** ¹Central Valley beds ¹†Chippewa felsite ¹†Chippewa porphyry ¹**Clarksburg volcanics** ¹ member
(of Michigamme slate)**Copper City flow** (in Portage
Lake lava series) ²**Copper Harbor conglomerate** (as
group) ¹Coppes group ¹Corning Creek zone (in Negaunee
formation) ¹Crystal Falls formation ¹†Crystal Falls series ¹**Curry iron-bearing member** (of
Vulcan iron-formation) ¹†Deer Lake conglomerates ¹**Douglas amygdaloid** ¹**Douglas flow** ¹**Eagle River group** ¹**Evergreen amygdaloid** ¹**Evergreen flow** ¹**Felch formation** (as schist) ¹

United States—Continued

Michigan—Continued

Precambrian—Continued

†Felch Mountain iron-bearing series ¹
Fern Creek formation ²

Ford River granite ²
Forest amygdaloid ¹
Forest conglomerate ¹
Forest flow ¹
Freda sandstone ¹

†Gogebic series ¹
Goodrich quartzite ¹

Goose Lake slate ¹

†Grand Portage amygdaloid ¹

†Grand Portage flow ¹
Gratiot flow (in Portage Lake lava series) ²

†Graveland formation ¹
Great conglomerate ¹

†Great Copper Harbor conglomerate ¹
Greenstone flow ¹
Greenwood iron-formation ¹
member (of Michigamme slate)

Gwinn series ¹

†Hanbury slate ¹
Hancock amygdaloid ¹
Hancock conglomerate ¹
Hancock flow ¹
Hancock West conglomerate ¹
Hemlock formation (as greenstone ¹)

Holyoke conglomerate ¹

Holyoke formation ¹
Houghton conglomerate ¹
Huginnin porphyrite ¹
Iron River iron-formation member (of Michigamme slate) ¹
Ironwood iron-formation ¹
Iroquois flow (in Portage Lake Lava series) ²

†Ishpeming formation ¹
Island Mine conglomerate ¹
Isle Royale amygdaloid ¹
Isle Royale flow ¹
Isle Royale trap ¹
Jasper Knob zone (in Negaunee formation) ¹

†Johnson Creek conglomerate ¹
Kearsarge amygdaloid ¹
Kearsarge conglomerate ¹
Kearsarge flow ¹
Kearsarge trap ¹
Kearsarge West amygdaloid ¹
Kearsarge West flow ¹
Keweenaw series ¹
Kingston conglomerate ¹
Kitchi schist ¹
Knowlton amygdaloid ¹
Knowlton flow ¹
Kona dolomite ¹
Lac La Belle conglomerate ¹
Lake amygdaloid ¹
Lake flow ¹
Lake Enchantment sediments ²

United States—Continued

Michigan—Continued

Precambrian—Continued

Lake Hanbury slate group ¹
Lake Shore trap ¹

†Lake Superior group ¹
Loretto slate ¹ member (of Vulcan iron-formation)

Mabb amygdaloid ¹
Mabb flow ¹

Makasin Hill zone (in Negaunee formation) ¹
Mandan amygdaloid ¹
Mandan flow ¹
Manitou amygdaloid ¹
Manitou flow ¹
Mansfield iron-bearing slate member (of Hemlock formation); (as formation or slate ¹)

†Mareniscan series ¹

Marquettan series ¹

†Marquette series ¹
Mass amygdaloid ¹
Mass flow ¹
Mayflower amygdaloids ¹
Mayflower flows ¹
Medora amygdaloids ¹
Medora flow ¹
Menominee group (as series ¹)

Merchants amygdaloid ¹
Merchants flow ¹

†Mesnard epidote ¹

†Mesnard formation ¹
Mesnard quartzite ¹
Michigan conglomerate ¹
Michigamme slate ¹

†Michigamme jasper ¹
Minesota conglomerate ¹
Minesota trap ¹
Minong breccia ¹
Minong porphyrite ¹
Minong trap ¹
Mona schist ¹
Montreal amygdaloid ¹
Montreal flow ¹

†Mount Bohemia conglomerate ¹
Mount Houghton felsite ¹ or quartz porphyry ¹

Mount Mesnard quartzite ¹
National sandstone ¹

†Nebraska conglomerate ¹
Negaunee iron-formation ¹
New Arcadian amygdaloid ¹
New Arcadian flow ¹
New Mass amygdaloid ¹
New Mass flow ¹
New Mayflower amygdaloid ¹
Nonesuch shale ¹
Norrie ferruginous chert member (of Ironwood iron-formation) ¹
North amygdaloid ¹
North flow ¹
North Butler amygdaloid ¹
North Butler flow ¹
North Lake zone (in Negaunee formation) ¹

United States—Continued

Michigan—Continued

Precambrian—Continued

North Star conglomerate ¹
 Norway limestone ¹
 Norwich conglomerate ¹
 Norwich trap ¹
 Ogima amygdaloid ¹
 Ogima flow ¹
 Ohio Trap Rock traps ¹
 Old Colony amygdaloid ¹
 Old Colony flow ¹
 Old Colony sandstone ¹
 Old Pewabic amygdaloid ¹
 Old Pewabic flow ¹
 Oneco amygdaloid ¹
 Oneco flow ¹
 †Oneida conglomerate ¹
 Osceola amygdaloid ¹
 Osceola flow ¹
 Outer conglomerate ¹
 Pabst member (of Tyler slate) ¹
 Paint slate ¹
 Paint River greenstones ²
 Palmer gneiss ¹
 Palms quartzite ¹
 Pentoga greenstones ²
 Pewabic amygdaloid ¹
 Pewabic flow ¹
 Pewabic West conglomerate ¹
 †Phoenix Mine group ¹
 Portage Lake lava series ²
 Praysville porphyry ¹
 Presque Isle granite ¹
 Princeton series ¹
 Quincy amygdaloid ¹
 Quincy flow ¹
 Quincy Pewabic amygdaloid ¹
 Quincy Pewabic flow ¹
 Quinnesec formation (as greenstone ¹)
 Quinnesec ore-formation ¹
 Randville dolomite ¹
 †Republic formation ¹
 Republic granite ¹
 Republic quartzite ¹
 †Rockland sandstone ¹
 †St. Louis amygdaloid ¹
 St. Louis conglomerate ¹
 †St. Louis flow ¹
 †St. Marys epidote ¹
 Saunders formation ¹
 Scales Creek flow (in Portage Lake lava series) ²
 Shawmut amygdaloid ¹
 Shawmut conglomerate ¹
 Shawmut flow ¹
 Siamo slate ¹
 South Butler amygdaloid ¹
 South Butler flow ¹
 South Pewabic amygdaloid ¹
 South Pewabic flow ¹
 †State Road conglomerate ¹
 Sturgeon quartzite ¹
 Superior amygdaloid ¹

United States—Continued

Michigan—Continued

Precambrian—Continued

Superior flow ¹
 Superior West amygdaloid ¹
 Superior West flow ¹
 Toltec trap ¹
 Tomahawk amygdaloid ¹
 Torch Lake amygdaloid ¹
 Torch Lake flow ¹
 Traders iron-bearing member (of Vulcan iron-formation) ¹
 Tyler slate ¹
 †Victoria amygdaloid ¹
 †Victoria flow ¹
 Vulcan iron-formation ¹
 West Minnesota conglomerate ¹
 West Minnesota trap ¹
 Wewe slate ¹
 Winona amygdaloid ¹
 Winona conglomerate ¹
 Winona flow ¹
 Wolf Lake granite ¹
 Wolf Lake schist ¹
 Wolverine amygdaloid ¹
 Wolverine sandstone ¹
 Wyandot amygdaloid ¹
 Wyandot flow ¹
 Wyandot No. 8 amygdaloid ¹
 Wyandot No. 8 flow ¹
 Yale member (of Ironwood iron-formation) ¹

Age(?)

Commonwealth ore formation ¹
 Huron Bay slates ¹
 L'Anse series ¹

Minnesota

Pleistocene

Itasca till ¹
 Lake Agassiz clay ¹
 Lake Agassiz silt ¹
 Mankato drift (see Mankato substage ¹)
 Paulian till ¹
 West Union gravel ²

Upper Cretaceous

Big Cottonwood formation ¹
 Coleraine shale or formation ²

Lower Cretaceous

Ostrander member (of Dakota formation) ²

Ordovician

Minnesotan series ¹
 †Shakopee group ¹

Upper Ordovician

Wykoff beds ¹

Middle Ordovician

Carimona member (of Platteville formation) ²
 Cummingsville member (of Galena formation) ²
 Minneapolis limestone ¹
 Prosser member (of Galena dolomite); (as limestone ¹)
 St. Peter sandstone ¹

United States—Continued

Minnesota—Continued

Middle Ordovician—Continued

Stewartville massive member
(of Galena dolomite); (as dolomite)¹

Lower Ordovician

Blue Earth siltstone¹

†Elevator B sandstone¹ (sub-surface)

Kasota sandstone¹

Root Valley sandstone²

Shakopee dolomite¹

Cambrian

Lansingan series²

Cambrian(?)

New Ulm conglomerate¹

Upper Cambrian

Bad Axe member (of Franconia sandstone)¹

Dresbach sandstone¹

†Dresbach shale¹

Franconia sandstone¹

Galesville member¹ (of Dresbach formation)

Jordan sandstone¹; sandstone member (of Trempealeau formation) in Michigan.

Judson member (of St. Lawrence formation)²

Mill Street conglomerate (in Woodhill member of Franconia formation)²

Minneiska member (of Franconia formation)²

Nicollet Creek member (of St. Lawrence formation)²

Reno member (of Franconia formation)²

†St. Croix formation¹

St. Croixan series¹

†St. Lawrence limestone or dolomite member¹ (of Trempealeau formation)

St. Lawrence member (of Trempealeau formation); (as formation)¹

Taylor's Falls member (of Franconia formation)²

Van Osler member (of Jordan sandstone)²

Precambrian

Agamok sediments²

Agate Bay group¹

Aitkin formation¹

Amoeba Lake graywackes, slates, and tuffs²

†Bassimenan Lake granite¹

†Basswood granite¹

†Beaver Bay diabase¹

Biwabik iron-formation¹

Burntside granite gneiss¹

Cabotian¹ (lavas, red rock, and gabbro)

Carltonian formation¹

Carlton slate²

United States—Continued

Minnesota—Continued

Precambrian—Continued

Chengwatana series¹

†Couthiching series¹

†Clouquet slate¹

†Courtland quartzite¹

Crooked Lake granite pebble conglomerate²

Crow Wing formation¹

Crystal gray quartz monzonite²

Cuyuna member (of Crow Wing formation)¹

†Cuyuna series¹

Dam Lake quartzite¹

Deerwood iron-formation member (of Virginia slate)¹

Dike Lake slate²

Disappointment Mountain conglomerate²

Duluth gabbro¹

†Duluth group¹

Embarrass granite¹

Ely greenstone¹

Emily member (of Crow Wing formation)¹

Ensign Lake green slates, tuffs, and graywackes²

Ensign-Snowbank Lake agglomerate²

Ester Lake graywackes, slates, and tuffs²

Fond du Lac sandstone¹

Freedhem tonalite²

Giants Range granite¹

Grand Portage graywacke¹

Grant conglomerate¹

Gunflint iron-formation¹

Hillman gneissoid tonalite²

Hinckley sandstone¹

Hunters Island iron-bearing series¹

Jasper conglomerate¹

Jasper Lake greenstone conglomerate or agglomerate²

†Kawishiwin agglomerate, greenstones, or series¹

Keewatin series¹

Kekekabic granite¹

Kekekabic tuffs, agglomerates, slates, and andesite porphyry²

†Kettle River sandstone¹

Keweenaw Point volcanic series²

Knife Lake group (as series¹)

†Knife Lake slate¹

Koochiching granite¹

Lester River group¹

McGrath gneiss²

Manitou series¹

†Marquettian system¹

†Mesabi gabbro¹

†Mesabi series¹

†Mississippi slate series¹

Moose Lake conglomerate²

Morton granite gneiss²

†New Ulm quartzite¹

United States—Continued

Minnesota—Continued

Precambrian—Continued

Ogishke conglomerate (as member of Knife Lake slate ¹)

†Palisade porphyry ¹

Pebbles granite facies (of Ogishke conglomerate) ²

Pewabic quartzite ¹

†Pipestone quartzite ¹

Pokegama quartzite ¹

Prairie River granite ¹

Puckwunge conglomerate ¹

†Puckwunge slate ¹

Red Rock member ¹ (of Keweenaw series)

†Redstone quartzite ¹

Saddlebag Lake conglomerate ²

Saganaga granite ¹

Saganaga syenite ¹

St. Cloud gray granodiorite ²

St. Cloud red granite ²

†St. Louis River gabbro ¹

†St. Louis River slate ¹

Snowbank granite ¹

Soudan iron-formation ¹

South Range member (of Virginia formation) ²

Stearns magma series ²

Stuntz conglomerate (as member of Knife Lake slate ¹)

†Stuntz Island agglomerate ¹

Temperance River group ¹

Temperance River member ¹ (of Keweenaw series)

†Thomson slate ¹

†Tower group ¹

Townline Lake granodiorite ²

Vermilion granite ¹

†Vermilion group, schists, series ¹

†Vermilion Lake iron-bearing series ¹

Virginia slate ¹

Warman quartz monzonite ²

Wausaugoning quartzite ¹

West Gull jasper facies (of Ogishke conglomerate) ²

†White Iron granite ¹

Zeta Lake granite porphyry facies (of Ogishke conglomerate) ²

Mississippi

Recent(?)

Vicksburg fossiliferous loam ¹

Pleistocene

Biloxi sand ¹

Natchez formation ¹

Pliocene

Graham Ferry formation ²

Miocene

†Davion rock ¹

Fort Adams member (of Pascagoula clay); (as Fort Adams or Ellisville phase ¹; see also G. F. Brown, 1943, Mississippi Geol. Survey Bull. 56, p. 47-48)

United States—Continued

Mississippi—Continued

Miocene—Continued

†Grand Gulf sandstone ¹

Homochitto member (of Pascagoula formation) ²

Knoxville member (of Pascagoula 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

Chickasaw limestone (as marl member of Byram marl ¹)

Oligocene, middle

Bucatunna clay member (of Byram 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

Moody's Branch marl ¹ or formation

Yazoo clay (as member of Jackson formation ¹)

Eocene, middle

Archusa shale member (of Cook Mountain formation) ²

†Basic claystone ¹

Basic City shale member (of Tallahatta 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)

†Kosciusko sandstone member (of Lisbon formation) ¹

†Meridian formation ¹

Meridian sand member (of Tallahatta formation) ²

United States—Continued

Mississippi—Continued

Eocene, middle—Continued

Neshoba sand member (of Tallahatta formation)²

Potterchitto sand member (of Cook Mountain formation)²

Shippis Creek shale member (of Wautubbee formation)²

Shongalo greensand¹

†Wautubbee marl¹

Winona sand (as member of Lisbon formation)¹

Zilpha clay²

Eocene, lower

†Ackerman formation¹

Fearn Springs sand member (of Wilcox formation)²

†Flatwoods clay¹

Noxubee sand²

Paleocene or Eocene

†Betheden formation²

Paleocene

†Chalybeate limestone member (of Porters Creek formation)²

Tippah sand lentil (of Porters Creek clay)¹

Cretaceous, Tertiary, and Pleistocene

†Lafayette formation¹

Upper Cretaceous

†Coulters Ferry sands¹

Houston marl¹

Mooreville chalk (as tongue of Selma chalk)¹

†Oktibbeha tongue (of Selma chalk)¹

Owl Creek formation¹

Prairie Rock limestone¹

Ripley formation¹

Ripleyan series¹

Tombigbee sand member (of Eutaw formation)¹

Tupelo tongue (of Coffee sand)¹

Lower Cretaceous

Dantzler formation² (subsurface)

Little Bear formation or residuum²

Upper Mississippian

Cripple Deer sandstone member (of Alsobrook formation)¹

Forest Grove formation¹

Hargett sandstone¹

Highland Church sandstone member (of Forest Grove formation)¹

Pond limestone¹

Southward Spring sandstone¹ member (of Pride Mountain formation)

Lower Mississippian

Carmack limestone¹

Iuka formation¹

Devonian and Lower Mississippian

†Yellow Creek beds¹

United States—Continued

Mississippi—Continued

Upper Devonian

Whetstone Branch shale¹

Lower Devonian

Island Hill formation¹

Missouri

Pleistocene

Bagnell till¹

Pleistocene(?)

Asherville alluvium²

Tertiary

Benton sand¹

Commerce sandstone¹

Crowleyan series¹

Idalia clay¹

Piketon gravel¹

Poinsettian series¹

Pliocene

Winoka gravel¹

Miocene(?)

Grover gravel²

Eocene

Bloomfield sand¹

Upper Cretaceous

Egypt sand¹

Zadoc member (of McNairy formation)²

Pennsylvanian

†Atchinson shale¹

Baden sandstone¹

†Bull ledge¹

Graydon channel sandstone¹

Graydon shales¹

Hardesty shale¹

†Holden group¹

†Knob Noster group¹

Moberly channel sandstone¹

†Mound group¹

Rockport shales¹

Saline Creek cave conglomerate¹

Sonora shale¹

Spring River sandstone¹

Walker conglomerate and sandstone¹

Warrensburg channel sandstone¹

Pennsylvanian(?)

Eureka fire clay¹

Granby conglomerate¹

Pennsylvanian (Virgil)

Amazonia limestone member (of Lawrence shale)¹

†Andrew shale (in Douglas formation)¹

City Bluffs shale (in Shawnee formation)¹

Curzon limestone (in Shawnee formation)¹

†Forbes limestone (in Shawnee formation)¹

Forest City limestone (in Shawnee formation)¹

Forest City sand rock (in Shawnee formation)¹

United States—Continued

Missouri—Continued

Pennsylvanian (Virgil)—Continued**Heumader shale member** (of Oread limestone)¹**Holt shale member** (of Topeka limestone)¹Langdon shale²Nodaway limestone (in Shawnee formation)¹†Quitman limestone¹†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 limestone¹†Kansas City oolite¹Knobtown sand¹Liberty Memorial shale member (of Chanute formation)²**Missouri series** (as group)¹†Parkville limestone (in Kansas City formation)¹†Parkville shale¹**Plattsburg limestone**; †member (of Lansing formation)¹**Raytown limestone bed** (in Kansas City formation)¹; limestone in KansasSniabar limestone¹Sugar Creek shale (in Bethany Falls limestone)¹Swope limestone¹ or formation¹Union Station shale member (of Chanute formation)²Weston limestone¹**Weston shale**; †member (of Douglas formation)¹*Pennsylvanian (Des Moines)*Amoret limestone member (of Altamont formation)²**Ardmore limestone member** (of Cherokee shale)¹Bevier cyclothem or formation (including Bevier clay)²Bevier fire clay¹Blackjack Creek cyclothem (including Blackjack Creek limestone)²Blackwater Creek shale member (of Fort Scott formation)²†Cheltenham fire clay¹ (formation)

United States—Continued

Missouri—Continued

Pennsylvanian (Des Moines)—Con.†Clear Creek sandstone (in Cherokee shale)¹†Clear Fork group¹**Dederick shale member**¹ (of Cherokee formation)**Drywood Formation** or coal cycle²**Excello formation**²Flint Hill sandstone member (of Fort Scott formation)²†Henrietta formation or group¹Higginsville cyclothem (including Higginsville limestone)²Houx cyclothem (including Houx limestone)²Lagonda sandstone member (of Cherokee shale)¹†Lexington group¹Loutre formation²Macon City shale¹Miller fire clay¹Myrick Station cyclothem (including Myrick Station limestone)²Republic chert¹**Rich Hill limestone member** (of Cherokee shale)¹Robinson Branch formation or coal cycle²Summit limestone (in Cherokee shale)¹Tebo formation²Thomas Hill fire clay¹Thomas Hill shale¹Tina cyclothem (including Tina limestone)²†Warrensburg group¹Worland limestone¹*Mississippian*†Ste. Genevieve group¹†Seneca chert¹*Upper Mississippian***Aux Vases sandstone**¹**Carterville formation**¹Carthage limestone¹†Gabouri limestone¹†Genevieve group¹**Meramec series** (as group)¹**Ste. Genevieve limestone**¹†Ste. Genevieve marble¹†Ste. Genevieve sandstone¹†St. Louis group¹**St. Louis limestone**¹*Lower Mississippian***Bushberg sandstone member** (of Sulphur Springs formation)¹†Chouteau group¹**Chouteau limestone**¹**Compton limestone**¹Easley group²**Fern Glen limestone**¹**Glen Park limestone member** (of Sulphur Springs formation); formation¹ in Illinois

United States—Continued

Missouri—Continued

Lower Mississippian—Continued

Grand Falls chert member (of

Boone limestone)¹

Hannibal shale¹

Louisiana limestone¹

Northview shale¹

Osage series (as group)¹

†Ozark group¹

Pierson limestone¹

Reeds Spring limestone¹ member (of Boone formation)

Saverton shale¹

Sedalia limestone¹

Sulphur Springs formation¹

Devonian or Mississippian

Fabius group²

Devonian

Ashland limestone²

Auxvasse Creek sandstone member (of Callaway limestone)¹

Fortune formation²

Kings limestone¹

Webster group¹

Devonian(?)

James River shale¹

†Phelps sandstone¹

Upper Devonian or Mississippian

Grassy Creek shale¹

Upper Devonian

†Craghead Creek shale¹

Snyder Creek shale¹

Middle Devonian

Beauvais sandstone¹

Callaway limestone¹

Cooper limestone¹

Mineola limestone¹

St. Laurent limestone¹

Wittenberg shale¹

Lower Devonian

Bailey limestone¹

Little Saline limestone¹

Silurian and Devonian

†Perry limestone¹

Middle Silurian

Bainbridge limestone¹

Moccasin Springs formation²

Lower Silurian

Bowling Green limestone member (of Edgewood limestone)¹

Edgewood limestone¹

Girardeau limestone¹

Hopkintonian series²

Noix oolite member (of Edgewood limestone)¹

Watson limestone¹

Ordovician

Rock Levee formation²

Upper Ordovician and Silurian

Buffalo shale¹

Upper Ordovician

†Cape Girardeau sandstone¹

Decaturville chert¹

Spencer chert¹

United States—Continued

Missouri—Continued

Middle Ordovician

Auburn chert¹

Beckett limestone or formation²

Bloomsdale formation²

†Bryant limestone¹

Charrette limestone¹

†Cape Girardeau marble¹

Hager limestone or formation²

Hook limestone member (of Macy formation)²

Joachim dolomite¹

Kimmswick limestone¹

Macy limestone or formation²

McCune limestone¹

McPherson marble¹

Plattin limestone¹

Zell limestone member (of Macy formation)²

Lower Ordovician

Blackjack Knob member (of Theodosia formation)²

Bolin sandstone member (of Roubidoux formation)¹

Bolivar sandstone¹

†Cole Camp sandstone (in Van Buren formation)¹

Crystal City sandstone¹

Dutchtown formation²

†Finley limestone¹

†Folley limestone¹

Gainesville sandstone (in Blackjack Knob member of Theodosia formation)²

Gasconade dolomite¹

Geiser Quarry member (of Dutchtown formation)²

Gunter sandstone member (of Van Buren formation)¹

Hercules Tower sandstone (in Lutie member of Theodosia formation)²

Jefferson City dolomite¹

†Jefferson City group¹

King limestone¹

Lutie member (of Theodosia formation)²

Marshfield sandstone¹

Minnith zone (in Powell limestone)¹

†Moreau sandstone¹

†Osage limestone¹

†Pacific sandstone¹

Rich Fountain formation²

Rockaway conglomerate bed (in Lutie member of Theodosia formation)²

†Rock Fort sandstone¹

Roubidoux formation¹ or dolomite

Sac limestone¹

†St. Elizabeth formation¹

†St. Peter group¹

†St. Thomas sandstone¹

United States—Continued

Missouri—Continued

Lower Ordovician—ContinuedSchool Mine ledge beds (in Rich Fountain formation) ²Theodosia formation ²†White River limestone ¹†Winfield dolomite ¹**Van Buren formation** ¹*Cambrian*Delassus formation ²Tom Sauk limestone member (of Bonnetterre formation) ²*Upper Cambrian and Lower Ordovician*†Lesueur dolomite ¹†Ozark series ¹†Potosi group ¹*Upper Cambrian and Lower Ordovician*(?)†Eangua limestone ¹*Upper Cambrian***Bonnetterre dolomite** ¹**Davis formation** ¹†Decaturville limestone ¹**Derby dolomite** ¹**Doe Run dolomite** ¹**Elvins group** ¹Eminence dolomite ¹†Fredericktown dolomite ¹Iron Mountain conglomerate ¹Laclede sandstone ¹**Lamotte sandstone** ¹†Ozark marble ¹Pilot Knob conglomerate ¹Potosi dolomite ¹†Potosi slates and conglomerate ¹**Proctor dolomite** ¹†St. Francois limestone ¹†St. Joseph limestone ¹*Precambrian*Francoisian series ¹Graniteville granite ²**Iron Mountain porphyry** ¹Ironton granite ²Ironton slate ¹**Knob Lick granite** ¹Pilot Knob formation ¹Pilot Knob iron formation ¹Skrainka diabase ¹Silver Mine granite ²*Age*(?)Kings Branch limestone ¹

Montana

*Recent*Galata ash ²*Pleistocene*Great Falls lake sands ²†Kennedy gravels ¹Lake Missoula beds ¹*Pleistocene*(?)**Wiota gravels** ²*Tertiary***Bozeman group** (as lake beds) ¹

United States—Continued

Montana—Continued

Tertiary—Continued**Carpenter Creek granite porphyry** ¹Drummond ¹ (clays)Silver Dyke breccia ¹*Tertiary, upper, or Pleistocene*Clark Canyon lavas ²*Tertiary, upper*(?)**Belmont porphyry** ¹**Drummond porphyry** ¹*Probably upper Tertiary***Stanford conglomerate** ¹(?) *Tertiary, lower***Snow Creek quartz porphyry** ¹*Tertiary (Post-Eocene?)***Linley conglomerate** ¹*Pliocene*(?)Fort Ellis beds ¹*Miocene or Pliocene***Castle granite** ¹†Modoc porphyry ¹Robinson diorite ¹*Miocene, upper, or Pliocene***Flaxville formation** (as gravel) ¹Madison Valley beds ¹*Miocene, middle***Deep River beds** ¹†Smith River lake beds ¹(?) *Miocene, middle*†Flint Creek beds ¹*Miocene, lower*Blacktail Deer Creek basalts ²**Fort Logan beds** ¹*Oligocene*Pipestone beds ¹*Oligocene*(?)Muddy Creek beds ²*Oligocene, upper, to Miocene, lower*Medicine Lodge volcanics ²(?) *Oligocene, upper*†Blacktail Deer Creek beds ¹*Oligocene, middle*Cook Ranch formation ¹Cook Ranch rhyolites ²Cook Ranch volcanics ²Muddy Creek volcanics ²†Toston beds ¹*Oligocene, lower*†Pipestone Creek beds ¹†Thompson Creek beds ¹*Eocene*Beaverhead granite ²Black Butte till ²†Bluebird aplite ¹†Bull Mountain series ¹Crazy Mountain granite ¹Loco diorite ¹Sagean series ¹Snowcrest granite ²Sphinx conglomerate ¹*Eocene*(?)**Butte quartz monzonite** ¹Highwood syenite ¹**Reese formation** ¹

United States—Continued

Montana—Continued

Eocene, upper

 Sage Creek basalts ²
Eocene, upper(?)

 Sage Creek formation ¹
Paleocene

 Bear [formation] ²
Lebo shale member and andesitic member (of Fort Union formation) ¹

 Maudlow conglomerate lentil (in Livingston formation) ²

 Melville formation ²
Tulloch member (of Fort Union formation); (as formation) ¹
Willow Creek formation ¹
Post-Cretaceous
Barker porphyry ¹
Wolf porphyry ¹
Post-Cretaceous(?)
Pinto diorite ¹
Cretaceous(?)

 Neihart porphyry ¹
Upper Cretaceous and Paleocene

 †Crazy Mountain beds ¹
Livingston formation ¹
Upper Cretaceous

 Adel Mountain volcanics ²
Bearpaw shale ¹
Beaverhead formation ²
Big Elk sandstone member (of Colorado shale) ¹
Birdhead sandstone member (of Cloverly formation); (as member of Thermopolis shale) ¹
Blackleaf formation (as sandy member of Colorado shale) ¹

 Bowdoin sand ¹ (subsurface)

 Bull Creek sandy limestone (in Greenhorn formation) ²
Claggett formation, ¹ shale, or shale member (of Cody shale)

Colgate member (of Fox Hills sandstone) ¹

 Cow Island beds ¹
Eagle sandstone ¹

 †Fish Creek beds ¹

 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

United States—Continued

Montana—Continued

Upper Cretaceous—Continued
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
Lower and 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)

Lower(?) Cretaceous

 American Fork formation ¹
Jurassic and Cretaceous

 †Crow Ridge series ¹
Jurassic

 Picard shale member (of Nesson formation) ² (subsurface)

 Vernal ¹ (shale)

Upper Jurassic

 Emrick sand ¹ (subsurface)

Rierdon formation ²
Swift formation ²
Middle and Upper Jurassic
Ellis formation ¹ or group

Middle Jurassic

 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

United States—Continued

Montana—Continued

*Carboniferous*Melrose ¹ (quartzite)Missoula ¹ (limestone)*Pennsylvanian* (?)Tyler sandstone member (of
Quadrant formation) ¹*Mississippian or Pennsylvanian*Alaska Bench limestone ¹*Mississippian to Pennsylvanian*Absaroka sequence ²*Mississippian and (or) Pennsylvanian***Big Snowy group** ¹ or formation*Mississippian***Charles formation** ² (subsurface)Dean Lake Chert member ¹ (of
Madison limestone)**Hannan limestone** ²Monitor Mountain limestone mem-
ber ¹ (of Madison limestone)Rooney chert member ¹ (of Mad-
ison limestone)Saypo limestone member ¹ (of
Madison limestone)Silvertip conglomerate member ¹
(of Madison limestone)Van Duzen sand ¹ (subsurface)*Upper Mississippian***Heath formation** ¹**Kibbey sandstone** (as member of
Quadrant formation) ¹**Otter formation or shale** (as
member of Quadrant forma-
tion) ¹Sun River dolomite ²Yakinikak limestone ¹*Lower Mississippian*†Castle limestone member (of
Madison limestone) ¹**Little Chief Canyon member** (of
Lodgepole limestone) ²**Lodgepole limestone** ¹**Madison limestone, ¹ formation,
or group****Mission Canyon limestone** ¹**Paine shale member** (of Madison
limestone) ¹Trident ¹ (formation)**Woodhurst limestone member**
(of Madison limestone) ¹*Devonian*Ermont formation ¹*Upper Devonian and Mississip-
pian***Sappington sandstone member**
(of Three Forks shale) ²**Threeforks shale, ¹ limestone, ¹
or formation***Upper Devonian***Jefferson limestone, ¹ dolomite, ¹
or formation; group in subsur-
face****Maywood formation** ¹

United States—Continued

Montana—Continued

*Upper Devonian—Continued***Potlatch anhydrite** ¹ or member
(of Three forks formation)
(subsurface)Union shale ¹*Middle and Upper Devonian*†Monarch formation ¹*Middle Devonian*Coopers Lake limestone member ¹
(of Jefferson limestone)Glenn Creek shale member (of
Jefferson limestone) ¹Lone Butte limestone member ¹
(of Jefferson limestone)Spotted Bear limestone member ¹
(of Jefferson limestone)White Ridge limestone member ¹
(of Jefferson limestone)*Post-Cambrian*Bandbox Mountain type ¹ (anal-
cite basalt)Barker syenite ¹Big Baldy Mountain type ¹ (anal-
cite basalt)Eureka Divide type ¹ (analcite
basalt)Steamboat Mountain type (of
diorite porphyry) ¹Wolf Butte type (of granite
porphyry) ¹Yogo Peak type (of granite
porphyry) ¹*Cambrian*Barkerian series ¹Tilden formation ¹*Upper Cambrian and Middle Devo-
nian*Keene limestone ¹*Upper Cambrian*Cemetery limestone ¹**Devils Glen dolomite** ¹**Dry Creek shale** ¹Elkhorn shale or hornstone ¹**Gallatin limestone** ¹ or formation**Grove Creek formation** ²**Hasmark formation** ¹Maurice formation ²**Pilgrim limestone** ¹ or dolomite**Red Lion formation** ¹

†Republic reef

Sage pebble-conglomerate member
(of Snowy Range formation) ²**Snowy Range formation** ²**Yogo limestone** ¹*Middle and Upper Cambrian*†Barker formation ¹Gordon Mountain limestone ¹*Middle or Upper Cambrian***Switchback shale** (as limestone) ¹*Middle Cambrian*Alpreston quartzite ¹**Dearborn limestone** ¹**Flathead quartzite** ¹ or sandstone

United States—Continued

Montana—Continued

Middle Cambrian—Continued

 †Flathead formation or shales ¹

 Gordon shale ¹

 Hobo Gulch formation ¹

 Meagher limestone ¹

 Pagoda oolite ¹

 Park shale ¹

 Pentagon shale ¹

 Silver Hill formation ¹

 Starmount limestone ¹

 Steamboat limestone ¹

 Wolsey shale ¹

Middle(?) Cambrian

 Damnation limestone ¹

 Nannie Basin limestone ¹

Precambrian

 Altyn limestone ¹

 Appekunny argillite ¹ or formation

 Appistoki member (of Appekunny argillite) ¹

 Ahorn quartzite ²

 Axes Creek phase (of Cherry Creek series) ²

 Belt series ¹

 Bitterroot period ¹

 Blackfoot formation ¹

 Blackfootian series ¹

 Black Point dolomite member (of Cherry Creek series) ²

 Blacktail granite gneiss ²

 Boulder Pass formation ¹

 Camp Creek group ¹

 Cayuse limestone ²

 Chamberlain shale ¹

 Cherrie period ¹

 Cherry Creek group ¹

 Cooke granite ¹

 Dillon granite gneiss ²

 Donaher sandstones ¹

 Donald quartzites ¹

 †East Gallatin group ¹

 Empire shale ¹

 Gallatinian series ¹

 Garnet Range formation ¹ or quartzite

 Gateway formation ¹

 Gothaunt member (of Siyeh limestone) ¹

 Goose Creek granite ¹

 Granite Park member (of Siyeh limestone) ¹

 Greenhorn Mountain quartzite ²

 Greyson shale ¹

 Grinnel argillite ¹

 Hefty formation ¹

 Helena limestone ¹

 Helenan series ¹

 Hellgate quartzite member (of Miller Peak argillite); (as formation) ¹

 Hoadley formation ²

 Hole-in-the-Wall member ¹ (of Boulder Pass formation)

United States—Continued

Montana—Continued

Precambrian—Continued

 Kintla argillite ¹

 Libby formation ²

 †Lolo series ¹

 McNamara formation ¹ or argillite

 Madisonic period ¹

 Marsh shale ¹

 Miller Peak formation ¹ or argillite

 Missoula group ¹

 Neihart quartzite ¹

 Newland limestone ¹ or formation

 North Boulder group ² or formation

 Piegan group ²

 Pony series ¹

 Prickly Pear member (of Spokane formation) ²

 Ravalli group ¹ or argillite

 Ravallian series ¹

 Red Gap member (of Grinnell argillite) ¹

 Rising Bull member (of Grinnell argillite) ¹

 Rising Wolf member (of Appekunny argillite) ¹

 Rogersian series ¹

 Ruby limestone and gneiss ¹

 Scenic Point member (of Appekunny formation) ²

 Sheep Mountain quartzite ¹

 Shepard formation ¹

 Singleshoot member (of Appekunny argillite) ¹

 Siyeh limestone ¹

 Spokane shale ¹ or formation ¹

 Stillwater complex ¹

 Turnley hornstone or shale ¹

Nebraska

Pleistocene and Recent

 Bignell loess ²

 †Plains series ¹

 Sand Hills formation ¹

Pleistocene

 †Platte series ¹

 †Sheridan beds ¹

Pleistocene (Wisconsin)

 Brady soil ²

 Todd Valley sand (as formation) ¹

Pleistocene (Illinoian)

 Crete formation ²

Pleistocene (Yarmouth)

 Sappa formation ²

 †Upland formation ¹

Pleistocene (Kansan)

 Grand Island formation ¹

 Red Cloud sand and gravel ²

Pleistocene (Aftonian)

 Fullerton formation ¹

Pleistocene (Nebraskan)

 David City formation ¹

 Holdrege formation ¹

 Nebraskan drift ¹

United States—Continued

Nebraska—Continued

*Pleistocene, lower*Broadwater formation ²Lisco member (of Broadwater formation) ²*Tertiary, middle*Loupian ¹ (series)Whitian series ¹*Pliocene*Ash Hollow formation ²Feldt Ranch beds (in Ash Hollow formation) ²Kimball formation ²Minnechaduzza beds (in Ash Hollow formation) ²**Ogallala formation** ¹Seward formation ²Sidney gravel ²Snake River stage ¹*Pliocene(?)*Devils Gulch beds ¹Valentine beds ¹*Pliocene, lower*†Republican River formation ¹*Miocene, Pliocene, and Pleistocene(?)*†Loup Fork beds or group ¹*Miocene, Pliocene, and later(?)*†Niobrara group ¹*Miocene to Pliocene*Niobrara River channel sands (in Valentine 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) ¹Hemingford group ²**Marsland formation** ²†Nebraska beds ¹Sand Canyon member (of Sheep Creek formation) ²†Scotts Bluff formation ¹**Sheep Creek formation** (as beds) ¹Spottedtail member (of Sheep Creek formation) ²*Miocene, upper, or Pliocene, lower*Burge sands member (of Ogallala formation) ¹†Fort Niobrara formation ¹Snake Creek beds ¹*Miocene, lower***Harrison sandstone** (as beds) ¹**Monroe Creek beds** ¹*Oligocene*Orella member (of Brule formation) ²Whitney member (of Brule formation) ²*Oligocene, upper, to Miocene*Bayard paleosol complex ²*Oligocene, lower***Chadron formation** ¹

United States—Continued

Nebraska—Continued

Cretaceous†Omadi sandstone ²*Upper Cretaceous or Eocene*Platte River formation ¹*Upper Cretaceous*Ainsworth formation ¹**Dakota sandstone** ¹, formation, group or quartziteDakotan series ¹†Dixons group ¹**Niobrara formation** ¹, chalk, or shale; member (of Mancos shale in New Mexico; of Cody shale in Montana)Ponca sandstone 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)**Hawxby 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 shale¹ member (of Nolans limestone)

Roca shale¹

Salem Point shale member¹ (of Grenola limestone)

Speiser shale¹

Stine shale¹ bed (in Hamlin shale member of Janesville shale)

West Branch shale¹ member (of Janesville shale)

Wymore shale¹ member (of Matfield shale)

Pennsylvanian

Ashland limestone¹

Cedar Creek limestone¹

Cullom limestone¹

Fargo limestone¹

Lehmer limestone member (in Admire shale)¹

Louisville limestone¹

Meadow limestone¹

Miles limestone member¹ (of Falls City formation)

Nehawka limestone¹

Oreapolis limestone¹

Preston limestone¹

Union limestone¹

Pennsylvanian (Virgil)

Avoca limestone (in Lecompton limestone)¹

Beil limestone (in Lecompton limestone)¹

Brownville limestone¹ member (of Wood Siding formation)

Cass limestone¹

Church limestone¹ member (of Howard limestone)

Ervine Creek limestone (in Deer Creek limestone)¹

Heebner shale¹ member (of Oread limestone)

Jones Point shale (in Calhoun shale)¹

Kenosha shale (in Tecumseh shale)¹

King Hill shale (in Lecompton limestone)¹

Larsh shale (in Deer Creek limestone)¹

Little Pawnee shale member (of Cass formation)²

Minersville shale member (of Friedrich formation)²

Morton shale²

Nebraska City limestone¹ member (of Wood Siding formation)

Nemaha formation, member, or subgroup¹

Ost limestone (in Tecumseh shale)¹

United States—Continued

Nebraska—Continued

Pennsylvanian (Virgil)—Continued
Otoe shale member (of Friedrich formation)²

Palmyra limestone member (of Friedrich formation)²

Pierson Point shale¹

Plattford shale (in Scranton shale)¹

Plattsmouth limestone¹ member (of Oread limestone)

Pony Creek shale¹ member (of Wood Siding formation)

Queen Hill shale (in Lecompton limestone)¹

Rakes Creek shale (in Tecumseh shale)¹

Richardson subgroup¹

Rock Bluff limestone (in Deer Creek limestone)¹

Rulo limestone¹ member (of Scranton shale)

Sheldon limestone (in Calhoun shale)¹

Shoemaker limestone¹

Snyderville shale¹ member (of Oread limestone)

South Fork limestone¹

Sturm limestone (in Lawrence shale)¹

Table Creek shale¹

Taylor Branch limestone¹

Turner Creek shale (in Topeka limestone)¹

Weeping Water limestone (in Oread limestone)¹

Winnebago shale¹

Wood Siding formation²

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 shale¹ member (of Stanton limestone)

Sarpy formation²

South Bend limestone¹ member (of Stanton limestone)

Stoner limestone¹ member (of Stanton limestone)

Mississippian

Boice shale² (subsurface)

Nevada

Quaternary

American Flat basalt²

Carsonian series¹

Pleistocene (see also *Pliocene*, upper, or *Pleistocene*)

Lake Lahontan beds¹

United States—Continued

Nevada—Continued

Tertiary (see also *Precambrian* or *Tertiary*)

- Chipsa andesite ¹
- Elko Prince rhyolite ¹
- Extension breccia ¹
- Grapevine conglomerates ¹
- June Bell rhyolite ¹
- Kendall tuffs ¹
- Kyle sandstone ¹
- Mammoth andesite ¹
- Meda rhyolite ¹
- †Midway andesite ¹
- Milltown andesite ¹
- Mizpah trachyte ¹
- †Montana breccia ¹
- Morena rhyolite ¹
- Sandgrass andesite ¹
- Sandstorm rhyolite ¹
- Tonopah formation ¹
- Victor andesite ¹
- Vindicator rhyolite ¹
- West End rhyolite ¹
- Wonder rhyolite ¹

Tertiary(?)

- Modoc lavas ¹
- Overton fanglomerate ¹

Tertiary(?) (*pre-Pliocene*)

- Black Canyon group ²

Tertiary, upper

- Mesa basalt ¹
- Pueblo Mountain series ¹

Tertiary, lower

- Amargosan series ¹

Pliocene

- Gilbert andesite ²
- Mount Kate volcanics ²
- Railroad Ridge basalt ¹
- Thousand Creek beds ¹
- Truckee formation ¹

Pliocene(?)

- Hospital porphyry ²
- Malpais basalt ¹
- Muddy Creek formation ¹
- †Muddy Valley beds ¹
- Pozo formation ²
- Rabbit Spring formation ¹
- Spearhead rhyolite ¹
- Toyabe quartz latite ²

Probably Pliocene

- Panaca formation ¹

Pliocene or Pleistocene

- Knickerbocker andesite ²

Pliocene, upper, and Pliocene, lower

- Lousetown formation ²

Pliocene, lower(?)

- Oddie rhyolite ¹

Miocene and Pliocene(?)

- Humboldt formation ¹

Miocene

- Davis Creek beds ¹
- Forman volcanics ²
- Virgin Valley beds ¹

United States—Continued

Nevada—Continued

Miocene(?)

- American Ravine andesite porphyry ²

- Davidson granodiorite ²

Miocene, upper, or later

- Maris rhyolite ¹

Miocene or Pliocene, lower

- Kate Peak formation ²

Miocene, upper, or Pliocene, lower

- Currant tuff ²

Miocene, upper, and Pliocene, lower

- Bald Mountain lake beds member (of Esmeralda formation) ¹

- Diamond King member (of Esmeralda formation) ¹

- Esmeralda formation ¹

- Hedwig breccia member (of Esmeralda formation) ¹

- Round Rock member (of Esmeralda formation) ¹

Miocene, upper

- †Cedar Mountain beds ¹

- Fraction breccia ¹

- Mira basalt ¹

- †Siebert formation ¹

- Siebert tuff ¹

Miocene, upper(?)

- Brougher dacite ¹

- Divide andesite ¹

- Espina breccia ¹

- Heller dacite ¹

Probably pre-upper Miocene

- Gilmore Gulch formation ¹

Miocene, lower

- Pueblo Range series ¹

Oligocene(?)

- Alta formation ²

- Hartford Hill rhyolite tuff ²

- Sutro member (of Alta formation) ²

Eocene

- Elko shale or group ¹

Eocene(?)

- Horse Spring formation ¹

Upper Cretaceous

- Baseline sandstone ²

- Willow Tank formation ²

Upper Cretaceous(?)

- Thumb formation ²

Jurassic or Cretaceous

- Rocky Canyon granite ¹

Jurassic

- Oreana shale ¹

- Scossa slates ¹

Jurassic(?)

- Aztec sandstone ¹

Lower Jurassic

- Dunlap formation ¹

- Lovelockian series ¹

- Muttleberry limestone ¹

- Sunrise formation ¹

Triassic

- Red Rock limestone ²

- Rochester rhyolite ¹

United States—Continued

Nevada—Continued

Upper Triassic

 Cane Spring formation ²

 Dun Glen formation ²

 Gabbs formation ¹

 Grass Valley formation ²

 Luning formation ¹

 Osobb formation ²

 Raspberry formation ²

 Winemucca formation ²

Upper(?) Triassic

 †Staran series ¹

Middle and Upper Triassic

 Natchez Pass formation ²

 Star Peak group ¹

Middle Triassic

 Augusta Mountain formation ²

 Favret formation ²

 Grantsville formation ²

 †Koipatoan series ¹

 Nenzel rhyolite breccia ²

 Panther Canyon formation ²

 Prida formation ²

 Simon quartz keratophyre ¹

Middle(?) Triassic

 Excelsior formation ¹

 Limerick keratophyre ¹

Lower and Middle(?) Triassic

 China Mountain formation ²

Lower Triassic

 Candelaria formation ¹

 Dixie Valley formation ²

 Tobin formation ²

Lower Triassic and Permian(?)

 Weaver rhyolite ¹

Permian and Triassic

 Koipato formation ¹ or group

Permian

 Arcturus limestone ¹

 Diablo formation ²

 Edna Mountain formation ²

 Rochester trachyte ¹

 Tallman fanglomerate ²

Permian(?)

 Darrough felsite ²

 Pablo formation ²

Carboniferous

 Diamondian series ¹

Pennsylvanian and Permian

 Callville limestone ¹

 Havallah formation ²

Pennsylvanian

 Rib Hill formation ²

 †Ruth limestone ¹

Upper Pennsylvanian and Permian

 Antler Peak limestone ²

 Strathearn formation ²

Middle Pennsylvanian

 Battle formation ²

 Highway limestone ²

 Tomera formation ²

Lower Pennsylvanian

 Moleen formation ²

Post-Mississippian

 Whistler Mountain alaskite ²

United States—Continued

Nevada—Continued

Mississippian and Pennsylvanian

 Tonka formation ²

Mississippian (see also Devonian and Mississippian)

Indian Springs member (of Bird

 Spring formation) ¹

 †Robinson shale ¹

 Rogers Spring limestone ¹

 San Simon limestone ¹

Mississippian(?)

 Inskip formation ²

Upper Mississippian to Permian

 Bird Spring formation ¹

Upper Mississippian and Lower Pennsylvanian

 Bailey Spring limestone ¹

 Ely limestone ¹

Upper Mississippian

 Arrowhead limestone member (of
 Monte Cristo limestone) ¹

 Bluepoint limestone ¹

 Chainman shale ¹

 Diamond Peak formation (as
 quartzite) ¹

 Illipah formation ²

 Scotty Wash quartzite ¹

 Yellowpine limestone member (of
 Monte Cristo limestone) ¹

Lower and Upper Mississippian

 Monte Cristo limestone ¹ or
 dolomite

 Peers Spring formation ¹

 †White Pine shale ¹

Lower Mississippian

 Anchor limestone member (of
 Monte Cristo limestone) ¹ or
 member (of Monte Cristo
 dolomite)

 Bristol Pass limestone ¹

 Bullion dolomite member (of
 Monte Cristo limestone) ¹ or
 member (of Monte Cristo
 dolomite)

 Dawn limestone member (of
 Monte Cristo limestone) ¹ or
 member (of Monte Cristo
 dolomite)

 Joana limestone ¹

Mississippian or older

 Leach formation ²

 Pumpnickel formation ²

Devonian and Mississippian

 Pilot shale ¹

Devonian

 Lamoureux or Lamoureaux shale ¹

 Pinean series ¹

 Woodpecker limestone ¹

Upper Devonian

 Atrypa limestone ¹

 Combs limestone ¹

 West Range limestone ¹

Middle and Upper Devonian

 Crystal Pass limestone member
 (of Sultan limestone) ¹

United States—Continued

Nevada—Continued

*Middle and Upper Devonian—Con.***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** ¹Slaven 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*Timpahutean series ¹*Ordovician***Pahranagat limestone** ¹Pinyon series ¹*Ordovician(?)*Coaldale chert ²**Mayflower schist** ¹**Sonoma Range formation** ²Zanzibar 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** ²Egan limestone ¹**Goodwin limestone** (as formation) ¹Goodwinian series ¹Lehman formation ²†Pogonipan series ¹Schell shale ¹Steptoean series ¹**Tank Hill limestone** ¹Willow 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**Swarbrick 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** ¹Dunderbergian series ¹†Hambergian series ¹**Hamburg limestone** ¹ or dolomite†Hamburg shale ¹**Harmony formation** ²**Mendha 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 ²Burrows dolomite ²Burrows shale ²**Chisholm shale** ¹Comet shale ²Condor member (of Swasey limestone) ²Eldoradan series ¹**Eldorado dolomite** (as limestone) ¹**Geddes limestone** ²**Lyndon limestone** ¹Peasley limestone ²†Prospect Mountain limestone ¹Rubyan 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

Nevada—Continued

Precambrian or Tertiary

 Boulder Wash group ²
Precambrian

 Clover quartzites ¹
Age(?)

 Cañon rhyolite ¹

 Elder sandstone ²

 Gold Butte granite ²

New Hampshire

Paleozoic(?)

 Coos group ¹

 Kearsarge andalusite group ¹
Upper Paleozoic(?)

 †Berlin gneiss ¹
Carboniferous(?)

 Albany quartz syenite ¹

 Garland Peak syenite ²

 Lafayette granite porphyry ¹

 Mount Tripyramid complex ²

 Passaconway syenite ²

 Red Hill complex ²

 Watson Ledge quartz syenite ²
Carboniferous or post-carboniferous

 Fitzwilliam granite ¹
Carboniferous to Precambrian(?)

 †Lake Winnepesaukee gneiss ¹
Pennsylvanian(?)

 Gonic formation ¹

 Rindgemere formation ¹
Mississippian(?)

 Albany porphyritic quartz syenite ¹

 Conway granite ¹

 Moat volcanics ¹

 Mount Garfield porphyritic quartz syenite ¹

 Mount Lafayette granite porphyry ¹

 Mount Osceola granite ¹

 Pawtuckaway complex ²

 White Mountain plutonic-volcanic series (as magma series ¹)

Devonian or Carboniferous

 Albany granite ¹

 Ames monzodiorite ¹

 Baldface phase ¹ (of Conway granite)

 Belknap syenite ¹

 Black Cap phase ¹ (of Conway granite)

 Chatham granite ¹

 Chocorua granite ¹

 Diana phase ¹ (of Conway granite)

 Endicott diorite ¹

 Franconia breccia ¹

 Gilford gabbro ¹

 Gilmanton monzodiorite ¹

 Lake quartz syenite ¹

 Landaff granite ¹

 Moody Ledge granite ¹

 Moulton diorite ¹

 Owls Head granite ¹

 Pemigewasset series ¹

United States—Continued

New Hampshire—Continued

Devonian or Carboniferous—Con.

 Pond Hill granite ¹

 Priest Hill granite ¹

 Randolph granite ¹

 Rowes vent-agglomerate ¹

 Sawyer quartz syenite ¹

 Scrag granite ¹

 Sugar Hill quartz monzonite ¹
Devonian(?)

 Albany porphyritic nordmarkite ¹

 Durham quartz diorite ¹

 Hampton granodiorite ¹

 Mount Moat conglomerate ¹

 Pequawket breccia ¹

 Rochester biotite granite ¹

 South Moat flow ¹
Upper Devonian

 Smarts Mountain granite ²
Upper Devonian(?)

 Baker Pond gneiss ²

 Bethlehem gneiss ¹

 Bickford granite ¹

 Concord granite ¹

 Croydon group ²

 Exeter diorite ¹

 French Pond granite ¹

 Haverhill granodiorite ²

 Kinsman quartz monzonite (as granodiorite ¹)

 Long Mountain granite ²

 Mascoma group ²

 Meredith granite ¹

 New Hampshire plutonic series (as magma series ¹)

 Norway quartz monzonite ²

 Remick tonalite ¹

 Spaulding quartz diorite ²

 Tamworth granite ²

 Unity group ²
Middle or Upper Devonian

 Lebanon granite ¹
Middle or Upper Devonian(?)

 Oliverian plutonic series (as magma series ¹)

 Whitefield gneiss ²
Post-Lower Devonian

 Pine Mountain complex ¹
Lower Devonian

 Boott member (of Littleton formation) ²

 Dakin Hill member (of Littleton formation) ²

 Durgin Brook member (of Littleton formation) ²

 Hubbard Hill member (of Littleton formation) ²

 Jenness Pond member (of Littleton formation) ²

 Littleton formation ¹

 May Pond member (of Littleton formation) ²

 Pittsfield member (of Littleton formation) ²

United States—Continued

New Hampshire—Continued

*Lower Devonian(?)*Blueberry Mountain argillite ¹Talford schist ¹*Pre-Devonian(?)*Parker Hill schist ¹*Silurian and Devonian*Blueberry Mountain series ¹*Silurian(?)*Fitch Hill granite gneiss ¹Intervale clay slate ¹Lyman formation ¹*Middle Silurian*Fitch formation ¹Fitch Hill arkose ¹*Lower and Middle Silurian*Clough quartzite or formation (as conglomerate) ¹*Pre-Silurian*West Bath slate ¹*Ordovician to Lower Devonian*New Hampshire sequence ²*Probably Ordovician and Silurian*Calef member (of Eliot formation) ²Gove member (of Berwick formation) ²Rye formation ²*Ordovician*Albee formation ¹Piermont member (of Albee formation) ²*Ordovician(?)*Ammonoosuc volcanics ¹Partridge formation (as slate) ¹*Upper Ordovician*Highlandcroft granodiorite ¹Highlandcroft plutonic series (as magma series) ¹†Lisbon quartzite ¹Lost Nation quartz diorite ²*Middle Ordovician(?)*Hardy Hill quartzite member (of Orfordville formation) ²Orfordville formation ²Post Pond volcanic member (of Orfordville formation) ²Sunday Mountain volcanic member (of Orfordville formation) ²*Cambrian and Ordovician*Lisbon formation ¹*Probably Cambrian*Swift Water formation ¹*Precambrian and Pennsylvanian(?)*†Rockingham schist ¹*Precambrian(?)*†Montalban ¹ (formation)Mount Deception granite ¹Rye gneiss ¹Winnepesaukee quartz diorite (as gneiss) ¹*Precambrian(?) and later*White Mountain series ¹

United States—Continued

New Hampshire—Continued

*Age(?)*Gunstock gneiss ¹South Hampton granite ¹

New Jersey

*Quaternary (probably Recent)*Lalor sands ¹*Pleistocene*Bridgeton formation ¹Cape May formation ¹†Fish House beds ¹Fish House clay ¹Glassboro gravel ¹†Jamesburg formation ¹Jerseyan drift ¹Pensauken formation ²†Trenton gravel ¹Woodmansie phase (of Bridgeton formation) ¹*Pliocene(?)*Beacon Hill gravel ¹Mount Holly conglomerate ¹*Miocene(?)*Cohansey sand ¹*Miocene, upper*Alloway clay ¹Asbury clay ¹*Miocene, middle*Kirkwood formation ¹Shiloh marl member (of Kirkwood formation) ¹*Eocene*†Long Branch sand ¹†Squankum marl ¹†Timber Creek beds ¹*Eocene, middle*Shark River marl ¹*Eocene, lower*Manasquan marl ¹Rancocas group or formation ¹†Sewell formation ¹*Paleocene*Hornerstown marl ¹Vincentown sand ¹*Cretaceous*Sand Hill ¹ (series)*Upper Cretaceous*†Amboy clays ¹Bay View Avenue sand ¹†Cliffwood clays ¹†Columbus sand ¹Crosswicks clay ¹Englishtown sand ¹Farrington sand member (of Raritan formation) ²†Hazlet sands ¹Marshalltown formation ¹Matawan group or formation ¹Merchantville clay ¹Monmouth group or formation ¹Mount Laurel sand ¹Navesink marl ²Old Bridge sand member (of Raritan formation) ²

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) ²

 South Amboy fire clay ¹

 Tinton sand member (of Red Bank sand) ¹

 Trenton clays ¹

 Wenonah sand ¹

 Woodbridge fire clay ¹

 Woodbury 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

 Longwood 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

 Carrizozo lava flow ²

 Gamarco 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 basalt flow ¹

 Mescalero sands ¹

 Palomasan series ¹

 Puyé 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 ²

 Vallecito basalt ²

Pleistocene

 Clovis beds ²

 Cuerbio basalt ²

 Laguna basalt flow ¹

 Palomas gravel ¹

 Suwanee basalt flow ¹

 Wheatland formation ²

Pleistocene(?)

 Gatuña formation ²

Pleistocene, upper

 Sand Canyon formation ²

 San Jon formation ²

Tertiary or Quaternary

 Las Foveras formation ²

Tertiary or Quaternary(?)

 Tulrosa formation ¹

Tertiary

 Arriban series ¹

 Caballo Blanco rhyolite tuff ²

 Cieneguilla limburgite ²

 Cooney quartz latite ¹

 Crankton sandstone ¹

 Deadwood Gulch rhyolite tuff ¹

Deza formation (H. E. Wright, Jr., 1954, Am. Assoc. Petroleum Geologists Bull., v. 38, no. 8, p. 1830-1833)

United States—Continued

New Mexico—Continued

Tertiary—Continued**Dog Gulch formation**¹Espinazo volcanics²**Fanney rhyolite**¹**Houston andesite**¹Jamez marl¹**Last Chance andesite**¹Latir Peak latite²Llano Estacado series¹Lufkin rhyolite¹Maya conglomerate¹**Mineral Creek andesite**¹**Mogollon andesite**¹Monument andesite¹Ortega formation²Pacific quartz latite¹Picuris tuff²Rio Grande gravels¹Rio Grande loess¹Selden basalt tongue²**Whitewater Creek rhyolite**¹*Tertiary(?)*Cueva rhyolite¹Orejon andesite¹Otero formation¹Soledad rhyolite¹*Tertiary, upper*Albuquerque marl¹Bear Springs basalt²Kneeling Nun rhyolite tuff²Mimbres Peak formation²Pecosan series¹Pollack quartz latite²Razorback formation²Rio Grande series¹Rubio Peak formation²Sugarlump tuffs²*Tertiary, middle or upper*Amalia formation²*Tertiary, middle*Chicoma volcanic formation²*Tertiary, lower*Aztecan series¹Carson conglomerate¹Wimsattville formation²*Tertiary, lower(?)*Macho pyroxene andesites²*Pliocene(?)*Chuska sandstone¹Eagle Nest formation²*Pliocene, upper, or Pleistocene*Ancha formation²Servilleta formation²*Miocene and Pliocene(?)***Los Pinos gravel** (as member of Hinsdale formation¹)*Probably Miocene and Pliocene*Placita marl¹*Miocene*Abiquiu tuff²Bell Top formation²Uybs basalt²

United States—Continued

New Mexico—Continued

*Miocene(?) to Pliocene*Mimbres conglomerate²*Miocene(?)*Chama clays¹**Datil formation**¹Lucky Bill formation²Pedernal chert member (of Abiquiu tuff)²*Miocene, upper***Popotosa formation**²*Miocene, pre-upper*El Rito formation²*(?) Miocene, upper*Hells Mesa member (of Datil formation)²La Jara Peak member (of Datil formation)²Spears member (of Datil formation)²*Miocene, middle(?) to Pleistocene(?)***Santa Fe group** (as formation¹)*Miocene, middle(?) to Pliocene, lower***Tesuque formation**²*Miocene, middle(?)***Bishops Lodge member** (of Tesuque formation)²*Oligocene and Miocene*Thurman formation²*Oligocene*Palm Park formation²*Eocene and Oligocene(?)***Galisteo formation** (as sandstone¹)*Eocene*Canyon Largo sandstone¹Chaco marl¹Chaman series¹Houten sandstone¹Ratonan series¹*Eocene(?)***Baca formation**²Zia marl¹*Eocene, lower*†Almagre beds¹†Largo beds¹Maxwell terrane¹San Jose formation²*Eocene and older(?)*†Canyon Largo group¹†Pinyon Mesa group¹*Paleocene***Nacimiento group**¹ or formation**Puerco formation**¹**Torrejon formation**¹*Cretaceous or younger*Hanover granodiorite porphyry²Santa Rita granodiorite porphyry²*Cretaceous and Paleocene***Raton formation**¹*Cretaceous*Chacra¹ (terrane)Gallinas shale¹Mora sandstone²Pueblan series²

United States—Continued

New Mexico—Continued

Cretaceous—Continued

 Sanastee sandstone member (of Mancos shale)²

 Whim Hill breccia²
Cretaceous(?)

 Pyramid shale¹
Upper Cretaceous and Tertiary(?)

 McRae formation²
Upper Cretaceous and Tertiary, lower

 Hall Lake member (of McRae formation)²

 Jose Creek member (of McRae formation)²
Upper Cretaceous

 Allison member (of Menefee formation); (as barren member of Mesaverde formation)¹

 Archuleta shale¹

 Atarque member (of Mesaverde formation)²

 Barker Dome tongue (of Cliff House sandstone)²

 Bartlett barren member (of Crevasse Canyon formation); (as barren member of Mesaverde formation)¹

 Beechatuda tongue (of Cliff House sandstone)²

 †Bell Mountain sandstone member (of Miguel formation)¹

 Cano member (of Mesaverde formation)²

 †Chacara sandstone member (of Mesaverde formation)¹

 †Chamiso formation¹

 Cholla Canyon tongue (of Cliff House sandstone)²

 Crevasse Canyon formation²

 Dalton sandstone member (of Crevasse Canyon formation); (as member of Mesaverde formation)¹

 Dilco coal member (of Crevasse Canyon formation); (as member of Mesaverde formation)¹

 Farmington sandstone member (of Kirtland shale)¹

 Fort Stanton shale¹

 Fruitland formation¹

 Gallego sandstone member (of Gallup sandstone); (as member of Miguel formation)¹

 Gallup sandstone (as member of Mesaverde formation)¹

 Gibson coal member (of Crevasse Canyon formation); (as member of Mesaverde formation)¹

 Horsehead tongue (of Mancos shale)²

 Hosta tongue (of Point Lookout sandstone); (as sandstone member of Mesaverde formation)¹

United States—Continued

New Mexico—Continued

Upper Cretaceous—Continued

 Juana Lopez sandstone member (of Carlile shale)²

 Kirtland shale¹

 La Cruz Peak formation²

 La Jara shale¹

 La Ventana tongue (of Cliff House sandstone); (as sandstone member of Mesaverde formation)¹

 †Madrid formation¹

 †Miguel formation¹

 Mulatto tongue (of Mancos shale)¹

 †Navajo shales¹

 North Hogback tongue (of Point Lookout sandstone)²

 Ojo Alamo sandstone²

 Pescado tongue (of Mancos shale)²

 Pictured Cliffs sandstone¹

 Pina Vititos sandstone¹

 †Placer Mountain group¹

 †Prieta sandstone¹

 Puercan series¹

 †Punta de la Mesa sandstone member (of Mesaverde formation)¹

 Pyramid conglomerate¹

 Rail Canyon sandstone member (of Vermejo formation)¹

 Satan tongue (of Mancos shale)¹

 Sierra Blanca series or coal measures¹

 †Tocito sandstone lentil (of Mancos shale)¹

 Tohachi formation (as shale)¹

 Tres Hermanos sandstone member (of Mancos shale)¹

 Tuscon sandstone¹

 Twowells sandstone lentil (of Mancos shale)²

 Ute Canyon tongue (of Cliff House sandstone)²

 Vermejo formation¹
Upper(?) Cretaceous

 Beartooth quartzite¹
Lower Cretaceous

 Broken Jug limestone²

 Corbett sandstone²

 Garrett conglomerate¹

 Hidalgo volcanics²

 Howells Ridge formation²

 Mesa Rica sandstone (as member of Purgatoire formation)²

 Pajarito shale (as member of Purgatoire formation)²

 Playas Peak formation²

 Redondo sandstone²

 Revuelto shales²

 Ringbone shale²

 Sarten sandstone¹

 Skunk Ranch conglomerate²

United States—Continued

New Mexico—Continued

Lower Cretaceous—ContinuedTucumcari shale (as beds ¹)Tucumcarian series ²*Jurassic*Chavez member (of Morrison formation) ²†Ocate sandstone ²Prewitt sandstone member (of Morrison formation) ²Thoreau formation or sandstone ²*Jurassic and Triassic*(?)†Zunian series ¹*Jurassic*(?)Amarillo sandstone ¹*Upper Jurassic*Chaquagua shale ¹Todillo limestone (as member of Morrison formation) ¹Zuni sandstone ¹†Zuni shale ¹*Middle Jurassic*Travester shale ¹*Triassic to Lower Cretaceous*(?)Puertocito formation ¹*Triassic*Naranjo formation ²*Triassic*(?)Endee shale ¹Lobo formation ²Lukachukai sandstone ¹Sheep Pen Canyon formation ¹Sloan Canyon formation ¹*Upper Triassic*Agua Zarca sandstone member (of Chinle formation) ²Correo sandstone member (of Chinle formation) ²Pierce Canyon redbeds ¹Poleo sandstone ¹ lentil (of Chinle formation)Redonda formation (as member of Chinle formation) ²Salitral shale tongue (of Chinle formation) ²Santa Rosa sandstone ¹†Senorito sandstone lentil (in Chinle formation) ¹Wingate sandstone ¹*Permian and Triassic*†Pecos Valley red beds ¹*Permian*Aqua Torres formation ²Artesia sands ¹ (subsurface)Bernal formation ²†Bernalilán series ¹Bernalillo shale ¹Bluewater formation ²Bower sand ¹ (subsurface)Ceja Glorieta sandstone ¹Chaves shale ¹†Cimarron formation ¹†Dog Canyon limestone ¹Eddy sandstone ¹†Gym limestone ¹

United States—Continued

New Mexico—Continued

Permian—Continued†Manzano group ¹†Nogal formation ¹†Pecos formation ¹Pecos Canyon sandstone ¹†Picacho limestone ¹*Permian*(?)Pecos shale ¹Torrance shale ¹*Permian (Ochoa)*Culebra dolomite member (of Rustler formation) ²Fletcher anhydrite member (of Salado formation) ² (subsurface)La Huerta siltstone member (of Salado formation) ² (subsurface)Magenta member (of Rustler formation) ²Ochoa series ² (subsurface and surface)Vaca Triste sandstone member (of Salado formation) ² (subsurface)*Permian (Guadalupe)*Azotea tongue (of Seven Rivers formation); (as tongue of Carlsbad limestone) ¹Carlsbad group (as limestone) ¹Chalk Bluff formation ¹Grayburg formation ² (subsurface)Ocotillo silt member (of Tansill formation) ²Queen formation (as sandstone member of Chalk Bluff formation) ¹Seven Rivers formation or gypsiferous member (of Chalk Bluff formation) ¹Shattuck member (of Queen formation) ²Tansill anhydrite or formation ²Three Twins member (of Chalk Bluff formation) ¹*Permian (Leonard and Guadalupe)*†Chupadera formation ¹Hondo sandstone member (of San Andres formation); (as member of Chupadera formation) ¹

San Andres limestone (as member of Chupadera formation*)

*Permian (Leonard)*Cañas gypsum member (of Yeso formation) ²Drinkard sandy member (of Yeso formation) ² (subsurface)Glorieta sandstone ¹Joyita sandstone member (of Yeso formation) ²Los Vallos member (of Yeso formation) ²

United States—Continued

New Mexico—Continued

 Permian (*Leonard*)—Continued

 Lovington sandstone member (of San Andres formation) ²

 Meseta Blanca sandstone member (of Yeso formation) ²

 San Ysidro member (of Yeso formation) ²

 Torres member (of Yeso formation) ²

 Yeso formation (as member of Chupadera formation) ¹

 Permian (*Wolfcamp* and *Leonard*?)

 Abo sandstone ¹, red beds ¹, or formation

 Permian (*Wolfcamp*)

 Bursum formation ²

 Pendejo tongue (of Abo formation) ²

Carboniferous

 Ladronean series ¹

 Lunasan series ¹

 Sandia quartzites ¹

 †Sandia series ¹

Pennsylvanian and Permian

 Magdalena group or limestone ¹

Pennsylvanian

 Alamito shale ¹

 Atrasado member (of Madera limestone) ²

 Bar B formation ²

 Bullington member (of Magdalena formation) ²

 Coyote sandstone member (of Madera limestone) ¹

 Don limestone ¹

 Gobbler formation ²

 Gray Mesa member (of Madera limestone) ²

 Humboldt formation ¹

 Incarnacion fire clay ¹

 Madera limestone ¹ or formation

 Maderan series ¹

 Manzanan series ¹

 Montosa limestone ¹

 Mosca limestone ¹

 Mountain Home shale ¹

 Nakaye formation ²

 Osceola limestone ¹

 Oswaldo formation ¹

 Placitos limestone ¹

 Red House formation ²

 Red Tanks member (of Madera limestone) ²

 †Rio Grande series ¹

 Syrena formation ¹

Pennsylvanian(?)

 Antonito limestone ¹

 Gallegos sandstone ¹

 Teller limestone ¹

 Pennsylvanian (*Virgil*)

 Bruton formation ²

 Del Cuerto formation ²

 Fresno group ²

 Holder formation ²

United States—Continued

New Mexico—Continued

 Pennsylvanian (*Virgil*)—Con.

 Keller group ²

 Moya formation ²

 Pennsylvanian (*Missouri*)

 Adobe formation ²

 Beeman formation ²

 Burrego formation ²

 Coane formation ²

 Council Spring limestone ²

 Hansonburg group ²

 Story formation ²

 Veredas group ²

 Pennsylvanian (*Des Moines*)

 Armendaris group ²

 Bolander group ²

 Cieneguilla formation ²

 Cortado formation ²

 Elephant Butte formation ²

 Garcia formation ²

 Warmington limestone member (of Elephant Butte formation) ²

 Whiskey Canyon limestone ²

 Pennsylvanian (*Derry*)

 Apodaca formation ²

 Arrey formation ²

 Cuchillo Negro formation ²

 Derry series ²

 Fra Cristobal formation ²

 Green Canyon group ²

 Hot Springs formation ²

 Mud Springs group ²

 Pennsylvanian (*Morrow*)

 Log Springs formation ²

Lower Pennsylvanian

 Sandia formation ¹

Mississippian, Pennsylvanian, and Permian

 †Fierro limestone ¹

Mississippian

 Berenda limestone ¹

 Grande limestone ¹

 Kelly limestone ¹

 Sierra limestone ¹

 Silver-pipe limestone ¹

 Socorran series ¹

Upper Mississippian

 Arroyo Penasco formation ²

Lower Mississippian

 Alamogordo member (of Lake Valley formation) ²

 Andrecito member (of Lake Valley formation) ²

 Arcente member (of Lake Valley formation) ²

 Caballero formation ²

 Caloso formation ²

 Dona Ana member (of Lake Valley formation) ²

 Hanover limestone ¹

 Lake Valley limestone ¹

United States—Continued

New Mexico—Continued

Lower Mississippian—Con.Nunn member (of Lake Valley formation)²Tierra Blanca member (of Lake Valley formation)²*Devonian or Mississippian*(?)Chloride formation¹*Devonian*Martinian series¹Sly Gap formation²*Upper Devonian*Bella shale¹Box member (of Percha shale formation)²Contadero formation²**Percha shale**¹Ready Pay member (of Percha shale)²Silver shales¹Volusia shale¹*Middle Devonian*Oñate formation²Perchan series¹*Silurian*Santa Rita limestone¹*Silurian*(?)Cibola limestone¹Naiad limestone¹*Middle Silurian*Mesillan series²*Ordovician and Silurian*†Mimbres limestone¹*Ordovician*Armendaris limestone¹Cristobal limestone¹Froncosa limestone¹Mimbresian series¹†Pinos Altos limestones¹*Upper Ordovician*Aleman formation²Cable Canyon sandstone²Cutter formation²Jornada limestone²Par value member (of Montoya dolomite)²Raven member (of Montoya dolomite)²Second Value member (of Montoya dolomite)²Upham dolomite²Valmont dolomite²*Lower Ordovician*Bat Cave limestone²Sierrite limestone²*Cambrian*Chiricahuan series¹Hawkins limestone¹*Cambrian*(?)Burro quartzite¹*Upper Cambrian*Chloridian series¹Long quartzite¹Mangas quartzite¹†Shandon quartzite¹

United States—Continued

New Mexico—Continued

Upper Cambrian(?)Carrasco limestone¹*Middle Cambrian*Dragoonan series¹*Precambrian*Agua Caliente gabbro²Albuquerquean series¹Antonio slate¹Badito quartzite member (of Hopewell series)²Blue Springs muscovite schist²Cabresto metaquartzite²Cleveland Gulch quartzite member (of Hopewell series)²Dixon granite²Embudo granite²Garnuan series¹Graphic lavas¹Hondo slate²Hopewell series²Lacrocach meta-andesite tuff member (of greenstone complex)²Los Pinos granite²Ninos schist¹Ortega quartzite²Penasco quartzite¹Picursian series¹Petaca schist phase (of Ortega quartzite)²Picuris basalts²Pilar phyllite member (of Ortega formation)²Priest granite²†Pueblo quartzite¹Rinconada schist member (of Ortega formation)²Rociada limestone¹Sais quartzite²Sandoval granite¹Sapello quartzite¹Serna schist¹Sevilleta rhyolite²Solitario slate¹Taosan series¹Tijeras quartzite¹Truchas slate²Tusas granite²Vadito formation²Valencian series¹Vallecitos rhyolites²White Ridge quartzite²Ysidro shale¹*Age*(?)Incarnacion granite¹

New York

*Pleistocene*Albany clay¹Cowaselon clay¹**Gardiners clay**¹**Hempstead gravel member** (of Manhasset formation)¹

United States—Continued

New York—Continued

Pleistocene—Continued

Herod gravel member (of Manhasset formation)¹

Jacob sand¹

Jameco gravel or formation¹

Manhasset formation¹

Montauk till member (of Manhasset formation)¹

Saratoga sand¹

 Pleistocene (*Wisconsin*)

Binghamton drift²

Olean drift²

Tertiary

Far Rockaway gravels¹

Pliocene(?)

Mannetto gravel or formation¹

Miocene(?) or Pleistocene(?)

Bethpage gravel¹

Cretaceous

Northport clays¹

Upper Cretaceous

†Island series¹

Lloyd sand¹ member (of Raritan formation)

Upper Triassic

Ladentown diabase¹

Palisade diabase¹

Union Hill trap¹

Pennsylvanian

†Chautauqua conglomerate¹

Ellicottville conglomerate¹

Olean conglomerate member (of Pottsville formation)¹

†Olean shale¹

†Rock City conglomerate¹

Devonian or Carboniferous

Allegany Park parafacies¹

Killbuck conglomerate lentil (of Cattaraugus formation)¹

Knapp formation¹

Knapp formational suite¹

Knapp monothem¹

Mount Herman sandstone¹

Panama conglomerate¹ lentil (in Cattaraugus formation)

†Pope Hollow conglomerate¹

†Portville conglomerate¹

Salamanca conglomerate or sandstone member (of Cattaraugus formation or Conewango formation)¹

Salamanca formational suite¹

Wolf Creek conglomerate lentil (of Cattaraugus formation)¹

Devonian

Allegany oil sand¹ (subsurface)

Apulia shale¹ or limestone¹

Cattaraugus formation¹

Butternut shale²

Chenango sandstone²

Delphi Station member (of Skaneateles formation)²

Humphrey sand¹ (subsurface)

United States—Continued

New York—Continued

Devonian—Continued

Nile sand¹ (subsurface)

†Onondaga limestone series¹

Oswayo formation¹

Richburg sand¹ (subsurface)

Scio sand¹ (subsurface)

†Sherburne group¹

Stony Hollow member (of Marcellus formation)²

Devonian(?)

Chipmonk sand¹ (subsurface)

Fulmer Valley sand¹ (subsurface)

Madison Hill sand¹ (subsurface)

Marsh sand¹ (subsurface)

Penny sand¹ (subsurface)

Rice Brook sand¹ (subsurface)

Upper Devonian

Alfred shale¹

Angola shale¹ member (of West Falls formation)

Arkwright group²

Attica shale¹

Barryville member¹ (of Shohola formation)

Beebe limestone¹

Bluff Point flagstone¹ (subsurface)

Bradford group¹

Cadiz beds¹

Canadaway group¹

Canaseraga sandstone¹

Caneadea member (of Perrysburg formation); (as shale)¹

Canisteo shale member (of Perrysburg formation)²

Cardiff shale¹

Cascadilla shale member¹

Cashaqua shale¹ member (of Sonyea formation)

Cayuta shale member (of Chemung formation)¹

Chadakoin beds¹

Chautauquan group¹

†Chemung conglomerate¹

Chemung formation¹

Cherry Creek member (of Venango formation)²

Cincinnatus sandstone¹

Clarksville oil sand¹ (subsurface)

Cornell member¹ (of Portage formation)

Crosby sandstone¹

Cuba sandstone¹

Dexterville shale member¹ (of Chadakoin stage)

Dunkirk shale¹ member (of Perrysburg formation)

Ellicott shale member¹ (of Chadakoin stage)

Enfield facies subgroup¹

Enfield shale member (of Portage formation)¹

Forestville member (of Canadaway formation)²

United States—Continued

New York—Continued

Upper Devonian—Continued

Gardeau shale member (of West Falls formation); (as member of Portage formation)¹

Genesee formation (as group)¹ (see p. 621)

Genesee shale¹ (see p. 621)

Genundewa limestone lentil (of Genesee shale)¹ (see p. 621)

Gilboa formation¹

Gorham shales¹

Gowanda shale¹ member (of Perrysburg formation)

Grimes siltstone member (of West Falls formation); (as sandstone)¹

Hanover shale¹

Haymaker beds¹

Hatch shale¹ member (of West Falls formation)

†High Point firestone¹

†High Point sandstone¹

Hinsdale sandstone¹

Hume shale member (of Perrysburg formation)²

†Ischua sandstone¹

Ithaca facies sub-group¹

Ithaca shale member (of Portage formation)¹ (see p. 621)

Jamestown conglomerate¹

Juland member¹ (of Enfield formation)

Kaaterskill formation¹

Kaaterskillian series²

Katsberg red beds¹

Kattel shale¹

Keuka flagstone¹

Laona sandstone¹

Laurens member¹ (of Tully limestone)

Letchworth shale¹

Lillibridge sandstone member¹ (of Chadakoin stage)

Little Genesee conglomerate¹

Long Beards Riffs sandstone¹

Machias shale¹

Marathon sandstone member¹ (in Ithaca facies subgroup)

Middlesex shale¹ member (of Sonyea formation)

Milo tongue (of West River shale)²

†Naples shale or group

New Lisbon member¹ (of Tully formation)

Northeast shale¹

†Nunda group¹

Nunda sandstone¹ member (of West Falls formation)

Oneonta sandstone¹

Onteora formation (as red beds)¹

Otselic shale and sandstone¹

Parrish limestone bed (as lentil)¹ (in Cashaqua shale member of Sonyea formation)

United States—Continued

New York—Continued

Upper Devonian—Continued

Penn Yan tongue (of West River shale)² (see p. 621)

Perrysburg formation²

Pipe Creek shale member (of Hanover shale); (as member of Wiscoy sandstone)¹

Portage group, formation, or shale¹

†Portage sandstone¹

†Portland shale¹

Prattsburg sandstone and shale¹

Renwick shale member¹ (of Middlesex shale) (see p. 621)

Rhinestreet shale¹ member (of West Falls formation)

Rock Stream siltstone member (of Sonyea formation); (as member of Cashaqua shale)²

†Rockville sandstone¹

Rushford sandstone¹

Senecan group¹

Sherburne flagstone member (of Portage formation)¹ (see p. 621)

Shumia sandstone¹

†Silver Creek shale¹

Six Mile shale member¹ (of Middlesex shale)

Skunnemunk conglomerate¹

Slide Mountain conglomerate¹

Sonyea¹ formation

South Wales member (of Perrysburg formation)²

Standish flagstone¹

Starkey tongue (of Sherburne formation)²

Stony Clove sandstone member (of Katsberg red beds)²

Table Rock sandstone¹

Tinkers Falls member¹ (of Tully formation)

Triphammer shale member¹ (of Ithaca facies subgroup)

Twilight Park conglomerate²

Unadilla formation¹

Van Etten¹ (zone)

Wellsburg sandstone member (of Chemung formation)¹

Wellsville formation²

West Brook member¹ (of Tully formation)

Westfield shale¹

West Hill member (of West Falls formation); (as formation)¹

West River shale¹ (see p. 621)

White Church zone¹

Whitesville formation²

Williams Brook coquinite member¹ (of Ithaca facies subgroup)

Wiscoy shale or sandstone¹

Wittenberg conglomerate¹

United States—Continued

New York—Continued

Middle and Upper Devonian
Catskill formation¹ or red beds

Erie group¹ or series¹
Middle Devonian

Avery shale¹

Ashokan beds¹

Athol shale¹

Babcock Hill member (of Onondaga formation)²

Bakoven shale¹

Bellvale flags or sandstone¹

Berne member (of Marcellus shale)¹

Berwyn member (of Skaneateles shale)¹

Bridgewater member (of Marcellus shale)¹

†Canadaigua shale¹

Cazenovia group¹
Centerfield limestone member (of Ludlowville shale)¹

Cherry Valley limestone (in Marcellus shale)¹

Chittenango member (of Marcellus shale)¹

Colgate member (of Skaneateles shale)¹
Cornwall shale¹

Deep Run member (of Ludlowville shale)¹

Delphi member (of Skaneateles shale)¹

Edgecliff member (of Onondaga limestone)²

Eighteenmile Creek member (of Ludlowville formation)²
Hamilton group¹; formation in Pennsylvania

Ivy Point member¹ (of Ludlowville shale)

Joshua submember (of Otisco member of Ludlowville formation)²

Kashong member (of Moscow shale)¹

King Ferry shale member (of Ludlowville shale)¹

Kiskatom formation¹

Ledyard member (of Ludlowville shale)¹

Leeds facies (of Schoharie formation)²

Leicester marcasite member (of Moscow formation)²

Levanna shale (in Hamilton formation)¹

†Ludlowville group¹
Ludlowville shale¹
Marcellus shale¹; shale member (of Romney shale) in Maryland

Menteth limestone member (of Moscow shale)¹

United States—Continued

New York—Continued

Middle Devonian—Continued

Moheganter shales and sandstones¹

†Monroe shales¹

Moorehouse member (of Onondaga limestone)²

Morse Creek limestone¹
Moscow shale¹

Mottville member (of Skaneateles shale)¹
Mount Marion formation (as beds)¹

Nedrow member (of Onondaga limestone)²

†Newfoundland grit¹ or quartzite¹

Oatka Creek shale (in Marcellus shale)¹

Otisco member¹ (of Ludlowville formation)

Otsego member (of Marcellus shale)¹

Owasco member¹ (of Ludlowville formation)

Panther Mountain shale and sandstone¹

Pecksport member¹ (of Marcellus formation)

Pompey member (of Skaneateles shale)¹

Portland Point member (of Moscow shale)¹

Seneca limestone¹

Shaffer shale¹

†Sherburne shale¹
Skaneateles shale¹

Solsville member¹ (of Marcellus formation)

Spafford member¹ (of Ludlowville formation)

Spring Brook shale member (of Ludlowville formation)²

Springfield Center member (of Onondaga formation)²
Stafford limestone member (of Skaneateles shale)¹

Staghorn Point submember¹

Stone Mill member (of Ludlowville formation)²
Tichenor limestone member (of Ludlowville shale)¹
Tully limestone¹

†Ulsterian group¹

Union Springs member (of Marcellus shale)¹

Wanakah shale¹
Windom member (of Moscow shale); (as shale)¹
Lower or Middle Devonian
Carlisle Center formation²
Esopus grit, shale¹ or siltstone

Onondaga limestone¹ or formation

United States—Continued

New York—Continued

*Lower or Middle Devonian—Con.***Schoharie grit**¹Sharon Springs formation²*Lower Devonian***Alsen (cherty) limestone**¹**Becraft limestone**¹Bishop Brook limestone¹†Catskill or Delthyris shaly limestone¹**Coeymans limestone**¹Connelly conglomerate²Deansboro member (of Coeymans limestone)²**Glenerie limestone**¹**Helderberg group or limestone**¹**Kalkberg limestone**¹†Kingston beds¹**New Scotland limestone**¹**Oriskany formation, group**¹, or **sandstone**¹Oriskany Falls member (of Oriskany sandstone)²**Port Ewen limestone**¹Port Jarvis limestone¹†Schoharie stage¹Thacher limestone member (of Manlius formation)²*Lower(?) Devonian*Saugerties limy shale¹*Silurian and Devonian*†Cornwall limestones¹†Onondaga saliferous group¹*Silurian*Bear Creek shale (in Clinton formation)¹Binnewater sandstone (in Salina formation)¹Brewerton shale¹Bridgeburg horizon¹†Buffalo cement bed¹Chrysler waterlime¹†Clinton quartzites¹Donnelly iron ore¹Elmwood beds¹†Esopus millstone¹†Fiddlers Green limestone¹Furnaceville iron ore¹Furnaceville shale¹Gasport shaly channel¹Gates limestone¹†Green Pond Mountain formation¹

Guymard quartzite (W. L. Bryant, 1926, Am. Philos. Soc. Proc., v. 65, no. 4, p. 259)

Herkimer sandstone¹**High Falls shale**¹; **formation**¹ in New JerseyJamesville limestone¹Kirkland formation¹Kirkland limestone and iron ore¹Kodak white sandstone¹Lakeport limestone¹†Lockport group¹

United States—Continued

New York—Continued

Silurian—Continued†Lockport marble¹Maplewood shale¹Martville sandstone¹†Niagara limestone¹†Niagara sandstone¹†Niagara shale¹O-atka beds¹Olney limestone¹**Oneida conglomerate**¹†Onondaga group¹†Ontario group¹Ontario series¹Otisville shale member (of Shawangunk formation)¹Otsquago sandstone¹Phoenix or Schroeppel shale¹Pine Hill quartzite¹**Reynales limestone** (as member of Clinton formation)¹Sauquoit beds¹Scajaquada limy shale¹**Shawangunk conglomerate**¹Sterling Station iron ore¹Verona iron ore¹Wolcott Furnace iron ore¹*Silurian(?)*Clark Reservation limestone¹Pools Brook limestone¹*Upper Silurian*Akron dolomite¹**Bertie limestone** (as member of Salina formation)¹**Camillus shale** (as member of Salina formation)¹**Cayuga group**¹, **dolomite**, or **series****Cobleskill limestone or dolomite**¹Falkirk dolomite¹Forge Hollow member (of Bertie formation)²Fuyk sandstone member (of Rondout waterlime)²Glasco limestone lentil (of Rondout waterlime)²Le Fever limestone²Lyndon gypsum bed¹**Manlius limestone**¹†Onondaga salt group¹**Pittsford shale** (as member of Salina formation)¹**Rondout limestone**¹**Rosendale limestone member** (of Salina formation)¹**Salina formation**¹ or **group****Syracuse salt** (as member of Salina formation¹) (subsurface)**Vernon shale** (as member of Salina formation¹)**Wilbur limestone member** (of Salina formation)¹

United States—Continued

New York—Continued

Upper Silurian—Continued

 Williamsville waterlime and shale¹

Middle Silurian

 Brewer Dock member¹ (of Clinton formation)

 Clinton formation¹ or group

 Dawes sandstone²

 Gasport limestone member (of Lockport dolomite)¹

 Goat Island member (of Lockport formation)²

 Irondequoit limestone (as member of Clinton formation¹)

 Lockport dolomite¹

 Neahga shale¹

 Niagara group¹, limestone, dolomite, or series

 Oak Orchard member (of Lockport formation)²

 Rochester shale (as member of Clinton formation¹)

 †Shelby dolomite¹

 Sodus shale (as member of Clinton formation¹)

 Vanhornsville sandstone¹

 Westmoreland member (of Clinton formation)²

 Williamson shale member (of Clinton formation)¹

 Willowvale shale²

 Wolcott limestone (as member of Clinton formation¹)

Lower Silurian

 Albion group (as sandstone¹)

 Fish Creek shale²

 Rumsy Ridge sandstone member (of Fish Creek formation)²

 Whirlpool sandstone (as member of Albion sandstone¹)

Ordovician

 Burden conglomerate¹

 †Dudley limestone¹ or series¹

 †Hudson schist¹

 Marlboro member (of Hudson River formation)²

 Peekskill phyllite¹

 Poestenkill fault breccia¹

 †Taconic slate¹

 †Trenton conglomerate¹

 Trenton Falls series¹

Ordovician and Cambrian(?)

 †Champlain division¹

Upper Ordovician and Silurian

 Brayman shale¹

 †Medina group¹

 †Oswegan period or group¹

Upper Ordovician

 Atwater Creek shale¹

 Bennett Bridge beds¹

 Deer River shale¹

 Fairfield slate¹

 Frankfort shale¹

United States—Continued

New York—Continued

Upper Ordovician—Continued

 Harter member (of Frankfort formation)²

 Hasenclever member (of Frankfort formation)²

 Holland Patent¹ (zone)

 Indian Ladder formation (as beds¹)

 †Lewiston shale¹

 Lorraine group¹

 Loyal Creek¹ (zone)

 †Mohawk slate group¹

 Moose Creek beds¹

 Moyer member (of Frankfort formation)²

 Nowadaga¹ (zone)

 Oswego sandstone¹

 Pulaski shale¹

 †Salmon River sandstone¹

 Sandy Creek beds¹

 Tremaines Bridge beds¹

 Utica shale¹

 Whetstone Gulf formation¹

 Wood Creek beds¹

 Worthville beds¹

Upper Ordovician(?)

 Amawalk granite²

Middle Ordovician

 Amsterdam limestone¹

 Austins Glen member (of Normanskill formation)²

 Balmville limestone member (of Wappinger limestone)¹

 Black River group¹

 Camp member (of Denmark formation)²

 Canajoharie shale¹

 Chaumont formation¹

 Chazy group¹ or limestone

 Cumberland Head shale¹

 Chuctenunda¹ (zone)

 Crown Point limestone¹

 Denmark member (of Sherman Fall formation)²

 Dolgeville shale¹

 Fort Plain¹ (zone)

 Gansevoort¹ (zone)

 Glendale member of (Denmark formation)²

 Glens Falls limestone¹

 Hounsfield bentonite¹

 Indian River slate¹

 Leray limestone member (of Lowville limestone)¹

 Lorette formation¹

 Lowville limestone¹

 Minaville member (of Canajoharie formation)²

 †Mohawk limestone¹

 Mohawkian series¹

 Morphy¹ (zone)

 Mount Merino chert and shale member (of Normanskill formation)²

United States—Continued

New York—Continued

Middle Ordovician—Continued**Normanskill shale**¹**Pamelia limestone**¹Poland limestone member (of Denmark formation)²Rathbun limestone member (of Denmark formation)²Rust limestone member (of Cobourg formation)²Russia limestone member (of Denmark formation)²**Rysedorph conglomerate**¹**Schenectady formation**¹Sherman Fall formation¹**Snake Hill formation**¹Sprakers¹ (zone)Steuben limestone member (of Cobourg formation)²Tackawasick limestone¹**Trenton limestone or group**¹Van Schaick¹ (zone)**Watertown limestone**¹*Middle(?) Ordovician*Stony Point shale¹*Lower and Middle Ordovician*†Mohawk group¹*Lower Ordovician*Bald Mountain limestone¹

Baldwin Corner formation (R. H. Flower, 1952, in Geol. Soc. America Guidebook for field trips in New England, p. 35)

Beekmantown group or limestone¹Benson dolomite member (of Tribes Hill formation)²Bucks Bridge mixed beds¹Chuctununda Creek dolomite²**Copake limestone**¹Cranesville dolomite²Day Point limestone¹**Deepkill shale**¹†Depauville waterlime¹Fonda limestone member (of Tribes Hill formation)²Fort Ann limestone member (of Tribes Hill formation)²Fort Johnson member (of Tribes Hill formation)²Gailor dolomite²Great Meadows formation (R. H. Flower, *ibid.*)Halycon Lake calc-dolomite²Hewittsville calcilitites or beds¹Mosherville sandstone member (of Gailor dolomite)²Norton limestone member (of Tribes Hill formation)²Ogdensburg formation¹Palatine Bridge limestone member (of Tribes Hill formation)²**Rochdale limestone**¹Schaghticoke shale¹Smith Basin formation (R. H. Flower, *ibid.*)

United States—Continued

New York—Continued

Lower Ordovician—Continued**Tribes Hill limestone**¹Valcour limestone¹Warwick limestone¹Whitehall formation²Wolf Hollow limestone member (of Tribes Hill formation)²*Cambrian, Ordovician and probably Silurian*†Champlain group¹*Cambrian and Ordovician*Fishkill limestone¹†Poughquag limestone¹*Cambrian*Ashley Hill limestone¹Claverack conglomerate (in Schodack formation)²†Saratoga formation, group, or series¹*Cambrian(?)*†Stissing quartzite¹*Upper Cambrian or Ordovician*Broadalbin passage beds²†Hudson formation¹Hudson River group¹Ritchie limestone²*Upper Cambrian to Lower Ordovician*Moses Hill beds²*Upper Cambrian*Adirondack-Border series²Ausable sandstone¹Briarcliff dolomite²Dewey Bridge dolomite (R. H. Flower, *ibid.*)Galway formation¹†Greenfield limestone¹Heuvelton sandstone¹**Hoyt limestone member** (of Theresa dolomite)¹ or **dolomite**¹**Little Falls dolomite**¹Neelytown limestone¹Pine Plains formation²†Potsdam limestone¹**Potsdam sandstone**¹Skene dolomite member (of Whitehall formation)²**Theresa dolomite**¹*Upper Cambrian(?)*Keeseville sandstone¹*Lower Cambrian to Middle Ordovician*Barnegat limestone¹Newburgh limestone¹Peekskill Creek limestone¹†Wappinger limestone¹*Lower and Middle Cambrian***Stissing dolomite**¹*Lower Cambrian*Diamond Rock quartzite¹**Eagle Bridge quartzite**¹Eddy Hill grit¹**Greenwich formation**¹

United States—Continued

New York—Continued

Lower Cambrian—Continued

 Mettawee slate ¹

 Nassau formation (as beds ¹)

 Poughquag quartzite ¹

 Schodack formation ¹

 Troy shales ¹

Lower Cambrian(?)

 Rensselaer graywacke ¹

Precambrian, Cambrian, and

Ordovician

 Hudson schist ¹

Precambrian

 Adirondack anorthosite ¹

 Adirondack gneiss ¹

 Alexandria syenite ¹

 Alexandria type ¹ (granite)

 Allens Falls fanglomerate ²

 Antwerp type granite ²

 †Ausable granite ¹

 Ausable syenite ¹

 Bald Hill granite gneiss ¹

 Barton gneiss ¹

 Beach Mountain paramphibolite ¹

 Bear Pond schist ¹

 Beech Mountain amphibolite ¹

 Brooklyn gneiss ¹

 Bryant Lake limestone ¹

 California granite ¹

 Canada Hill granite ¹

 Canton phacolithic complex ¹

 Catamount schist ¹

 Cat Hill gneissoid granite ¹

 Chesterfield limestone ¹

 Chippewa granite ¹

 Croghan syenite granite complex ¹

 †Dannemora formation ¹

 DeKalb granite ¹

 Diana syenite complex ¹

 Dixon schist ¹

 Dresden amphibolite ¹

 Elizabeth gabbros ¹

 Elizabethtown gabbro ¹

 Faxon limestone ¹

 Fordham gneiss ¹

 Fort Washington gneiss ¹

 Geers Corners gabbro ²

 Glenham gneiss ¹

 Gore Mountain gabbro ²

 Gouverneur granite ¹

 Gouverneur limestone ¹

 Grampus gneiss ¹

 Hague gneiss ¹

 Hammondville gneiss ¹

 Harlem gneiss ¹

 Hawkeye granite ¹ gneiss

 Hermon granite gneiss (as type ¹)

 High Bridge gneiss ¹

 Highland gneiss ¹

 Hudson Highlands complex ²

 Hyde granite ¹

 Indian River hornblende syenite ²

 Inwood limestone ¹

United States—Continued

New York—Continued

Precambrian—Continued

 Jayville granite ²

 Johnsburg limestone ¹

 Keeseville granite ¹

 Kingsbridge marble ¹

 Keene gneiss ¹

 Long Lake gneiss ¹

 Loon Lake quartz-syenitic complex ²

 Lower quartzite ¹

 Lowville granite ¹

 Lyon Mountain granite ¹ gneiss

 Macomb granite ¹

 Mahopac granite ¹

 †Manhattan group ¹

 †Manhattan gneiss ¹

 Manhattan schist ¹

 Marcy anorthosite ¹

 Matteawan granite ¹

 Mohegan granite ¹

 Moon Lake diorite ¹

 Morris granite ¹

 Mott Haven limestone ¹

 New Bremen granite ²

 New Rochelle serpentine ¹

 Orchard gneiss ¹

 †Oswegatchie series ¹

 Pawling gneiss ¹

 Peekskill diorite gneiss ¹

 Peekskill granite ¹

 Piercefield gneiss ¹

 Picton granite ¹

 Pitcairn gneiss complex ²

 Pleasant Lake gabbro ²

 Pochuck diorite ¹

 Pyrites granite ¹

 Ravenswood granodiorite ¹

 Reservoir granite ¹

 Reservoir Hill granite ¹

 Rossie intrusive complex ¹

 Russell feldspathic gabbro ²

 Sacandaga quartzite ¹

 St. Regis granite ²

 Santa Clara complex ²

 Saranac formation ¹

 Shenandoah Mountain granite ¹

 Simons syenite ¹

 Sing Sing marble ¹

 Split Rock ¹ (type granite)

 Sprout Brook limestone ¹

 Stark complex (as quartz syenitic complex ²)

 Storm King granite ¹

 Swede Pond quartzite ¹

 Theresa syenite ¹

 Trout Pond limestone ¹

 Trumbull gneiss ¹

 Tuckahoe marble ¹

 Tupper syenite ¹

 Union Corners granite ¹

 Westchester gneisses and granites ¹

 Whiteface anorthosite ¹

 Yonkers granite ¹

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** ¹
- 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
- Pine sand ²

Pliocene, lower

- Croatan sand** ¹

Miocene, upper

- Duplin marl** ¹

Miocene, middle(?) and upper

- †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
- Cummock formation** ¹
- †Dan River series ¹
- †Deep River formation ¹ or series ¹

- Pekin formation** ¹

- Sanford formation** ¹

Carboniferous(?)

- Whiteside granite** ¹

Devonian(?)

- Cherryville quartz monzonite** ²

Ordovician

- Toluca quartz monzonite** ²

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 or slates ¹

- †Linville slates ¹

- †Piedmont group ¹

Precambrian and Cambrian(?)

- †Buncombe group ¹

Precambrian

- Aaron slate ¹
- Beech granite** ¹
- Bessemer granite** 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 ²
- 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
- Tempa 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** ²
- Yule coal group ¹

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

United States—Continued

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

Hecia sandstone (in Allegheny formation) ¹

Hewetts Branch sandstone (in Allegheny formation) ¹

Hockingport sandstone ²

†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

United States—Continued

Ohio—Continued

Pennsylvanian—Continued

- †Meigs Creek white limestone (in Monongahela formation)¹
- Mitchell sand¹ (subsurface)
- Moxahala clay (in Allegheny formation)¹
- Nagle sand¹ (subsurface)
- Norris limestone (in Allegheny formation)¹
- Oak Hill clay (in Allegheny formation)¹
- Ogan clay (in Allegheny formation)¹
- †Ohio conglomerate¹
- Patriot limestone (in Conemaugh formation)¹
- Peeker sand¹ (subsurface)
- Pomeroy sandstone (in Monongahela formation)¹
- Porterville fossiliferous horizon or limestone (in Conemaugh formation)¹
- Poverty Run limestone (in Pottsville formation)¹
- Redstone clay (in Monongahela formation)¹
- Round Knob horizon or shale member (in Conemaugh formation)¹
- Salem limestone (in Allegheny formation)¹
- Schramm sand¹ (subsurface)
- Scioto freestone (in Allegheny formation)¹
- †Sciotoville fire clay (in Pottsville formation)¹
- Sharon clay¹
- †Shawnee limestone (in Allegheny formation)¹
- Skelley limestone (in Conemaugh formation)¹
- Snow Fork limestone (in Allegheny formation)¹
- †Stillwater sandstone (in Conemaugh formation)¹
- Strasburg cyclothem (including Strasburg shale and/or sandstone)²
- †Summerfield limestone (in Conemaugh formation)¹
- Tionesta clay (in Pottsville formation)¹
- Vandusen cyclothem (including Vandusen clay, shale, and sandstone)²
- Vincent sand¹ (subsurface)
- Washingtonville member (of Allegheny formation)¹
- Wilgus clay (in Conemaugh formation)¹
- Winters clay (in Allegheny formation)¹
- Wolf Creek sand¹ (subsurface)

United States—Continued

Ohio—Continued

Pennsylvanian—Continued

- Zaleski flint (in Allegheny formation)¹
- Zoar limestone (in Pottsville formation)¹

Upper Pennsylvanian

- Ames limestone member** (of Conemaugh formation)¹
- Cambridge limestone member** (of Conemaugh formation)¹
- Ewing limestone member** (of Conemaugh formation)¹

Middle Pennsylvanian

- Putnam Hill limestone member** (of Allegheny formation)¹

Mississippian

- Allensville member (of Logan formation)¹
- Armstrong member (of Cuyahoga formation)¹
- Aurora siltstone member** (of Orangeville shale)¹
- Bedford shale¹ or formation**
- Berea sandstone¹ or formation**
- †Berea shale¹
- Berne member (of Cuyahoga formation)¹
- Black Hand formation¹ or sandstone**
- †Brecksville shale member (of Orangeville shale)¹
- Buena Vista sandstone member** (of Cuyahoga formation)¹
- Burbank member (of Cuyahoga formation)¹
- Byer member (of Logan formation)¹
- Canter limestone¹
- Chardon siltstone member** (of Orangeville shale); (as sandstone)¹
- Churn Creek member (of Cuyahoga formation)¹
- †City Ledge sandstone (in Cuyahoga formation)¹
- Cuyahoga formation, group¹ or shale**
- Euclid sandstone member** (of Bedford shale); (as lentil)¹
- Fairfield member (in Cuyahoga formation)¹
- Granville beds¹
- Granville shale facies¹ (of Cuyahoga formation)
- Hamden sand¹ (subsurface)
- Hanover pebble bed (in Cuyahoga formation)²
- Henley shale member (in Cuyahoga formation)¹
- Hocking Valley conglomerate facies¹ (of Cuyahoga formation)
- Killbuck shale facies (of Cuyahoga formation)²

United States—Continued

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

 Racoon shale ¹

 Rarden shale member ¹ (of Cuyahoga formation)

 Richland limestone and flint ¹

 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

 Bellepoint member (of Columbus limestone) ¹
Columbus limestone ¹
Delaware limestone ¹

 Delhi limestone ¹

United States—Continued

Ohio—Continued

Middle Devonian—Continued

 Dublin blue shale ¹

 East Liberty bone bed (in Columbus formation) ²

 Eversole chert ¹

 Klondike 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

 Prout limestone ¹

 Prout series ¹

 Sandusky limestone ¹

 Silica shale (in Traverse formation) ¹
Sylvania sandstone ¹ or formation

 Tenmile 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

 Monclova 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) ¹
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
Lower Silurian

 Centerville formation ¹

United States—Continued

Ohio—Continued

Upper Ordovician

Arnheim shale¹; formation in Kentucky; limestone in Tennessee

Bellevue limestone member (of McMillan formation)¹

Blanchester division (in Richmond group)¹

Cincinnatian series¹

Clarksville division (in Richmond group)¹

Corryville shale member (of McMillan formation)¹

†Covington group¹

Eden group¹ or formation

Fairmont limestone member (of Fairview formation)¹

Fairview formation¹

Fort Ancient division (in Richmond group)¹

Fulton shale¹

†Hill Quarry beds¹

†Lebanon beds¹

McMicken member (in Latonia shale)¹

McMillan formation¹

Mount Auburn shale member (of McMillan formation)¹

Mount Hope shale member (of Fairview formation)¹

Point Pleasant limestone¹

Turkey Track limestone layer (in Richmond group)¹

Waynesville shale¹; limestone in Kentucky

†Warren beds¹

Upper Ordovician(?)

Belfast bed¹

Middle Ordovician

Bromley shale (in Cynthiana formation)¹ (see p. 622)

†River Quarry beds¹

Oklahoma

Quaternary(?)

†Peaceable sand¹

Pleistocene

Gerty sand¹

Tertiary

Black Mesa basalt¹

Tertiary(?)

†Fort Sill series¹

Pliocene or Pleistocene

Grandfield conglomerate¹

Pliocene, lower

Laverne formation¹

Upper Cretaceous

†Silo sandstone¹

Lower and Upper Cretaceous

Washita group¹

Lower Cretaceous

†Antlers sand¹

Baum limestone member (of Paluxy sand)²

Bennington limestone²

United States—Continued

Oklahoma—Continued

Lower Cretaceous—Continued

Bokchito formation¹

Caddo limestone¹

Camp Supply beds¹

Comet Creek bed¹

Goodland limestone¹

†Indian Territory division¹

Kiamichi formation¹

Upper Jurassic

Exeter sandstone¹

Triassic(?)

Custer formation¹

Permian

Addington formation¹

Altona dolomite member (of Blaine gypsum)¹

†Amphitheater dolomite¹

Antelope Flats member (of Wellington formation)²

Anthony sandstone²

Antioch sandstone¹

Asher formation¹

Auger conglomerate lentil (of Wichita formation)¹

Beaver gypsum¹

Bessie member (of Quartermaster formation)¹

Billings member (of Wellington formation)²

Bison banded member¹ (of Hennessy shale)

Blackwell sand¹ (subsurface)

Blaine gypsum or formation¹

Bu-Vi-Bar bed¹

Caddo sand¹ (subsurface)

Cedartop gypsum member (of Blaine gypsum)¹

Chaney gypsum member (of Blaine gypsum)¹

Chapman dolomite¹

Chickasha formation¹

Cimarron anhydrite²

Cloud Chief formation (as gypsum)¹

Cornish sandstone member¹

Creta dolomite (in Blaine formation)¹

Crouse limestone or formation (as member of Garrison shale)¹

†Cushing limestone member (of Elmdale formation)¹

†Cyril gypsum member¹ (of Greer formation)

†Delphi dolomite¹

Doe Creek sandstone member (of Marlow formation)²

Doxey member (of Quartermaster formation)¹

Duncan sandstone¹

Elk City member (of Quartermaster formation)¹

El Reno group (as formation)¹

Enid formation¹

United States—Continued

Oklahoma—Continued

Permian—Continued

- Evansville sandstone beds (in Wellington formation)¹
- Fairmont shale member (of Hennessey shale)¹
- Fallis sandstone member** (of Wellington formation)¹
- Ferguson gypsum member** (of Blaine gypsum)²
- Foraker limestone**¹; †member (of Sand Creek formation)¹
- Fortuna sand¹ (subsurface)
- Garber sandstone**¹
- Garvin beds¹
- †Glass Mountain formation¹
- †Greenfield dolomite (in Whitehorse sandstone)¹
- †Greer formation¹
- Hart limestone member** (of Stratford formation¹ and Wichita formation)
- Haskew gypsum member (of Blaine formation)¹
- Haystack gypsum member** (of Blaine formation)¹
- Hayward sandstone member¹ (of Garber sandstone)
- Hennessey shale**¹
- Hoy sand¹ (subsurface)
- Iconium member (of Wellington formation)¹
- Jester dolomite (in Blaine formation)¹
- Jester sand¹ (subsurface)
- †Kingfisher formation¹
- Kiser gypsum member (of Blaine gypsum)¹
- Kisner sand¹ (subsurface)
- †Lone Wolf sandstone¹
- Lovedale gypsum member (of Blaine formation)¹
- Lowrie sandstone bed (in Wellington formation)¹
- Lucien shale member¹ (of Garber sandstone)
- McCann sandstone¹
- Magpie dolomite member (of Blaine gypsum)¹
- Mangum dolomite member** (of Blaine gypsum)¹
- Marlow formation**¹
- Mauldin beds¹ (subsurface)
- Midco (lacustrine) member (of Wellington formation)²
- Minco division²
- Newkirk limestone¹
- Nicholas sand¹ (subsurface)
- †Norman division¹
- Oklahoma series¹
- Old Crow gypsum¹
- One Horse gypsum¹
- Otoe redbed member (of Wellington formation)²

United States—Continued

Oklahoma—Continued

Permian—Continued

- Patsy gas sand¹ (subsurface)
- Payne sandstone¹
- Piedmont sandstone²
- Post Oak conglomerate member** (of Wichita formation)²
- Prosperity sand¹ (subsurface)
- Purcell sandstone lenses (in Hennessey shale)¹
- Quartermaster dolomite (in Quartermaster formation)¹
- Quartermaster formation**¹
- Red Eagle limestone** (as member of Elmdale formation¹)
- †Red Eagle shale (in Elmdale formation)¹
- Reeding sandstone²
- Relay Creek dolomite**¹ beds (in Marlow formation)
- Rush Springs sandstone or formation** (as member of Whitehorse sandstone¹)
- Salt Creek marble (in Blaine formation)¹
- †Sand Creek formation¹
- Stillwater formation¹
- Stony Hills formation¹
- Stratford formation**¹
- †Table Mountain sandstone¹
- Taloga formation¹
- Uncas shale¹
- Verden sandstone**¹ member (of Marlow formation)
- Wanette division²
- Weatherford member** (of Cloud Chief formation); (as dolomite¹)
- Whitehorse sandstone**¹ or group
- Whitney sand¹ (subsurface)
- Wildhorse sandstone¹
- Wilson sand¹ (subsurface)
- †Woodward group¹
- Permian(?)*
- Konawa formation¹
- Newberry sand¹ (subsurface)
- orman sandstone**¹
- Pennsylvanian or Permian*
- Miller sand¹ (subsurface)
- Nigh sand¹ (subsurface)
- Pennsylvanian and Permian*
- †Hominy formation¹
- Ralston group¹
- Pennsylvanian and Permian(?)*
- Pontotoc group**¹
- Pennsylvanian*
- †Akins shale member¹ (of Winslow formation)
- Atlantic oil sand¹ (subsurface)
- Belveal sand¹ (subsurface)
- Bennett oil sand¹ (subsurface)
- Berwyn conglomerate¹
- Billings sand¹ (subsurface)
- †Bristow formation¹
- Brunner sand¹ (subsurface)

United States—Continued

Oklahoma—Continued

Pennsylvanian—Continued

- Buckhorn asphalt ²
- Bull Creek limestone ¹
- Burgess sand ¹ (subsurface)
- Campbell sand ¹ (subsurface)
- Cantrell sand ¹ (subsurface)
- Carmichael sand ¹ (subsurface)
- †Chandler formation ¹
- Claypool formation ¹
- Cleveland sand ¹ (subsurface)
- Colbert sand ¹ (subsurface)
- Cosden sand ¹ (subsurface)
- Covington sand ¹ (subsurface)
- Crews sand ¹ (subsurface)
- Dillard sand ¹ (subsurface)
- Dixie sand ¹ (subsurface)
- Earlsboro sand ¹ (subsurface)
- Endicott sand series ¹ (subsurface)
- Flat-top sandstone ¹
- Gilcrease sand ¹ (subsurface)
- †Glenn formation ¹
- Graham oil sand ¹ (subsurface)
- Grayhorse sand ¹ (subsurface)
- Hallett sand ¹ (subsurface)
- Hamilton Switch sand ¹ (subsurface)
- Harjo sand ¹ (subsurface)
- Healdton sand zone ¹ (subsurface)
- Hewitt sand ¹ (subsurface)
- Hickman sand ¹ (subsurface)
- Holland sand ¹ (subsurface)
- Hominy lime ¹ (subsurface)
- Hoover sand series ¹ (subsurface)
- Hotson sand ¹ (subsurface)
- Jackson sand ¹ (subsurface)
- Johnson oil and gas sand ¹ (subsurface)
- Kelso sand ¹ (subsurface)
- Ketchum Bluff conglomerate ¹
- Keys sand ¹ (subsurface)
- Kirk gas sand ¹ (subsurface)
- Layton sand ¹ (subsurface)
- McEwin sand ¹ (subsurface)
- Markham sand ¹ (subsurface)
- Mervine sand ¹ (subsurface)
- Morris sand ¹ (subsurface)
- Moyer gas sands ¹ (subsurface)
- Muskogee lime ¹ (subsurface)
- †Musselman sand ¹ (subsurface)
- †Nelagoney sandstone ¹
- Nellie gas sand ¹ (subsurface)
- Nemire sand ¹ (subsurface)
- Newkirk sand ¹ (subsurface)
- †Ochelata member ¹ (of Ramona formation)
- †Oil City lime ¹ (subsurface)
- Oscar sandstone ¹
- Papoose sand ¹ (subsurface)
- Pawhuska series ¹ (subsurface)
- Peoples sand ¹ (subsurface)
- Perryman sand ¹ (subsurface)
- Peru sand ¹ (subsurface)
- Ponca sand ¹ (subsurface)

United States—Continued

Oklahoma—Continued

Pennsylvanian—Continued

- Priddy sand ¹ (subsurface)
- Prune sand ¹ (subsurface)
- Quinn sand ¹ (subsurface)
- Ragan sand ¹ (subsurface)
- †Ramona formation ¹
- Ramsey sand ¹ (subsurface)
- Red Fork sand ¹ (subsurface)
- Richter sand ¹ (subsurface)
- Ricketts oil sand ¹ (subsurface)
- Ryan sandstone ¹
- †Sapulpa group ¹
- Shelton sand ¹ (subsurface)
- Sholem Alechem limestone ¹ (subsurface)
- Skinner sand ¹ (subsurface)
- Smith sand ¹ (subsurface)
- Squirrel sand ¹ (subsurface)
- Standpipe sandstone (in Elmdale formation) ¹
- Suitcase sand ¹ (subsurface)
- Surber sand ¹ (subsurface)
- Sutherland oil sand ¹ (subsurface)
- Swaggart sand ¹ (subsurface)
- Swenson sand ¹ (subsurface)
- Tatums sand ¹ (subsurface)
- †Tiger Creek sandstone member (of Bristow formation) ¹
- Timber Ridge sand ¹ (subsurface)
- Ti Valley series ²
- Tonkawa sand ¹ (subsurface)
- †Tulsa group ¹
- Turk sand ¹ (subsurface)
- †Vinita formation ¹
- Walker sand ¹ (subsurface)
- Wayside sand ¹ (subsurface)
- Wheeler lime ¹ (subsurface)
- Wheeler sand ¹ (subsurface)
- Whiting sand ¹ (subsurface)
- Wigdon sand ¹ (subsurface)
- Wiser sand ¹ (subsurface)
- Zypsie sand ¹ (subsurface)
- Pennsylvanian* (?)
- Blaydes sand ¹ (subsurface)
- Brown sand ¹ (subsurface)
- †Geronimo series ¹
- Hogshooter sand ¹ (subsurface)
- Kagey sand ¹ (subsurface)
- Lyons limestone ¹ (subsurface)
- Maloney sand ¹ (subsurface)
- Meadows sand ¹ (subsurface)
- Pawnee limestone ¹
- Thomas sand ¹ (subsurface)
- Vann sand ¹ (subsurface)
- Pennsylvanian* (*Virgil*)
- Ada formation ¹
- Bird Creek limestone (as member of Buck Creek formation) ¹
- Boley conglomerate member (of Vamoosa formation) ²
- Bowhan sandstone member** (of Vamoosa formation); (as member of Nelagoney formation) ¹
- †Buck Creek formation ¹

United States—Continued

Oklahoma—Continued

Pennsylvanian (Virgil)—Con.

Cheshewalla sandstone member (of Vamoosa formation), (as member of Nelagoney formation¹)

Cochahee sandstone member (of Vamoosa formation); (as member of Nelagoney formation¹)

Collings Ranch conglomerate² †Fourmile sandstone member (of Nelagoney formation)¹

Grayhorse limestone member (of Vanoss formation); **member** (of Wood Siding formation in Kansas); (as member of Sand Creek formation¹)

Labadie limestone member (of Vamoosa formation); (as member of Nelagoney formation¹)

Little Hominny limestone member (of Pawhuska limestone)¹

†Nelagoney formation¹

Okay limestone lentil (of Pawhuska formation)¹

Pawhuska limestone or formation¹

Plummer limestone member (of Pawhuska formation)¹

Rock Creek limestone (in Nelagoney formation)¹

†Stonebreaker limestone member (of Buck Creek formation)¹

Turkey Run limestone member (of Pawhuska formation); (as member of Buck Creek formation¹)

Vamoosa formation¹

Vanoss formation¹

Wildhorse limestone (in Nelagoney formation)¹

Wynona sandstone member (of Vamoosa formation); (as member of Nelagoney formation¹)

Pennsylvanian (Missouri)

Anadarche conglomerate (in Hoxbar formation)¹

Anadarche limestone (in Hoxbar formation)¹

Anadarche member (of Hoxbar formation)¹

Avant limestone member (of Iola limestone); (as member of Ochelata formation¹)

Barnsdall formation²

Belle City limestone¹

Bigheart sandstone member (of Tallant formation); (as member of Nelagoney formation¹)

Birch Creek limestone member (of Barnsdall formation); (as bed in Ochelata formation¹)

†Buck Point sandstone member (of Nelagoney formation)¹

United States—Continued

Oklahoma—Continued

Pennsylvanian (Missouri)—Con.

Checkerboard limestone (as member of Coffeyville formation¹)

Clem Creek sandstone tongue (of Wann formation); (as member of Ochelata formation¹)

Confederate limestone member (of Hoxbar formation)¹

†Copan formation¹

Crinerville limestone member (of Hoxbar formation)¹

Daube member (of Hoxbar formation)¹

DeNay limestone member (of Francis formation)¹

Dewey limestone¹

Francis formation¹

Gap sandstone member (of Tallant formation); (as member of Nelagoney formation¹)

Hay Hollow sandstone lentil (of Tallant formation); (as member of Nelagoney formation¹)

Hilltop formation²

Hogshooter limestone¹

Hoxbar formation¹

†Hulah sandstone member (of Nelagoney formation)¹

†Lost City limestone¹

Mission sandstone member (of Tallant formation); (as member of Nelagoney formation)¹

Nellie Bly formation¹

Ochelata group (as formation¹)

Okesa sandstone member (of Barnsdall formation); (as member of Ochelata formation¹)

†Panther Creek limestone member (of Ochelata formation)¹

Possum sandstone tongue (of Revard sandstone member of Tallant formation); (as member of Nelagoney formation¹)

Revard sandstone member (of Tallant formation); (as member of Nelagoney formation¹)

Seminole conglomerate¹ or **formation**

Skia took group (as shale¹)

Tallant formation²

Torpedo sandstone (as member of Ochelata formation¹)

Union Dairy member (of Hoxbar formation)¹

Wann formation¹

Westheimer member (of Hoxbar formation)¹

Zuckerman limestone member (of Hoxbar formation)¹

United States—Continued

Oklahoma—Continued

Middle Pennsylvanian

- Bad Hole sand ¹ (subsurface)
- Barnett sand ¹ (subsurface)
- Bartlesville sand ¹ (subsurface)
- Bixier 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)
- Oklahoma 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

Hartshorne sandstone ¹

Holdenville shale ¹

Hollis limestone member (of Deese formation)²

United States—Continued

Oklahoma—Continued

Pennsylvanian (Des Moines)—Con.

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

†Narcissa sandstone (in Cherokee shale)¹

Natsy member (of Deese formation)²

Nowata shale ¹

Oklmulgee 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

Sasakwa limestone member (of Holdenville shale)¹

Savanna sandstone ¹ or formation

Senora formation ¹

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

United States—Continued

Oklahoma—Continued

Pennsylvanian (Des Moines)—Con.

Warner sandstone member (of McAlester formation)¹

Wetumka shale¹

Wewoka formation¹

Wilburton group¹

Williams member (of Deese formation)²

Wimer School limestone member (of Labette shale)²

Pennsylvanian (Atoka)

Atoka formation¹ or series

Blackjack School sandstone member (of Atoka formation)¹

Chickachoc chert (as lentil of Atoka formation)¹

†Coata sandstone member (of Atoka formation)¹

Coody sandstone member (of Atoka formation)¹

Dirty Creek sandstone member (of Atoka formation)¹

Dornick Hills formation¹ (may be *Morrow* in part)

Georges Fork sandstone member (of Atoka formation)¹

Moore formation² (subsurface)

Muskogee sand¹ (subsurface)

Pope Chapel sandstone member (of Atoka formation)¹

Webbers Falls sandstone member (of Atoka formation)¹

Lower Pennsylvanian

Aradian series²

Big Branch formation¹

Bostwick member (of Dornick Hills formation)¹

Chickasaw Creek formation²

Cromwell sand¹ (subsurface)

Frensley limestone²

Jolliff limestone member (of Dornick Hills formation)¹

Lester limestone member (of Dornick Hills formation)¹

Markham Mill formation²

Moyers formation²

†Muskogee group¹

Otterville limestone member (of Dornick Hills formation)¹

Prairie Mountain formation²

Pumpkin Creek limestone member (of Dornick Hills formation)¹

Pushmataha series²

Sykes sand¹ (subsurface)

Tenmile Creek formation²

Union Valley sandstone member (of Wapanucka formation)¹

Wesley formation²

Wildhorse Mountain formation²

Pennsylvanian (Morrow)

Barnett Hill formation²

Castle Rock sandstone (in Springer formation)¹

United States—Continued

Oklahoma—Continued

Pennsylvanian (Morrow)—Con.

City Lake sandstone member (of Springer formation)¹

Goddard shale member (of Springer formation)²

Jackfork sandstone¹

Johns Valley shale¹

Lake Ardmore sandstone member (of Springer formation)¹

Limestone Gap shale²

Overbrook sandstone member (of Springer formation)¹

Primrose sandstone member (of Springer formation)¹

Rod Club sandstone member (of Springer formation)¹

Round Prairie formation²

Springer formation¹ or shale

Stapp conglomerate member (of Union Valley formation)²

Target limestone member (of Springer formation)²

Wapanucka limestone¹

*Mississippian and Pennsylvanian Stanley shale*¹

Mississippian

Ingraham gas sand¹ (subsurface)

Jefferson gas sand¹ (subsurface)

Lincolnton chert (in Boone limestone)¹

Mayes formation¹

Prairie Hollow member (of Prairie Mountain formation)²

Quapaw chert¹

†Smithville chert lentil (in Stanley shale)¹

Tuskahoma siliceous shale member (of Stanley formation)²

Welden limestone¹

Upper Mississippian or Lower Pennsylvanian

Deaner sand¹ (subsurface)

Kingwood sand¹ (subsurface)

Lyons sand¹ (subsurface)

Upper Mississippian

Albion formation²

Caney shale¹

Grand River limestone²

Lower Mississippian

Misener sand¹ (subsurface)

Sycamore limestone¹

Devonian and Mississippian

Woodford chert¹ or shale

Devonian(?)

Marland sand¹ (subsurface)

Mollie Miller sand¹ (subsurface)

Middle Devonian

†Brushy Creek chert¹

Lower or Middle Devonian

Pinetop chert¹

Sallisaw formation (as sandstone¹)

United States—Continued

Oklahoma—Continued

*Lower Devonian***Bois d'Arc limestone**¹Cravatt formation²**Frisco limestone**¹**Haragan shale**¹ or limestoneKite group²*Silurian and Devonian***Hunton limestone**¹ or group*Silurian***Chimneyhill limestone**¹**Henryhouse shale**¹ or limestoneSallisaw marble¹*Lower Silurian*

Cochrane limestone member (of

Chimneyhill formation)²

Dillard limestone member (of

Chimneyhill formation)²

Hawkins limestone member (of

Chimneyhill formation)²

Keel limestone member (of Chim-

neyhill formation)²*Ordovician, Silurian, and Devonian*†Talihina chert¹*Ordovician*Ada limestone²Alden limestone¹**Cool Creek formation**¹Detrick sand¹ (subsurface)Dunlap sand¹ (subsurface)**Fite limestone**¹**Hammar-Haindl limestone**¹ (sub-

surface)

Hoopes sand¹ (subsurface)Irish sand¹ (subsurface)Johnson sand¹ (subsurface)Kinter sand¹ (subsurface)Lowery sand¹ (subsurface)Marshall green-shale zone¹ (sub-

surface)

Mollman sand¹ (subsurface)Mose Carr sand¹ (subsurface)Olds sand¹ (subsurface)Patterson Ranch group²Pugh sand¹ (subsurface)School Land sandstone¹ (sub-

surface)

Seminole sand member (of Simp-

son formation)¹Simons sand¹ (subsurface)Stamper zone¹ (subsurface)Webster formation¹Wilcox sand¹ (subsurface)Wolf Creek dolomite¹*Upper Ordovician***Sylvan shale**¹*Middle and Upper Ordovician***Tyner formation**¹**Viola limestone**¹*Middle Ordovician***Bromide formation**¹Criner formation¹**Joins formation**¹**McLish formation**¹**Oil Creek formation**¹

United States—Continued

Oklahoma—Continued

*Middle Ordovician—Continued***Simpson group**¹**Tulip Creek formation**¹**West Spring Creek formation**¹*Lower or Middle Ordovician***Burgen sandstone**¹*Lower and Middle(?) Ordovician*†Stringtown shale¹*Lower Ordovician*Burgen limestone¹Chapman Ranch formation¹Falls formation¹†Falls Creek formation¹Joins Ranch formation¹**Kindblade formation**²**McKenzie Hill limestone**¹ or

formation

McMichel member (of McKenzie

Hill formation)²†Nebo¹ (formation)Rainy Mountain limestone¹Strange formation²*Lower(?) Ordovician*Hominy sand¹ (subsurface)*Cambrian*Blue Creek series¹Blue Creek Canyon group²*Cambrian(?)*Lukfata sandstone formation²*Upper Cambrian and Lower Ordo-*

vician

Arbuckle limestone¹ or group¹Turkey Mountain lime¹ (sub-

surface)

*Upper Cambrian***Butterly dolomite**²**Fort Sill limestone** (as forma-tion¹)**Honey Creek formation** (as lime-stone¹)**Reagan sandstone**¹**Royer marble**¹**Signal Mountain formation**¹**Timbered Hills group**¹*Precambrian*Carlton granophyre¹Carlton porphyry¹Colbert porphyry¹Cold Springs granite¹Davidson granophyre¹Headquarters granite¹Lugert granite¹**Meers quartzite**¹Quanah granite¹Raggedy Mountain gabbro¹Reformatory granite¹Saddle Mountain porphyry¹Tepee Creek formation²**Tishomingo granite**¹Troy granite¹*Precambrian(?)*Spavinaw granite¹

United States—Continued

Oregon

Quaternary

 Wineglass welded tuff ²
Recent

 Alkali formation ¹

 Malheur formation ¹

 Summer formation ¹
Recent(?)

 Crooked River formation ¹
Pleistocene

 Cascades formation ¹

 Cascan formation ²

 Chewaucan formation ¹

 Clackamas gravels ²

 Coquille formation ²

 Fossil Lake formation ¹

 Herman Creek lava ¹

 Lacombe gravels ²

 Leffler gravels ²

 Linn gravels ²

 Llano de Oro formation ¹

 Newport formation ¹

 Olallie lavas ²

 Portland delta gravels ¹

 Rocky Butte volcanics ²

 Santiam basalts ²

 Tualatin terrace gravels ²

 Wildhorse formation ¹

 Willamette silt ²
Pleistocene, upper, or Recent

 Diamond formation ¹
Pleistocene, upper

 Elk River beds ¹
Tertiary

 Dorena welded tuff ²
Tertiary, upper, and Pleistocene

 Arlington lake beds ¹

 Shutler formation ¹
Tertiary, upper

 Black Crater formation ¹

 Little Alvord Creek rhyolite ¹
Tertiary, upper(?)

 Fern Ridge tuffs ¹
Pliocene and Pleistocene

 Battle Ax basalts ²

 Minto basalts ²

 Mount Hood lavas ²

 Rattlesnake formation ¹
Pliocene

 Coos conglomerate ¹

 Dalles formation ¹

 Danforth formation ¹

 †Deschutes formation ¹

 Ironside beds ¹

 Madras formation ¹

 Molalla formation ²

 Mount Jefferson formation ¹

 Outerson basalts ²

 †Pelton basalt member (of Deschutes formation) ¹

 Silver Lake group ¹

 Steens Mountain formation ¹

 Troutdale formation ¹

 Underwood Mountain lava ²

 Yakima group ¹

United States—Continued

Oregon—Continued

Pliocene(?)

 Empire formation ¹

 Harney formation ¹
Pliocene, upper, or Pleistocene, lower

 Boring agglomerate ²

 Boring lava ²

 Portland Hills silt member (of Troutdale formation) ²
Pliocene, middle

 Port Orford formation ²

 Steens basalt ¹
Pliocene, lower

 Alvord Creek formation (as beds) ¹

 Pike Creek volcanic series ¹

 Steens Mountain volcanic series (as andesitic series) ¹
Miocene and Pliocene(?)

 Grassy Mountain basalt ¹
Miocene and Oligocene(?)

 †Oregon beds ¹
Miocene

 †Astoria group ¹

 †Astoria sandstone ¹

 Blackjack basalt ¹

 †Cape Blanco beds ¹

 Columbia River basalt ¹

 Coriba formation ¹

 Cottonwood beds ¹

 Glass Buttes series ¹

 Owyhee basalt ¹

 Sardine series ²

 Stayton lavas ¹

 Willamette group ¹
Miocene(?)

 Dooley rhyolite breccia ¹
Miocene, upper, or Pliocene

 Hood River conglomerate ¹
Miocene, upper

 Mascall formation ¹
Miocene, middle or upper

 Halls diorite porphyry ²

 Rhododendron formation ¹
Miocene, middle

 Astoria formation (as shale) ¹

 Trout Creek formation ¹
Miocene, lower

 Alvord formation ¹

 Nye mudstone (as shale) ¹
Oligocene and Miocene(?)

 Cascadia formation ¹
Oligocene

 Eugene formation ¹

 Illaho formation ¹

 Mehama volcanics ¹

 †Oakland limestone ¹

 Pittsburg Bluff formation (as sandstone) ¹
Oligocene to Eocene(?)

 Breitenbush series ²
Oligocene, upper, or Miocene, lower

 Bridge Creek shale ¹

 Butte Creek beds ²

 †Warrendale formation ¹

United States—Continued

Oregon—Continued

Oligocene, upper, to Miocene, lower
Scio beds ²

Oligocene, upper

Rocky Point beds ²

Scappoose formation ²

Yaquina sandstone (as formation ¹)

Oligocene, middle and upper, and
Miocene

John Day formation ¹

Oligocene, middle

Tunnel Point sandstone (as beds ¹)

Eocene

Arago group ¹

Clarno formation ¹

Comstock formation ²

Helmick formation ²

Lorane shale member (of Spencer formation) ²

†Pulaski formation ¹

Spencer formation ¹

Tillamook volcanic series ²

Tyee sandstone ¹ or formation

Wilbur tuff lentils ¹

Yamhill formation ²

Eocene(?)

Coyote formation ¹

Trail Crossing basalt ¹

Wagontire formation ¹

Eocene, upper, to Miocene, lower
Western Cascade volcanic series ²

Eocene, upper, and Oligocene, lower
Bastendorff shale (as Bassendorff shale ¹)

Calapooya formation ¹

Fisher formation ¹

Keasey shale ¹ or formation

Nehalem formation ²

Toledo formation ¹

Eocene, upper

Coaledo formation ¹

Goble volcanic series ²

Moody shale member (of Toledo formation) ¹

Nestucca formation ²

Eocene, middle

Burpee formation ¹

Coffin Butte volcanics ²

Eocene, lower

Kings Valley siltstone member
(of Siletz River volcanic series) ²

Siletz River volcanic series ²

Umpqua formation ¹

Mesozoic or older

Pueblo formation ¹

Cretaceous

Henley beds ¹

Phoenix beds ¹

Rogue River group ¹

Upper Cretaceous

Hornbrook formation ²

United States—Continued

Oregon—Continued

Lower Cretaceous

†Dillard series ¹

Whitsett limestone lentils (in Myrtle formation) ¹

Pre-Cretaceous

Colebrooke schist ¹

Upper Jurassic and Lower Cretaceous

Myrtle group (as formation ¹)
Jurassic(?)

Craggy gneiss ¹

Upper Jurassic

Dothan formation ¹

Galice formation ¹

Rogue formation ²

Trowbridge shale ²

Upper Jurassic(?)

Lonesome formation ²

Middle Jurassic

Colpitts group ²

Hyde formation ²

Izee group ²

Snowshoe formation ²

Warm Springs formation ²

Weberg formation ²

Lower Jurassic

Donovan formation ²

Mowich group ²

Nicely shale ²

Robertson formation ²

Silvies River beds ¹

Suplee formation ²

Post-Triassic (pre-Tertiary)

Haines granite ¹

Triassic(?)

Applegate group ²

Huntington series ¹

Upper Triassic

†Eagle Creek formation ¹

Hurwal formation ²

Martin Bridge formation ¹

Permian

Clover Creek greenstone ¹

Coyote Butte formation ²

Pre-Carboniferous(?)

Burnt River schist ¹

Pennsylvanian

Spotted Ridge formation ²

Pennsylvanian(?)

Elkhorn Ridge argillite ²

Mississippian

Coffee Creek formation ¹

Devonian(?)

May Creek formation ¹ or schist

Precambrian

Bald Mountain gneiss ¹

Pennsylvania

Pleistocene

Allegany drift ¹

Big Bend gravel ¹

Clarendon gravel ¹

Conewango clay ¹

Indian Hollow sands ¹

United States—Continued

Pennsylvania—Continued

Pleistocene—Continued

Lake Monongahela deposits ¹

Philadelphia brick clay ¹

Philadelphia red gravel ¹

University gravel ¹

Pleistocene (Illinoian)

Carmichaels formation ¹

†Packer clay ¹

Tertiary(?)

Mont Alto lignite ¹

Pliocene(?)

Branchtown clay ¹

Bryn Mawr gravel ¹

Triassic

Robeson conglomerate ²

South Valley limestone ¹

Triassic(?)

Spitzenberg conglomerate ¹

Upper Triassic

Arendtsville fanglomerate lentil
(in Gettysburg shale) ¹

Brunswick conglomerate ¹

Conewago conglomerate member
(of Gettysburg shale) (G. W.
Stose and A. I. Jonas, 1939,
Penn. Geol. Survey Bull. C-67,
p. 107, 115, 118)

Conewago group ¹

Elizabeth Furnace conglomerate
member (of Gettysburg shale) ¹

Gettysburg shale ¹

Graters member (of Brunswick
formation) ¹

†Gwynedd shale ¹

Heidlersburg sandstone member
(of Gettysburg shale) ¹

Lansdale shale ¹

†Lewistown group ¹

†Lisbon group ¹

Manchester group ¹

New Oxford formation ¹

Norristown sandstone ¹

†Norristown shale ¹

Perkasie shale ¹ member (of
Brunswick formation)

†Phoenixville shale ¹

Pottstown shale ¹

Santatoga member (of Brunswick
formation) ¹

Smith Corner member (of Locka-
tong formation) ²

Paleozoic

†Appalachian group or series ¹

Lower Paleozoic(?)

Marburg schist ²

Peters Creek quartzite (as
schist) ¹

Wissahickon schist ¹ or forma-
tion ¹

Permian (see also Pennsylvanian
and Permian)

Blacksville limestone (in Wash-
ington formation) ¹

Brier Hill sandstone ²

United States—Continued

Pennsylvania—Continued

Permian—Continued

Claysville limestone member (of
Greene formation) ¹

Colvin limestone member (of
Washington formation) ¹

Davistown sandstone ²

Donley limestone member (of
Greene formation) ¹

Dunkard group ¹

Dunlap sandstone ²

Fish Creek sandstone member
(of Greene formation) ¹

Franklin limestone (in Washing-
ton formation) ¹

Gilmore sandstone member (of
Greene formation) ¹

Greene formation ¹

Jackson limestone (in Greene
formation) ¹

Jollytown limestone member (of
Washington formation) ¹

Jollytown sandstone (in Wash-
ington formation) ¹

Lower Washington limestone
member (of Washington forma-
tion) ¹

Martinsburg limestone (in Wash-
ington formation) ¹

Middle Washington limestone
member (of Washington forma-
tion) ¹

Mount Morris limestone member
(of Washington formation) ¹

Nineveh limestone member (of
Greene formation) ¹

Nineveh sandstone member (of
Greene formation) ¹

Prosperity limestone member (of
Greene formation) ¹

Rogersville limestone (in Greene
formation) ¹

Taylor sandstone (in Greene
formation) ¹

Taylortown limestone (in Wash-
ington formation) ¹

Tenmile limestone (in Greene
formation) ¹

Upper Washington limestone
member (of Washington forma-
tion) ¹

Washington formation ¹

Washington sandstone member
(of Washington formation) ¹

Waynesburg sandstone member
(of Washington formation) ¹

Windy Gap limestone member
(of Greene formation) ¹

Woodglenn limestone ²

Carboniferous (see also Devonian or
Carboniferous)

Broad Top series ¹

Pennsylvanian and Permian

†Greene County group ¹

†Monongahela River coal series ¹

United States—Continued

Pennsylvania—Continued

Pennsylvanian

- Alto coal group (in Pottsville formation)¹
- Bakerstown sandstone (in Conemaugh formation)¹
- Barton group (in Conemaugh formation)¹
- Beaver River formation¹
- Berlin group (in Conemaugh formation)¹
- †Berlin limestone (in Conemaugh formation)¹
- Big Dunkard sand¹ (subsurface)
- Blue Ball fire clay (in Allegheny formation)¹
- Bolivar sandstone (in Allegheny formation)¹
- Brookville clay (in Allegheny formation)¹
- †Browntown sandstone (in Monongahela formation)¹
- Brush Creek clay or fire clay (in Conemaugh formation)¹
- Brush Creek red bed (in Conemaugh formation)¹
- Brush Creek sandstone (in Conemaugh formation)¹
- Buffalo formation (in Conemaugh formation)¹
- Buffalo shale (in Conemaugh formation)¹
- Campbells Ledge black slate (in Pottsville formation)¹
- Canal limestone¹
- Church Run conglomerate¹
- Clarion clay (in Allegheny formation)¹
- †Clarion coal group (in Allegheny formation)¹
- Clermont group (in Allegheny formation)¹
- Clermont limestone (in Allegheny formation)¹
- Coleman limestone (in Conemaugh formation)¹
- †Colorado conglomerate¹
- Connellsville member (of Conemaugh formation)¹
- Connellsville red bed (in Conemaugh formation)¹
- Darlington underclay (in Allegheny formation)¹
- Dunkard sand¹ (subsurface)
- Duquesne limestone (in Conemaugh formation)¹
- †Ebensburg sandstone member (of Conemaugh formation)¹
- Elk Lick clay¹
- Fagundas conglomerate¹
- Fishpot limestone member (of Monongahela formation)¹
- Foys limestone (in Allegheny formation)¹
- Freeport clay¹

United States—Continued

Pennsylvania—Continued

Pennsylvanian—Continued

- †Freeport coal group (in Allegheny formation)¹
- †Freeport limestone member (of Allegheny formation)¹
- Freeport sandstone member (of Allegheny formation)¹
- Gallitzin limestone (in Conemaugh formation)¹
- †Garland conglomerate (in Pottsville formation)¹
- Gourd Head Run clay (in Conemaugh formation)¹
- Gourdhead Run limestone (in Conemaugh formation)¹
- Grafton formation¹
- Grafton member (of Conemaugh formation)¹
- †Great Bend conglomerate¹
- Gurnee formation (in Pottsville formation)¹
- Harshberger limestone (in Conemaugh formation)¹
- Hillman limestone¹
- Hurry-up sand¹ (subsurface)
- Indian sand¹ (subsurface)
- †Johnson Run sandstone (in Pottsville formation)¹
- Johnstown iron ore (in Conemaugh formation)¹
- Kane limestone (in Allegheny formation)¹
- †Kinzua Creek sandstone (in Pottsville formation)¹
- Kittanning coal group (in Allegheny formation)¹
- Kittanning fire clay (in Allegheny formation)¹
- Kittanning shale (in Allegheny formation)¹
- †Ligonier sandstone¹
- Little Dunkard sand¹ (subsurface)
- †Little Pittsburg limestone (in Conemaugh formation)¹
- Little Pittsburg member (in Conemaugh formation)¹
- †Lower Freeport clay (in Allegheny formation)¹
- †Lower Freeport limestone member (of Allegheny formation)¹
- †Lower Freeport sandstone (in Allegheny formation)¹
- †Lower Kittanning limestone (in Allegheny formation)¹
- Lower Mercer fire clay (in Pottsville formation)¹
- Lower Mercer iron shales (in Pottsville formation)¹
- †Lower Mercer limestone (in Pottsville formation)¹
- †Lykens series¹
- Mahoning fire clay (in Conemaugh formation)¹

United States—Continued

Pennsylvania—Continued

Pennsylvanian—Continued

- Mahoning formation ¹
- Mahoning limestone (in Cone-
maugh formation) ¹
- Mahoning red bed (in Cone-
maugh formation) ¹
- Marshburg slates or shale (in
Pottsville formation) ¹
- Meadville monothem or stage ¹
- Mercer limestone (in Pottsville
formation) ¹
- Meyersdale red shale (of Cone-
maugh formation) ¹
- Middle Kittanning clay (in Alle-
gheny formation) ¹
- †Middle Mahoning sandstone (in
Conemaugh formation) ¹
- †Middle Mercer shales (in Potts-
ville formation) ¹
- Mill Creek limestone ¹
- Morgantown member (of Cone-
maugh formation) ¹
- Murphy sand ¹ (subsurface)
- New Galilee clay shale (in Cone-
maugh formation) ¹
- Niverton shale (in Conemaugh
formation) ¹
- Philson limestone (in Conemaugh
formation) ¹
- †Pine Creek limestone member
(of Conemaugh formation) ¹
- †Pine Creek sandstone (in Alle-
gheny formation) ¹
- †Pittsburgh limestone (in Cone-
maugh formation) ¹
- Pittsburgh member (in Monon-
gahela formation) ¹
- Pittsburgh red beds, red shale, or
Reds (in Conemaugh forma-
tion) ¹
- Pittsburgh (Lower) sandstone (in
Conemaugh formation) ¹
- †Pittsburgh series ¹
- Powerton shale (in Allegheny
formation) ¹
- Quakertown fire clay (in Potts-
ville formation) ¹
- †Quakertown group (in Pottsville
formation) ¹
- Quakertown shale (in Pottsville
formation) ¹
- Redstone member (of Monon-
gahela formation) ¹
- Saltsburg formation (in Cone-
maugh formation) ¹
- Saltsburg member (of Monon-
gahela formation) ¹
- Schenley red beds (in Conemaugh
formation) ¹
- Scranton sandstone (in Pottsville
formation) ¹
- Scrubgrass fire clay (in Allegheny
formation) ¹

United States—Continued

Pennsylvania—Continued

Pennsylvanian—Continued

- †Sewickley limestone (in Monon-
gahela formation) ¹
- Sewickley member (in Monon-
gahela formation) ¹
- Shinersville conglomerate (in
Pottsville formation) ¹
- †Summit limestone (in Cone-
maugh formation) ¹
- †Summit series (in Allegheny
formation) ¹
- †Tionesta group (in Pottsville
formation) ¹
- Tionesta iron shales (in Pottsville
formation) ¹
- †Tionesta sandstone (in Potts-
ville formation) ¹
- Tionesta series ¹
- Triumph conglomerate ¹
- Uniontown member (of Monon-
gahela formation) ¹
- †Upper Freeport clay (in Alle-
gheny formation) ¹
- †Upper Freeport limestone mem-
ber (of Allegheny formation) ¹
- †Upper Kittanning limestone (in
Allegheny formation) ¹
- †Upper Mahoning sandstone (in
Conemaugh formation) ¹
- Upper Mercer iron shales (in
Pottsville formation) ¹
- †Upper Mercer limestone (in
Pottsville formation) ¹
- †Washington reds (in Conemaugh
formation) ¹
- Waynesburg clay ¹
- Waynesburg member (in Monon-
gahela formation) ¹
- Wehbum flint clay ¹
- Wellersburg clay (in Conemaugh
formation) ¹
- Woods Run limestone (in Cone-
maugh formation) ¹
- Wurtemburg limestone (in Potts-
ville formation) ¹
- Wurtemburg sandstone (in Potts-
ville formation) ¹
- Wyoming Valley limestone beds ¹
- Upper Pennsylvanian*
- Birmingham shale member** (of
Conemaugh formation) ¹
- Brush Creek limestone member**
(of Conemaugh formation)¹;
shale member in Ohio
- Buffalo sandstone member** (of
Conemaugh formation) ¹
- Bulger limestone bed** (in Monon-
gahela formation) ¹
- Conemaugh formation** ¹
- Connellsville sandstone member**
(of Conemaugh formation) ¹
- Dinsmore limestone bed** (in
Monongahela formation) ¹

United States—Continued

Pennsylvania—Continued

Upper Pennsylvanian—Continued**Elk Lick limestone member** (of Conemaugh formation)¹**Lower Pittsburgh limestone member** (of Conemaugh formation)¹**Mahoning sandstone member** (of Conemaugh formation)¹**Monongahela formation**¹**Pittsburgh sandstone member** (of Monongahela formation)¹**Redstone limestone member** (of Monongahela formation)¹**Saltsburg sandstone member** (of Conemaugh formation)¹**Sewickley sandstone member** (of Monongahela formation)¹**Summerhill sandstone member** (of Conemaugh formation)¹**Uniontown limestone member** (of Monongahela formation)¹**Uniontown sandstone member** (of Monongahela formation)¹**Upper Pittsburgh limestone member** (of Conemaugh formation)¹**Waynesburg limestone member** (of Monongahela formation)¹**Wilmore sandstone member** (of Conemaugh formation)¹*Middle Pennsylvanian***Allegheny formation**¹**Bolivar fire clay** (in Allegheny formation)¹**Butler sandstone member** (of Allegheny formation)¹**Clarion sandstone member** (of Allegheny formation)¹**Homewood sandstone member** (of Pottsville formation)¹**Johnstown limestone member** (of Allegheny formation)¹**Kittanning sandstone member** (of Allegheny formation)¹**Llanfair sandstone member** (of Allegheny formation)¹**Lower Clarion clay** (in Allegheny formation)¹**Lower Kittanning clay** (in Allegheny formation)¹**Mercer shale member** (of Pottsville formation)¹**Upper Clarion clay** (in Allegheny formation)¹**Upper Kittanning clay**¹**Vanport limestone member** (of Allegheny formation)¹**Worthington sandstone member** (of Allegheny formation)¹*Lower and Middle Pennsylvanian***Pottsville formation or group**¹*Lower Pennsylvanian***Connoquenessing sandstone member** (of Pottsville formation)¹

United States—Continued

Pennsylvania—Continued

Lower Pennsylvanian—Continued**Sharon conglomerate member** (of Pottsville formation)¹**Sharon shale member** (of Pottsville formation)¹*Mississippian and Pennsylvanian*†**Allegheny River coal series**¹†**Shenango series**¹*Mississippian* (see also *Devonian or Mississippian*; *Upper Devonian and Mississippian*; and *Upper Devonian or Mississippian*)†**Allegheny group**¹**Bartholomew siltstone member** (of Orangeville shale)¹**Benezette limestone member** (of Pocono formation)¹**Big Injun group**¹ (subsurface)**Bitter Rock sand**¹ (subsurface)**Burgoon group**¹**Burgoon sandstone member** (of Pocono formation)¹**Byham limestone member**¹**Cameron red shale member**¹**Carl sandstone member** (of Shenango formation)²†**Conneaut limestone member**¹**Corry sandstone**¹**Crawford series or subseries**¹**Cussewago sandstone**¹**Cussewago stage or monothem**¹**Custards shale member** (of Meadville stage)¹**French Creek limestone member** (of Meadville stage)¹**Griswold conglomerate** (in Pocono formation)¹**Harvest Home shale member**¹ (of Meadville stage)**Hempfield shale member**¹ (of Shenango monothem)**Hosmer sand**¹ (subsurface)**Hungry Run sandstone member** (of Orangeville shale)²**Johnsonburg sandstone**¹**Loyalhanna limestone**¹; **limestone member** (of Greenbrier limestone) in Maryland and West Virginia**Mauch Chunk shale**¹ or **formation**†**Meadville group**¹**Meadville shale member** (of Cuyahoga formation)¹**Mount Morris sand**¹ (subsurface)**Murdockville sand**¹ (subsurface)**Murrysville sand**¹ (subsurface)**Orangeville shale member** (of Cuyahoga formation)¹; **shale** in Ohio**Papoose sand**¹ (subsurface)

United States—Continued

Pennsylvania—Continued

Mississippian—Continued

Patton shale member (of Pocono formation) ¹

Peters Mountain sandstone (in Pocono formation) ¹

†Pithole grit ¹

Pocono formation, group ¹ or sandstone

Riddlesburg shale member (of Pocono formation) ¹

Roaring Branch sandstone (in Pocono formation) ¹

Roaring Branch shales (in Pocono formation) ¹

Salvation sand ¹ (subsurface)

Schreyfogels limestone ¹

Sharpsville formational suite ¹

Sharpsville sandstone member (of Cuyahoga formation) ¹; sandstone in Ohio

Shaws sandstone member ¹

Shellhammer Hollow formation ²

†Shenango group ¹

Shenango sandstone ¹

Shenango shale ¹

Slippery Rock sand ¹ (subsurface)

Smiths Ferry sand ¹ (subsurface)

Squaw sand ¹ (subsurface)

Thorn Creek gas sand ¹ (subsurface)

Trough Creek limestone member (of Mauch Chunk formation) ¹

West Mead limestone member ¹

Lower Mississippian

Chestnut Ridge sandstone ²

Cove Mountain member (of Pocono formation) ²

Hopwood conglomerate ²

Lick Run conglomerate ²

Linderman sandstone ²

Pine Knob sandstone ²

Second Mountain member (of Pocono formation) ²

Mississippian and Devonian(?)

†Crawford shale ¹

Oil Lake group ¹

Devonian or Carboniferous

Amity shale ¹

Armenia limestone lentil (of Oswayo formation) ¹

Bimber Run conglomerate member ¹

Blue Monday sand ¹ (subsurface)

Boulder sand ¹ (subsurface)

Buchanan Hill conglomerate ¹

Clintonville oil sand ¹ (subsurface)

Cobham conglomerate member ¹

Columbia Hill oil rock ¹ (subsurface)

Conewango formation ¹

Cussewago shales ¹

Dutchmans conglomerate lens ¹

United States—Continued

Pennsylvania—Continued

Devonian or Carboniferous—Con.

East Kane shale member ¹

Elkland parafacies ¹

†Glade sandstone ¹

Gordon sand ¹ (subsurface)

Hayfield limestone ¹

Hayfield shale ¹

Hickory sand ¹ (subsurface)

Hosmer conglomerate ¹

Kushequa shale member ¹

Little's Corner limestone member ¹ (of Hayfield shale)

†Ludlow conglomerate member ¹ (of Knapp formation)

Millers sandstone ¹

Millers Cliff conglomerate ¹

Potter parafacies ¹

†Ridgway shale member ¹ (of Knapp formation)

Roystone coquinite member ¹

Saegerstown shale ¹

Shannopin sand ¹ (subsurface)

Smethport magnafacies ¹

†Smethport shale member (of Knapp formation) ¹

Snee sand ¹ (subsurface)

Stony Lonesome bed ¹

Tanners Hill quarry rock (in Conewango formation) ¹

†Tanners Hill red (in Conewango formation) ¹

Tidioute shale member ¹

Tioga magnafacies ¹

†Tunawant conglomerate ¹

Venango group, ¹ stage, ¹ or monothem ¹

†Watson sandstone member ¹ (of Cattaraugus formation)

Wetmore conglomerate member ¹

Woodcock sandstone ¹

Wrightsville conglomerate ¹

Devonian or Mississippian

Gantz sand ¹ (subsurface)

Marvin Creek limestone ¹

Pine Run sand ¹ (subsurface)

Devonian (see also Silurian and Devonian)

Brodhead member (of Marcellus formation) ²

Buttermilk Falls limestone ²

Campbell Run sand ¹ (subsurface)

Elk sand group ¹ (subsurface)

Hanley sandstone (in Cattaraugus formation) ²

Juniata coal measures ¹

Juniata River series ¹

Lytle sand ²

Queen sand ¹ (subsurface)

Red Valley sand ¹ (subsurface)

Tiona sand ¹ (subsurface)

Devonian(?)

Edensburg oil sandstone ¹ (subsurface)

United States—Continued

Pennsylvania—Continued

*Upper Devonian and Mississippian*Oil Creek Lake group ¹*Upper Devonian or Mississippian*Cherry Ridge conglomerate ¹Cherry Ridge group ¹Cherry Ridge limestone ¹Cherry Ridge red shale ¹Cherry Ridge sandstone ¹Cherry Ridge shales ¹Cleveland magnafacies ¹Coudersport member (of Cataraugus formation) ¹†Devils Den sandstone ¹Dyberry glomerate ¹Elk Mountain sandstone ¹Elk Mountain transition group ¹LeBoeuf conglomerate ¹North Warren shale member ¹Pimple Hill conglomerate ¹†Wild Cat coquinite ¹*Upper Devonian*Allegheny sand ¹ (subsurface)**Allegrippis sandstone member**
(of Chemung formation) ¹Analomink red shale ¹Atwell sand ¹ (subsurface)Balltown oil sand ¹ (subsurface)Barrett sand ¹ (subsurface)Bayard sand ¹ (subsurface)Beatty sand ¹ (subsurface)Big Bend facies and magnafacies ¹Blossburg formation ¹Blue Jay oil sand ¹ (subsurface)Bradford oil sand group ¹ (subsurface)**Brallier shale** ¹Brandt sandstone (in Kingsley member of Wellsburg monothem) ²Brodhead Creek member (of Tully formation) ²**Burket black shale member** (of Harrell shale) ¹†Burlington limestone (in Chemung formation) ¹†Cascade sandstone (in Chemung sandstone) ¹Cascade Creek sandstone (in Chemung formation) ¹Catawissa reds ¹Chagrin magnafacies ¹Cherry Grove sand ¹ (subsurface)Clarendon sand ¹ (subsurface)Conneaut group ¹Cooper sand ¹ (subsurface)Cotton formation ²Crandall Hill sand ¹ (subsurface)Damascus red shale ¹Darling oil sand ¹ (subsurface)Deer Lick sand ¹ (subsurface)Delaware flags ¹Delaware River flags ¹Dellville sandstone ¹

United States—Continued

Pennsylvania—Continued

*Upper Devonian—Continued*Drinker Creek sandstone member
(of Lanesboro formational suite) ²Elizabeth sand ¹ (subsurface)**Fall Creek conglomerate lentil**
(of Chemung formation) ¹Flatiron coquinite member (of Riceville formation) ²Flat Run sand ¹ (subsurface)Fort Littleton formation ¹**Franklindale limestone lentil** (of Chemung formation) ¹Garfield sand ¹ (subsurface)Garland sand ¹ (subsurface)Gartland oil sand ¹ (subsurface)Germania formation ²**Girard shale member** (of Chemung formation) ¹Glade sand ¹ (subsurface)Great Bend limestone (in Chemung formation) ¹Hague gas sand ¹ (subsurface)**Harrell shale** ¹Harrisburg Run sand ¹ (subsurface)Haskell sand ¹ (subsurface)Hauns Bridge group ¹Honesdale sandstone group (in Catskill formation) ¹Howard Quarry sandstone ²Irvineton parvafacies ¹Jumonville sandstone ²Kane sand ¹ (subsurface)Kingsley red shale member (of New Milford formation) ¹Kings Mill sandstone ¹Kings Mill shales ¹**Lackawaxen conglomerate** ¹Lanesboro member (of New Milford formation) ¹Leighton member (of Tully formation) ²Lewis Run sand ¹ (subsurface)Losh Run shale ¹Luthers Mills coquinite ¹McDonald sand ¹ (subsurface)McKean group ¹ (subsurface)Mansfield red beds (in Chemung formation) ¹Maple Summit sandstone ²Montrose red shale (in Catskill formation) ¹Montrose sandstone ¹Moosic ¹ (formation)Mount Pleasant conglomerate ¹Mount Pleasant red shale (in Catskill formation) ¹New Milford group (in Catskill formation) ¹Newport limestone ¹Newport shales and sandstones ¹Nineveh ¹ (sand) (subsurface)

United States—Continued

Pennsylvania—Continued

Upper Devonian—Continued

 Owego shale member (of Cayuta monothem) ²

 Paupack sandstone (in Catskill formation) ¹

 Paupack shales (in Catskill formation) ¹

 Piney Ridge sandstone member (of Chemung formation) ¹

 Porter sand ¹ (subsurface)

 Riceville shale (as member of Chemung formation) ¹

 Rocky Run conglomerate ¹

 Roulet conglomerate ¹

 Rush formation ¹

 Rush member (of Tully limestone) ¹

 Saxton conglomerate member (of Chemung formation) ¹

 Saxton shale (in Catskill formation) ¹

 Sheffield gas or oil sand ¹ (subsurface)

 Shohola formation ¹

 Skinners Eddy limestone (in Catskill formation) ¹

 Sliverville sand ² (subsurface)

 Smethport oil sand ¹ (subsurface)

 Speechley sand ¹ (subsurface)

 Starrucca sandstone ¹

 Starrucca shale (in Catskill or Chemung formation) ¹

 Stoneham oil sand ¹ (subsurface)

 Stony Brook beds (in Chemung formation) ¹

 †sub-Blairsville red shale member (of Chemung formation) ¹

 Sugar Run sand ¹ (subsurface)

 Susquehanna series ¹

 †Towanda sandstone (in Chemung formation) ¹

 Trimmers Rock sandstone ¹

 Venago formation ¹

 Warren oil sand group ¹

 Watering Trough shale ²

 Weissport member (of Tully formation) ²

 Windfall sand ¹ (subsurface)

 Youghioheny sandstone ²

Middle Devonian

 Beaver Dam black shale member (of Needmore shale) ²

 Bowmanstown chert ²

 Chaneyville sandstone member ¹ (of Manhantango formation)

 Fort Hunter sandstone member (of Manhantango formation) ²

 Frame shale member (in Hamilton group) ¹

 Gander Run shale member (in Hamilton group) ¹

 Knobsville continental beds ¹

 Ludlow sandstone ¹

United States—Continued

Pennsylvania—Continued

Middle Devonian—Continued

 Mahanoy black shale member ¹ (of Marcellus formation)

 Mahantango formation ¹

 Mexico sandstone member ¹ (of Marcellus formation)

 Montebello sandstone (in Hamilton formation) ¹

 Needmore shale ²

 Palmerton sandstone ²

 Perry formation ¹

 Peru limestone ¹

 Rockville member (of Skaneateles formation) ¹

 †Selingsgrove lower limestone ¹

 †Selingsgrove lower sandstone ¹

 †Selingsgrove upper limestone ¹

 †Selingsgrove upper sandstone ¹

 Shamokin black shale member ¹ (of Marcellus formation)

 Turkey Ridge sandstone member ¹ (of Marcellus formation)

Lower or Middle Devonian

 Peru sandstone ¹

Lower Devonian

 Clarks Mill beds ¹

 Fallings Springs sandstone member (of New Scotland formation) ²

 Licking Creek limestone ²

 Mandata formation ²

 Milesburg formation ¹

 †Selingsgrove shale ¹

 Stormville conglomerate ¹

 Stormville hydraulic cement bed or water lime ¹

 Stormville limestone ¹

 Stormville sandstone ¹

 Stormville shale ¹

Silurian and Devonian

 Lewistown limestone ¹

Silurian

 Aquashicola formation ¹

 Barree limestone ¹

 Barree shales ¹

 Bridgeport sandstone (in Wills Creek shale) ¹

 Croasdale quartzite ¹

 †Howard sandstone member (of Tuscarora sandstone) ¹

 Landisburg sandstone ¹

 Logan limestone ¹

 Logan shale ¹

 Lost Creek limestone ¹

 McCoytown sandstone ¹

 Mifflintown limestone ¹

 Poxino Island limestone (in Wills Creek shale) ¹

 Redstone Ridge group ¹

Silurian(?)

 Inwood sandstone ¹

Upper Silurian

 Bloomfield sandstone ¹

 Bloomsburg red beds ¹

United States—Continued

Pennsylvania—Continued

Upper Silurian—Continued**Bossardsville limestone** (as Bossardsville limestone)¹†Poxino Island shale¹*Middle Silurian*Center iron sandstone (in Clinton formation)¹**Keefer sandstone member** (of Clinton formation)¹Lakemont formation¹Swatara iron sandstone (in Clinton formation)¹*Lower Silurian*Castanea sandstone¹**Tuscarora sandstone**¹ or quartzite¹*Ordovician* (see also *Cambrian and Ordovician*)Cattasauqua limestone¹**Cocalico shale**¹†Cove limestone¹†Cove slate¹Dauphin shale²Jonestown beds or formation²Lost Run conglomerate²†Nittany Valley limestone¹Paxton Creek conglomerate (in Martinsburg shale)²West Fairview member (of Martinsburg shale)²*Ordovician(?) or Cretaceous(?)*Conshohocken clay¹*Ordovician(?)***Peach Bottom slate**¹*Upper Ordovician*†Bald Eagle conglomerate¹Bangor beds (in Martinsburg shale)¹**Juniata formation**¹Pen Argyl beds (in Martinsburg shale)¹**Reedsville shale**¹Shochary sandstone member (of Martinsburg formation)²†Tyrone conglomerate¹*Middle Ordovician*Antes shale²Benner limestone²**Chambersburg limestone**¹Clover member (of Loysburg formation)²Coburn formation¹Curtin limestone²Doylesburg member (of Shippensburg formation)²Eyer member (of Hatter formation)²Fannettsburg member (of Shippensburg formation)²Grazier member (of Hatter formation)²Greencastle bed¹Hatter limestone²

United States—Continued

Pennsylvania—Continued

Middle Ordovician—ContinuedHershey limestone²Hostler member (of Hatter formation)²Housum member (of Mercersburg formation)²Kauffman member (of Mercersburg formation)²**Leesport limestone**¹Lehigh limestone¹Mercersburg formation²Myerstown limestone²Nagany limestone²Nazareth cement rock¹Nealmont limestone²Nisky limestone¹Oak Hall member (of Nealmont limestone)²Pinesburg member (of Shippensburg formation)²**Rodman limestone**¹Salona formation¹Shippensburg formation²Snyder member (of Benner limestone)²Stover member (of Benner limestone)²Valley View member (of Curtin limestone)²*Lower Ordovician***Axemann limestone**¹**Bellefonte dolomite**¹**Carlisle limestone**¹Center Hall formation¹Coplay limestone¹**Larke dolomite**¹**Lemont argillaceous limestone member** (of Carlisle limestone)¹Loysburg formation¹**Mines dolomite**¹**Nittany dolomite**¹**Stonehenge limestone** (as member of Beekmantown limestone)¹Valentine formation¹*Lower Ordovician and Cambrian(?)***Conestoga limestone**¹*Cambrian and Ordovician*Annville limestone¹Codorus limestone¹†Lancaster limestone¹†Valley limestone¹†York limestone¹*Cambrian*Blue Ridge conglomerates¹Mountain Creek rock¹South Mountain slates¹Street Road limestone¹*Upper Cambrian*Allentown limestone¹†Buffalo Run limestone¹**Conococheague limestone**¹†Cornwall slates¹

United States—Continued

Pennsylvania—Continued

Upper Cambrian—Continued

Gatesburg formation ¹

Limeport limestone ²

Ore Hill limestone member (of

Gatesburg formation) ¹

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

Tomstown dolomite ¹

†Valley Forge quartzite ¹

Vintage dolomite ¹

Waynesboro formation ¹

White Spot sandstone ¹

†York schist ¹

†York shale ¹

†York County hydromica slates ¹

Precambrian and Lower Cambrian

†Carmargo schist ¹

Precambrian

†Arrowmink arkosic gneiss ¹

†Avondale limestone ¹

†Avondale series ¹

†Buck Ridge gneiss ¹

†Chestnut Hill schists and
gneisses ¹

Doe Run limestone ¹

†Fairmount gneiss ¹

Frankford gneiss ¹

Furnace Creek quartz diorite
gneiss ²

Kennett limestone ¹

Kennett rock ¹

Lafayette serpentine ¹

Manayunk mica schists and
gneisses ¹

Moravian Heights formation ²

†Octoraro schist ¹

Oley Valley slates ¹

†Overbrook granite gneiss ¹

†Philadelphia mica schists and
gneisses ¹

Pickering gneiss ¹

†South Valley Hill slates and
mica schists ¹

United States—Continued

Pennsylvania—Continued

Precambrian—Continued

†State line serpentine ¹

†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

†Millers River conglomerate ¹

Natick arkose ¹

†Newport conglomerate ¹

Paradise conglomerate ¹

Portsmouth conglomerate ¹

Rose Island arkose ¹

Sachuest arkose ¹

Slate Hill shale ¹

Tiverton arkose ¹

Woonsocket conglomerate ¹

†Woonsocket Basin series ¹

Pre-Carboniferous

Metacom granite-gneiss ²

Pennsylvanian and Permian(?)

†Narragansett Basin series ¹

Pennsylvanian

Cranston beds ¹

†Pawtucket formation ¹

Pawtucket shale ¹

Purgatory conglomerate ¹

Rhode Island formation ¹

†Sakonnet sandstone ¹

Sockanosset sandstone ¹

Mississippian(?)

Cowesett granite ¹

East Greenwich group (as granite
group ¹)

Maskerchugg granite ²

Spencer Hill volcanics ²

Devonian or older

Grant Mills granodiorite (as
granite ¹)

Devonian(?) or older

Esmond granite ²

Scituate granite gneiss ²

Precambrian

†Ashton schists ¹

Blackstone series ¹

Cumberland quartzite ¹

United States—Continued

Rhode Island—Continued

Precambrian—ContinuedLittle Compton shales ¹Newport Neck shale ¹†Smithfield limestone member
(of Marlboro formation) ¹*Precambrian*(?)**Absalona formation** ²**Albion schist member** (of West-
boro quartzite) ¹**Hunting Hill greenstone** ²**Mussey Brook schist** ²**Nepsachuck gneiss** ²**Sneech Pond schist** ²**Woonasquatucket formation** ²

South Carolina

Pleistocene†Accabee gravels ¹†Bohicket marl sands ¹†Hampton clays ¹**Horry clay** ²Myrtle Beach peat ²†Sea Island sands or loams ¹†Simmons Bluff beds ¹†Tenmile sands ¹†Wadmalaw shell marl or phase ¹†Wando clays and sands ¹*Pleistocene and Pliocene*(?)†Cheraw cobbles ¹*Pliocene*†Goose Creek marl or phase ¹*Pliocene, lower***Waccamaw formation** ¹*Miocene*†Combahee shale ¹†Salkehatchie marl or phase ¹*Miocene, upper*†Peedee marl ¹†Raysor marl ¹*Miocene, lower*†Edisto marl ¹*Eocene*†Carolinian bed ¹*Eocene, upper, or Oligocene***Cooper marl** ¹†Kings Creek siliceous or phase ¹*Eocene, upper*†Ashley marl ¹**Barnwell sand** ¹; formation in
Georgia†Congaree clay member ¹ (of
McBean formation)†Cooper-Ashley beds ¹†Mount Hope marl or phase ¹*Eocene, middle and upper*†Santee beds ¹*Eocene, middle*†Caw Caw formation or sands ¹**Congaree formation** (as shale) ¹†Orangeburg formation ¹**Santee limestone** ¹**Warley Hill marl** ¹; †phase ¹

United States—Continued

South Carolina—Continued

*Eocene, lower***Black Mingo formation** ¹†Lang Syne beds ¹†Rhems shale ¹†Williamsburg marl ¹*Upper Cretaceous and Pliocene*(?)†Aiken beds ¹*Upper Cretaceous***Black Creek formation** ¹†Burches Ferry marl ¹†Hamburg beds or clays ¹†Middendorf formation ¹**Peedee formation** ¹*Upper Triassic*Hornsboro sandstone or zone ¹*Carboniferous*(?)Table Rock granite ¹*Lower Mississippian***Yorkville quartz monzonite** (as
granite) ¹*Cambrian*(?)Chauga zone ¹Cherokee zone ¹Poor Mountain limestone series ¹*Probably Lower Cambrian***Blacksburg schist** ¹†Cherokee limestone ¹**Gaffney marble** ¹*Precambrian*Abbeville-York zone ¹Anderson-Spartanburg zone ¹**Battleground schist** ¹**Carolina gneiss** ¹Chatooga zone ¹Chesterfield zone ¹Edgefield-Chesterfield zone ¹Keowee zone ¹Oconee Creek zone ¹Saluda zone ¹Spartanburg zone ¹Stevens Creek slates ¹Tunnel Hill zone ¹Tyger zone ¹Vauluse zone ¹York zone ¹

South Dakota

*Pleistocene*Herrick gravels ²Orton gravels ²*Pleistocene (pre-Wisconsin)*Moreau gravels ²*Tertiary, middle*Whitean series ¹*Pliocene*Little White River beds ¹*Miocene to Pliocene*Bijou formation ²*Miocene, upper, or Pliocene, lower*Oak Creek formation ¹*Miocene, lower and middle*Rosebud beds ¹*Oligocene, middle and upper***Brule formation or clay** ¹

United States—Continued

South Dakota—Continued

Oligocene, lower, middle, and upper
White River formation or group¹
Oligocene, lower

 Ahearn member (of Chadron formation)²

 Crazy Johnson member (of Chadron formation)²

 Peanut Peak member (of Chadron formation)²
Eocene or Oligocene

 Ree beds¹
Paleocene
Ludlow member (of Fort Union formation); (as member of Lance formation)¹
Cretaceous

 Ardmore bentonite bed (in Pierre formation)²

 Bull Creek sand (in Hell Creek member of Lance formation)²

 Middle Creek limestone ledge (in Graneros formation)²

 Oacoma zone (in Sully member of Pierre formation)²

 Stoneville member (of Fox Hills sandstone)²

 Sully member (of Pierre formation)²

 †Pierran series¹
Upper Cretaceous

 Agency shale member (of Pierre formation)²

 Blackhorse shales¹
Crow Creek member (of Pierre shale)²
DeGrey member (of Pierre shale)²
Elk Butte member (of Pierre shale)²

 †Ft. Pierre group¹
Fox Hills sandstone¹
Gregory member (of Pierre shale)²

 Hermosa lens (in Newcastle formation)²

 Interior formation¹
Mobridge member (of Pierre shale)²
Orman Lake limestone member (of Greenhorn formation)²
Pierre shale¹

 Rapid City lens (in Newcastle formation)²

 Tilford lens (in Newcastle formation)²
Timber Lake member (of Fox Hills sandstone)²
Trail City member (of Fox Hills sandstone)²
Verendrye member (of Pierre shale)²
Virgin Creek member (of Pierre shale)²

United States—Continued

South Dakota—Continued

Lower Cretaceous
Fall River formation (as sandstone)¹
Fuson member (of Lakota formation); (as shale)¹
Lakota formation (as sandstone)¹
Minnewaste limestone¹ member (of Lakota formation)

Upper Jurassic
Redwater shale member (of Sundance formation)²
Unkpapa sandstone¹
Permian and Triassic
Spearsfish formation¹
Permian
Minnekahta limestone¹
Opeche formation¹ or shale

Pennsylvanian
Minnelusa sandstone¹
Lower Mississippian
Englewood limestone¹
Pahasapa limestone¹
Upper Ordovician
Whitewood limestone¹ or dolomite

Middle Ordovician

 Ice Box shale²

 Roughlock siltstone²
Upper Cambrian
Deadwood formation¹
Precambrian

 Corson diabase¹

 De Smet formation¹

 Ellison formation¹

 Estes system¹

 Flag rock formation²

 Game Lodge granite²

 Garfield formation¹

 Grizzly formation²

 †Harney granite¹
Harney Peak granite¹

 Homestake formation¹

 Lead system¹
Little Elk gneissoid granite²

 Nemo series¹

 Northwestern formation¹

 Pluma formation¹

 Poorman formation¹

 Roubaix group²

 Samelias formation²
Sioux quartzite¹

 West Ledge formation¹

Tennessee

Pleistocene

 Memphis loess¹

 Milan loam¹
Eocene

 †Lagrange formation¹
Paleocene

 †Crainesville horizon¹

 †Flatwoods group¹

 †Middleton formation¹
Porters Creek clay¹ or formation

United States—Continued

Tennessee—Continued

*Cretaceous*Western Valley gravel ¹*Upper Cretaceous*Coffee sand ¹ or formationCoon Creek tongue (of Ripley formation) ¹McNairy sand or sand member (of Ripley formation) ¹†McNairy shell bed ¹*Pennsylvanian*†Bon Air Measures ¹†Brushy Mountain Measures ¹†Clifty shale ¹Crossville sandstone (in Duskin Creek formation) ²Duskin Creek formation ¹†Emory sandstone ¹Etna sandstone ¹Fentress shale division (in Lee formation) ¹Frozenhead grit (in Anderson sandstone) ¹Herbert conglomerate ¹Jellico formation ¹†Monterey conglomerate ¹Newton sandstone ¹Pilot Knob sandstone ¹Pioneer sandstone ¹†Tracy City Measures ¹Walden sandstone ¹Windrock sandstone ¹*Middle Pennsylvanian*Anderson sandstone ¹Bryson formation ¹Mingo formation ¹Scott shale ¹Wartburg sandstone ¹*Lower and Middle Pennsylvanian*Briceville shale ¹*Lower Pennsylvanian*Bonair sandstone ¹Eastland shale lentil (in Bonair sandstone) ¹Gizzard formation ¹; member (of Lookout sandstone in Georgia)Sewanee conglomerate ¹ or member (of Lookout sandstone)Vandever shale ¹Warren Point sandstone member (of Gizzard formation) ¹Whitwell shale ¹*Mississippian*†Glendale shale ¹†Harpeth shale ¹Newman limestone ¹†Newman sandstone lentil (in Newman limestone) ¹†Tullahoma formation ¹*Upper Mississippian*Garrett Mill sandstone member (of Warsaw formation) ¹

United States—Continued

Tennessee—Continued

*Lower Mississippian*Eulie shale ²Maury formation (as member of Ridgetop shale) ¹Ridgetop shale ¹Short Mountain facies (of Fort Payne formation) ²Westmoreland shale ²*Devonian or Carboniferous*Cumberland Gap shale member (of Chattanooga shale) ¹Olinger gray shale member (of Chattanooga shale) ¹*Devonian and Mississippian*Chattanooga shale ¹Grainger shale ¹ or formation*Upper Devonian or Mississippian*Swan Creek phosphate ¹*Upper Devonian*Bransford sandstone bed (in Gassaway member of Chattanooga shale) ²Dowelltown member (of Chattanooga shale) ²Gassaway member (of Chattanooga shale) ²Hardin sandstone member (of Chattanooga shale) ¹Trousdale shale ¹*Lower or Middle Devonian*Camden chert ¹Pegram limestone ¹*Lower Devonian*Bear Branch limestone member (of Olive Hill formation) ¹Birdsong shale ¹Cypress Creek chert ¹Decaturville chert ¹Flat Gap limestone member (of Olive Hill formation) ¹Harriman chert ¹Linden group ¹Olive Hill formation ¹Pyburn limestone member (of Olive Hill formation) ¹Quall limestone ¹Rockhouse shale ¹Ross limestone member (of Olive Hill formation) ¹*Silurian and Devonian*†Harpeth and Tennessee River group ¹*Upper Silurian and Devonian*Hancock limestone ¹ or dolomite*Upper Silurian*Decatur limestone ¹†Sneedville limestone ¹*Middle Silurian*Beech River shaly limestone member (of Brownsport formation) ¹

United States—Continued

Tennessee—Continued

Middle Silurian—Continued

Bledsoe limestone ¹
Bob crystalline limestone member (of Brownsport formation) ¹
Brownsport formation ¹

Centerville limestone ¹
Clifton formation ¹
Dixon earthy limestone member (of Wayne formation) ¹

†Gant bed ¹

Glenkirk limestone ¹
Lego limestone member (of Wayne formation) ¹
Lobelville shaly limestone member (of Brownsport formation) ¹

Maddox limestone ¹

Newsom shaly clay ¹

South Tunnel bed ¹
Wayne formation ¹

White Oak Mountain sandstone ¹

Whites Bend limestone ¹
Lower and Middle Silurian
Clinch sandstone ¹ or quartzite

Rockwood formation ¹
Lower Silurian

†Baker limestone ¹
Ordovician
Bays formation (as sandstone) ¹

Inman formation ²
Upper Ordovician and Silurian

†Clinch Mountain sandstone ¹
Upper Ordovician

Camargo formation ²

College Hill limestone ¹
Fernvale limestone ¹ or formation ¹
Leipers limestone ¹

†Leipers Creek limestone ¹
Mannie shale (as clay) ¹
Sequatchie formation ¹

Swan Creek limestone ¹
Middle and Upper Ordovician

†Nashville group ¹

Normandy limestone ¹
Middle Ordovician

Athens shale ¹
Bigby limestone ¹
Cannon limestone ¹

†Capitol limestone ¹
Blount group ¹
Carters limestone (as member of Lowville limestone) ¹
Catheys limestone ¹
Chapman Ridge sandstone ²
Douglas Lake member (of Lenoir limestone) ²

Farragut limestone ²
Hermitage formation ¹ or limestone

United States—Continued

Tennessee—Continued

Middle Ordovician—Continued

Holston marble, limestone ¹ or formation

Lebanon limestone ¹
Lenoir limestone ¹
Meadow marble member (of Sevier shale) ¹
Mosheim member (of Lenoir limestone); (as limestone) ¹

Mount Pleasant phosphate ¹
Murfreesboro limestone ¹
Ottoese shale or limestone ¹
Pierce limestone ¹
Ridley limestone ¹

†Salttilo limestone ¹
Sevier shale ¹ or formation

Speers Ferry formation ²
Stones River group or limestone ¹

Strasburg limestone ²
Tellico formation or sandstone member (of Sevier shale); (as sandstone) ¹

Ward limestone ¹

†Wells limestone ¹
Wells Creek dolomite (as limestone) ¹
Whitesburg limestone ¹ member (of Blockhouse shale)

Lower, Middle, and Upper Ordovician

†Central limestone and shale group ¹
Chickamauga limestone ¹
Lower Ordovician

Forked Deer limestone ¹

†Glade limestone ¹

Grasselli dolomite (in Kingsport formation) ²

Heiskell shale ¹
Jonesboro limestone ¹
Kingsport formation or dolomite ²

†Knoxville marble ¹

†Lebanon group ¹
Mascot dolomite ²

Thorn Hill formation ¹

Vestal limestone ¹

†Wells chert ¹
Cambrian and Lower Ordovician

†Knoxville group ¹
Upper Cambrian and Lower Ordovician
Knox dolomite ¹ or group

Upper Cambrian
Bloomingdale limestone member ¹ (of Conococheague-Copper Ridge formation)

Copper Ridge dolomite ¹

Greenville dolomite ¹
Maynardville limestone ¹ member (of Nolichucky shale); formation in Virginia

United States—Continued

Tennessee—Continued

Upper Cambrian—Continued

Morristown dolomite member ¹
(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

Hampton 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 conglomer-
ate) ¹

Copperhill formation ²

Linville metadiabase ¹

Ocoee series (as group) ¹

Pigeon slate ¹ or siltstone

Roan gneiss ¹

Sandsuck formation (as shale) ¹

Thunderhead sandstone (as con-
glomerate) ¹

Wilhite 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 ²

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 ²

Potato Hill andesite ²

Pruett formation ²

Seven Springs formation ²

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 ²

Tertiary or younger

Butcherknife basalt ²

Pliocene

†Blanco Canyon beds ¹

Clarendon beds ¹

Coetas formation ¹

Goliad sand ¹

Labahia member (of Goliad for-
mation) 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

United States—Continued

Texas—Continued

Pliocene(?)

 Hockley Mound sand member
(of Willis sand)¹

 Uvalde gravel¹

 †Willis feruginous sand member¹
(of Willis sand)

 Willis sand¹
Pliocene, middle

 Blanco formation¹

 Bridwell formation²
Pliocene, lower

 Couch formation²

 Hemphill beds¹
Miocene and Pliocene

 Dewitt formation¹

 Dugout clay and gravel¹

 †Navasota beds¹
Miocene

 Moulton sandstone member (of
Oakville formation)²

 Oakville sandstone¹

 Onalaska clay¹
Miocene(?)

 Lagarto clay¹

 Rawls basalt²

 †Rockland sandstone¹
Miocene, upper, and Pliocene(?)

 Burkeville beds¹

 †Fleming clay or group¹
Miocene, upper

 Cuero formation²
Miocene(?), lower(?)

 Chita sand member (of Cata-
houla formation)¹

 Corrigan formation¹

 Dunlap Quarry sandstone mem-
ber¹ (of Catahoula formation)

Oligocene or younger

 Tascotal formation²
Oligocene and younger(?)

 Decie member (of Duff forma-
tion)²
Oligocene and Miocene(?)

 Gueydan group¹
Oligocene or Miocene, lower

 Chusa tuff member (of Cata-
houla tuff)¹

 Fant tuff member (of Catahoula
tuff)¹

 †Gueydan formation¹

 Soledad volcanic conglomerate
member (of Catahoula tuff)¹
Oligocene

 Anahuac formation² (subsur-
face)

 Driscoll-Sevier sand² (subsur-
face)

 Flour Bluff sand² (subsurface)

 Old Ocean shale² (subsurface)

 Pierce Estate sands² (subsurface)

 Van Vleck sands² (subsurface)

United States—Continued

Texas—Continued

Oligocene(?)

 Frio clay¹

 Quitman quartz monzonite²

 Refugio sand¹ (subsurface)

 Saxet sand¹ (subsurface)

 †Yeager clay¹
Oligocene, middle

 Greta sand¹ (subsurface)

Eocene to Miocene(?)

 Buck Hill volcanic series²
Eocene

 †Angellna County beds¹

 Buttsgin formation¹

 Cartright sand¹ (subsurface)

 Christine member (of Yegua for-
mation)²

 Cistern member (of Yegua for-
mation)²

 Cole sand¹ (subsurface)

 Crockett member¹ (of Claiborne
formation)

 Diboll member¹ (of Jackson for-
mation)

 Dime Box member (of Yegua for-
mation)²

 †Elstone formation¹

 Gazley Creek sands and clays¹

 Holzmark sand¹ (subsurface)

 †Lipan beds¹

 Low Creek beds¹

 †Lufkin beds¹

 Lufkin member (of Cook Moun-
tain formation)¹

 †Lytton formation¹

 Manning beds¹ (see p. 621)

 †Myrick formation¹

 Northrip member (of Yegua
formation)²

 †Sabine River beds¹

 Seco formation¹

 †Squirrel Creek formation¹

 †Timber Belt beds¹

 Turkey Creek beds (in Yegua
formation)¹

 †Webb Bluff¹ (greensand marls)

 Yegua River conglomerate (in
Yegua formation)¹
Eocene(?)

 Uvalde phonolite¹
Eocene, upper

 Agua Verde shale member (of
Fayette formation)²

 Bedias sandstone member¹ (of
Wellborn formation)

 Cadell formation (as clay¹)

 Calliham sand¹ (see p. 621)

 Carlos sandstone member¹ (of
Wellborn formation)

 Conroe sand¹ (subsurface)

 Dilworth sand¹ (see p. 621)

 Driscoll sand¹ (subsurface)

United States—Continued

Texas—Continued

Eocene, upper—ContinuedDubose sands and clays¹ (see p. 621)Falls City shale¹Fashing clays¹ (see p. 621)Fayette sandstone¹Glendale beds¹Gorgora shale member (of Fayette formation)²Government Wells sand¹ (subsurface)Grawunder sand¹ (subsurface)Gutoskey sand¹ (subsurface)Jacob sand¹ (subsurface)McElroy member (of Fayette sandstone)¹ (see p. 621)Mirando sand¹ (subsurface)Mirando City sand¹ (subsurface)Mitchells Ferry beds¹Nichols sand¹ (subsurface)Olmos sand¹Petters sand¹ (subsurface)Resendez shale member (of Fayette formation)²Rock Prairie sandstone²Salineno sandstone member (of Fayette formation)¹Simms sand¹ (subsurface)Stones Switch sand¹ (see p. 621)Wellborn sandstone¹Whitsett formation (as beds¹) (see p. 621)Wooleys Bluff clays¹Yuma sandstone member¹ (of Manning formation)*Eocene, middle*Arp sand member (of Reklaw formation)²Bigford member (of Mount Selman formation)²Byran sandstone²Carrizo sand¹Cook Mountain formation¹Easterwood shales²Eaton green sand lentil (in Claiborne group)¹Falcon sandstone member (of Cook Mountain formation)¹Garceno sandstone member (of Cook Mountain formation)²Hurricane marine lentil (in Landrum member of Cook Mountain formation)²Jennings sand¹ (subsurface)José shale member (of Yegua formation)²Landrum shale member (of Crockett formation)²La Perla shale member (of Yegua formation)²Laredo formation²Little Brazos limestone lentil (in Claiborne group)¹Loma Blanca tongue (of Yegua formation)²

United States—Continued

Texas—Continued

Eocene, middle—ContinuedLos Arrieros shale member (of Yegua formation)²Marquez shale member (of Reklaw formation)²Mills bed¹Moseley limestone lentil¹ (in Crockett member of Cook Mountain formation)Mount Selman formation¹Mount Tabor shale member (of Crockett formation)²Nacogdoches beds¹Newby glauconitic sand member (of Reklaw formation)²Noonday greensand¹Omen member (of Mount Selman formation)¹Palafox sandstone member (of Mount Selman formation)¹Queen City sand member (of Mount Selman formation)¹Reklaw member (of Mount Selman formation)¹San Augustine group¹Schott sand¹ (subsurface)Serbin sand lentil (in Mount Tabor member of Yegua formation)²Smetana sandstone²Spiller sand member (of Crockett formation)²Stone City beds¹Tabor member (of Crockett formation)²Therrill clay member (of Weches formation)²Tuleta sand¹ (subsurface)Two Mile member (of Crockett formation)²Tyler greensand member (of Sparta sand)¹Tyus member (of Weches formation)²Veleno member (of Cook Mountain formation)²Viesca member (of Weches formation)²Webster sand¹ (subsurface)Weches greensand member (of Mount Selman formation)¹Weiss sand¹ (subsurface)Wheelock marl member (of Crockett formation)²Yegua formation¹*Eocene, lower*Butler clay member (of Rockdale formation)¹Caldwell Knob member (of Sequin formation)¹Calvert Bluff clay beds (of Rockdale formation)¹Hilbig zone¹ (in Rockdale formation)Hooper formation²Indio formation¹

United States—Continued

Texas—Continued

Eocene, lower—Continued

- Losoya Creek conglomerate (in Sabinetown formation)¹
- Pendleton formation²
- Pendleton Ferry formation²
- Pendleton zone¹
- Rockdale formation¹
- †Sabine formation¹
- Sabinetown formation¹
- Seguin formation¹
- Simsboro sand member (of Rockdale formation)¹
- Solomon Creek member (of Seguin formation)¹
- †Tehuacana formation¹

Paleocene

- Kerens member** (of Wills Point formation)¹
- Kincaid formation¹**
- Littig glauconitic member** (of Kincaid formation)¹
- Lone Oak 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 formation¹**
- †Wortham aragonite lentil (in Wills Point formation)¹

Cretaceous

- †Cross Timbers¹ (sands or formation)
- Kanawha volcanic zone (of Eagleford formation)²
- Kirschberg evaporite (in Edwards limestone)²
- Lake Crockett formation²
- Lasca formation²
- Medill volcanic zone (of Eagleford formation)²
- Pine Bluff volcanic zone (of Eagleford formation)²
- Tarantula formation²

Cretaceous(?)

- Iron Mountain intrusive¹
- Ojo Bonito porphyry¹
- Toborg sand¹ (subsurface)

Upper Cretaceous and Tertiary
Chisos volcanics (as beds¹)

Upper Cretaceous

- Aguja formation¹**
- Anacacho limestone¹**
- Annona chalk¹**
- Arcadia Park formation¹
- Austin chalk¹**
- †Bexar¹ [unit]
- Black Prairie series¹

United States—Continued

Texas—Continued

Upper Cretaceous—Continued

- Blossom sand¹**
- †Blue Bluffs division¹
- Bluebonnet member (of Lake Waco formation)²
- Bonham marl¹**
- Boquillas flags¹**
- Bouldin member (of Lake Waco formation)²
- Britton clay¹
- Buda limestone¹**
- Burditt marl¹
- Carpenter bed¹
- Carpenter limestone member** (of Grayson formation)²
- Chispa Summit formation¹
- †Cline¹ (beds)
- Cloice member (of Lake Waco formation)²
- Colquitt formation¹
- Cooledge chalk¹
- Corsicana marl¹**
- Crown conglomerate¹
- †Dallas limestone¹
- †Del Rio clay¹
- Dessau formation²
- Dexter member** (of Woodbine formation)¹
- Durango sand member** (of Taylor marl)¹
- Eagle bed¹
- Eagle Ford shale, clay¹ or formation**
- Eagle Mountains sandstone member** (of Grayson formation)²
- Eagle Pass formation¹**
- Ector tongue** (of Austin chalk)¹
- Edens sand¹ (subsurface)
- Eldorado sand¹ (subsurface)
- Escondido formation¹**
- Eules member** (of Woodbine formation)²
- Farias beds¹
- 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 series¹**
- Kemp clay¹**
- †Kickapoo marl¹
- Lake Waco formation²
- Lewisville formation or member** (of Woodbine formation); (as marine member of Woodbine sand¹)
- †Lott chalk member (of Taylor marl)¹
- Lytton Springs sand¹ (subsurface)
- †Marlin chalk member (of Taylor marl)¹

United States—Continued

Texas—Continued

Upper Cretaceous—ContinuedMorrow pay sand ¹ (subsurface)Navarro group ¹ or formationNeylandville marl ¹Olmos formation ¹Pecan Gap chalk member (of Taylor marl) ¹Pepper shale member (of Woodbine formation); (as formation) ¹Pilot Knob tuff ²Powell sand ¹ (subsurface)†Pinto limestone ¹†Pulliam formation ¹†Rattlesnake beds ¹Red Branch member (of Woodbine formation) ²†Red River group ¹Rogers chalk lens (in Taylor marl) ¹†Roxton beds ¹St. Edwards tuff ²San Carlos formation ¹San Miguel formation ¹South Bosque marl ¹†sub-Clarksville sand ¹ (subsurface)Tarrant formation ¹ or member (of Lewisville formation)Taylor marl ¹Templeton member (of Woodbine formation) ²Terlingua clay ¹Thrall sand ¹ (subsurface)†Timber Creek beds ¹†Timber Creek group ¹Tornillo clay ¹Upson clay ¹Valverde flags ¹Vieja series ¹Webberville beds ¹Wolfe City sand member (of Taylor marl) ¹Woodbine sand, clay, ¹ or formation*Lower and Upper Cretaceous*Comanche series ¹*Lower Cretaceous*†Austin marble ¹Bacon limestone member (of Ferry Lake formation) ² (subsurface)†Barton Creek limestone ¹Bluff bed ¹Bluff Dale sand (in Travis Peak formation) ¹Bluff Mesa formation ²Bonnellian series ¹Boracho sandstone ²†Bosque division ¹Burnt limestone ²Caddo Levee Board horizon ¹ (subsurface)Campagrande formation ¹

United States—Continued

Texas—Continued

Lower Cretaceous—ContinuedCarr sand ¹ (subsurface)Cedar Park member ¹ (of Walnut clay)†Choctaw limestone ¹†Comanche Peak group ¹Comanche Peak limestone ¹Cow Creek limestone member (of Travis Peak formation or Pearsall formation); (as beds ¹)Cox sandstone ¹Cuchillo formation ¹Dees horizon or sand ¹ (subsurface)†Denison formation ¹Denton clay (as member of Denison formation) ¹Devils River limestone ¹Duck Creek limestone (as formation) ¹Edwards limestone ¹Espy formation ²Etholen conglomerate ¹Finlay limestone ¹Fort Worth limestone ¹Fredericksburg group ¹Gatesville formation ¹†Gainesville ¹ [group]Galt sand ¹ (subsurface)Georgetown limestone ¹Glen Rose limestone ¹ or formation†Grand Prairie formation ¹Hensell sand member (of Travis Peak formation) ¹ or shale member (of Pearsall formation) in subsurfaceHill sand horizon ¹†Leander beds ¹Main Street limestone (as member of Denison formation) ¹Maness shale member (of Tyler formation) ² (subsurface)†Marietta beds ¹Maxon sandstone ¹Mountain bed ¹Muleros sandstone ¹†North Denison sand ¹Paluxy sand ¹ or formationPawpaw formation (as sandy member of Denison formation) ¹Pearsall formation ² (subsurface)†Pottsboro subgroup ¹Presidio formation ¹†Preston formation ¹Quitman bed ¹Shafter limestone ¹Shingle Hills formation ²†Shoal Creek limestone ¹South Tyler formation ² (subsurface)Sycamore sand (in Travis Peak formation) ¹

United States—Continued

Texas—Continued

Lower Cretaceous—Continued

 Thorp Springs limestone ¹

 Torcer formation ¹

 Travis Peak formation ¹

Travis Peak limestone (in Travis

 Peak formation) ¹

 Trinity group or sand ¹

 Trinityan series ¹

 University Mesa marl ¹

 Walnut clay ¹; shaly member (of
Goodland limestone) ¹ in NE
Texas

 †Washita limestone ¹

 Weatherford lime rock ¹ (subsur-
face)

 Weno limestone or clay (as clay
member of Denison forma-
tion) ¹

 †Weno subgroup ¹

 Yucca formation (as bed ¹)

Upper Jurassic

 Malone formation ¹

Triassic

 Bissett conglomerate ¹

 Camp Springs conglomerate ¹

 Dockum group ¹

 Dockuman series ¹

 Tecovas formation ¹

 Trujillo formation ¹

Permian and Triassic

 †Brazos series ¹

Permian

 Abilene formation ¹

 Acme dolomite (in Blaine forma-
tion) ¹

 Albanian series ¹

 †Albany formation ¹

 Alta formation ¹

 Apache limestone ¹

 Aspermont dolomite ¹

 Bayloran series ¹

 Beaverburk limestone ¹

 Big Lake lime ¹ (subsurface)

 †Blowout Mountain sandstone ¹

 Bluff bone bed ¹

 †Bone Canyon limestone ¹

 Briggs formation ²

 Buffalo Hill sandstone ¹

 Childress dolomite member (of
Marlow formation); (as mem-
ber of Dog Creek shale ¹)

 Chinati series ¹

 Cibolo formation ¹

 Cieneguita beds ¹

 Claytonville dolomite ¹

 Claytonville gypsum ¹

 †Coleman division ¹

 Coleman bed, clay, or limestone
(in Admiral formation) ¹

 Croton gypsum ¹

 Culberson series ¹

 Delaware Mountain sandstone ¹

United States—Continued

Texas—Continued

Permian—Continued

 †Dos Alamos gypsum member (of
Delaware Mountain forma-
tion) ¹

 †Dothan limestone (in Moran
formation) ¹

 †Double Mountain formation ¹

 Doublian series ¹

 Dozier sandstone member (of
Rush Springs formation); (as
member of Peacock forma-
tion) ¹

 Eskota beds ¹

 Eskota dolomite or gypsum ¹

 †Frijole limestone member (of
Delaware Mountain forma-
tion) ¹

 Frijole shale ¹

 Fulda sandstone ¹

 Glass Mountains formation ¹

 Groesbeck dolomite ¹

 Guthrie dolomite ¹

 Hardin School limestone ¹

 Hartgrove limestone member (of
Talpa formation) ¹

 Hart School bed (in Moran
formation) ¹

 Hueconian ¹ (series)

 Indian Creek shale member (of
Admiral formation) ¹

 Lake Kemp limestone (in Lueders
formation) ¹

 Lake Lytle limestone ¹

 Lake Trammel sandstone ¹

 Limpia ¹ (limestone)

 Lytle limestone ¹

 McCaulley dolomite ¹

 Maravilla dolomite ¹

 Maybelle limestone ¹

 †Memphis sandstone (in Peacock
formation) ¹

 Millersview limestone member
(of Grape Creek formation) ¹

 Mina Grande formation ²

 †Moran limestone member (of
Moran formation) ¹

 Morrison sand ¹ (subsurface)

 Oriana gypsum member (of Pea-
cock formation) ¹

 Otero limestone ¹

 Paint Rock bed ¹

 †Peacock formation ¹

 Putnam limestone (in Putnam
formation) ¹

 Putnam sandstone (in Putnam
formation) ¹

 Quanah gypsum ¹

 Royston formation ¹

 †Rustler Springs formation ¹

 Shultz limestone member (of
Talpa formation) ¹

 Sweetwater dolomite ¹

 Swenson gypsum member ¹ (of
Peacock formation)

United States—Continued

Texas—Continued

Permian—ContinuedTexon sand ¹ (subsurface)Tye formation ¹Wagon Yard gypsum ¹Wahs Creek shale (in Moran formation) ¹Ward gypsum ¹†Wichita conglomerate (in Clear Fork formation) ¹Winkler Ford limestone member (of Grape Creek formation) ¹Yates sandstone ² (subsurface); formation ² (subsurface and surface in New Mexico)Yoakum dolomite member (of Queen formation) ² (subsurface)*Permian (Ochoa)*Castile gypsum ¹ or formationCowden anhydrite member (of Salado formation) ²Dewey Lake redbeds ² (subsurface)Rustler formation ¹ or limestone ¹Salado formation (as halite ¹); (subsurface and surface)Tessey limestone ¹*Permian (Guadalupe)*Alibates dolomite lentil (of Quartermaster formation) ¹Altuda formation (as shaly member of Capitan limestone ¹)Bell Canyon formation ²Brushy Canyon formation ²Capitan limestone ¹Cherry Canyon formation ²Delaware Mountain group (as formation ¹)Getaway limestone member (of Cherry Canyon formation) ²Gilliam thin-bedded member (of Capitan limestone) ¹Goat Seep limestone ²Guadalupe series (as group ¹)Hegler limestone member (of Cherry Canyon formation) ²Lamar limestone member (of Bell Canyon formation); (as member of Delaware Mountain formation ¹)McCombs limestone member (of Bell Canyon formation) ²Manzanita limestone member (of Cherry Canyon formation) ²Pinery limestone member (of Cherry Canyon formation) ²Rader limestone member (of Cherry Canyon formation) ²Ross Mine formation ²Saddlehorse gypsum lentil (of Quartermaster formation) ¹South Wells limestone member (of Cherry Canyon formation) ²

United States—Continued

Texas—Continued

Permian (Guadalupe)—ContinuedVidrio limestone member (of Word formation); (as member of Capitan limestone ¹)Word formation ¹*Permian (Leonard-Guadalupe)*Pipeline shale ²*Permian (Leonard)*Arroyo formation ¹Bone Spring limestone ¹Bullwagon dolomite ¹ member (of Vale formation)Choza formation ¹Clear Fork group (as formation or group ¹)Collingsworth gypsum member (of Blaine formation) ¹Cutoff shaly member (of Bone Spring limestone) ²Hess limestone member (of Leonard formation) ¹Kirby Lake dolomite ²Leonard formation ¹ or seriesMerkel dolomite member (of Choza formation); (as member of Clear Fork formation ¹)Pease River group ²Rainy limestone member (of Arroyo formation); (as member of Clear Fork formation ¹)San Angelo sandstone ¹Sprayberry sandstone ² (subsurface)Standpipe limestone member (of Arroyo formation); (as member of Clear Fork formation ¹)Vale formation ¹Victorio Peak gray member (of Bone Spring limestone) ¹*Permian (Leonard?)*Bead Mountain limestone member (of Belle Plains formation) ¹Belle Plains formation ¹Clyde formation ¹Elm Creek limestone member (of Belle Plains formation); (as member of Admiral formation ¹)Grape Creek limestone member (of Clyde formation) ¹Jagger Bend limestone ¹ member (of Belle Plains formation)Jim Ned shale member (of Belle Plains formation) ²Lueders limestone ¹Talpa limestone ¹ member (of Clyde formation)Valera shale ¹ member (of Belle Plains formation)Voss shale member (of Belle Plains formation) ²

United States—Continued

Texas—Continued

Permian (Leonard? and Wolfcamp)
Wichita formation or group¹
Permian (Wolfcamp)
Admiral formation¹
Camp Colorado limestone member (of Pueblo formation)¹
Camp Creek shale member (of Pueblo formation)¹
Coleman Junction limestone member (of Putnam formation)¹
Coon Mountain sandstone member (of Pueblo formation)¹
Dean sandstone² (subsurface)

Deer Mountain red shale member (of Hueco formation)¹
Fisk formation²
Gouldbusk limestone member (of Moran formation)²
Hordes Creek limestone member (of Admiral formation)¹
Horse Creek limestone member (of Moran formation)¹
Hueco limestone¹
Ibex limestone²
Kriz lens (in Hueco formation)²
Lost Creek shale member (of Admiral formation)¹
Moran formation¹
Overall limestone member (of Admiral formation)²
Powwow conglomerate member (of Hueco limestone)¹
Pueblo formation¹
Putnam formation¹
Saddle Creek limestone member (of Pueblo formation); (as member of Harpersville formation)¹
Salt Creek Bend shale¹ member (of Pueblo formation)

Santa Anna shale member (of Moran formation)¹
Santa Anna Branch shale member (of Putnam formation)¹
Sedwick limestone member (of Moran formation)¹
Stockwether limestone member (of Pueblo formation)¹
Waldrip member (of Pueblo formation); (as member of Harpersville formation)¹
Watts Creek shale member (of Moran formation)¹
Wildcat Creek shale member (of Admiral formation)²
Wolfcamp formation¹ or series

Carboniferous

 Cimarronian series¹

 Wichitan series¹

 Wiley dolomite¹
Pennsylvanian

 Antelope Creek bed (in Strawn formation)¹

United States—Continued

Texas—Continued

Pennsylvanian—Continued

 Archer County sand¹ (subsurface)

 Balsora limestone (in Palo Pinto formation)²

 Barton Creek limestone (in Millsap Lake formation)¹

 Bend sand¹ (subsurface)

 Berino member (of Magdalena formation)²

 Big Valley bed¹

 Binney sand¹ (subsurface)

 Bishops Cap member (of Magdalena formation)²

 Bond sand¹ (subsurface)

 Boone Creek limestone member (of Palo Pinto limestone)¹

 Brannon limestone member (of Millsap Lake formation)¹

 Brannon Bridge limestone (in Millsap Lake formation)¹

 †Breckenridge formation¹

 Breckenridge lime¹ (subsurface)

 Brelsford sand¹ (subsurface)

 Brick Yard limestone¹

 Bridgeport limestone (in Palo Pinto formation)¹

 Brown Creek bed (in Strawn formation)¹

 †Brownwood division¹

 Bryson sand¹ (subsurface)

 Buck Creek sandstone¹

 Buffalo Creek bed (in Strawn formation)¹

 Bull Creek sandstone (in Strawn formation)¹

 †Bunger formation¹

 Burkburnet sands¹ (subsurface)

 Burkett sand¹ (subsurface)

 Burnt Branch bed (in Strawn formation)¹

 Buttram sand¹ (subsurface)

 Caddo limes¹ (subsurface)

 Chico Ridge limestone (in Graford formation)¹

 Childers sand¹ (subsurface)

 Cisco Lake sandstone²

 †Clear Creek limestone member (of Graford formation)¹

 Comanche Creek bed (in Strawn formation)¹

 Cook sand¹ (subsurface)

 Cottonwood Creek beds (in Strawn formation)¹

 Cross Cut sand¹ (subsurface)

 Cross Plains sand¹ (subsurface)

 Cundiff limestone (in Caddo Creek formation)¹

 Dalmar sand¹ (subsurface)

 Dennis Bridge limestone (in Millsap Lake formation)¹

 Desdemona sand¹ (subsurface)

 Devils Den limestone (in Graford formation)¹

United States—Continued

Texas—Continued

Pennsylvanian—ContinuedDickerson member (of Millsap Lake formation)¹**Dimple limestone**¹Dobbs Valley sandstone (in Millsap Lake formation)¹Dog Bend limestone (in Mineral Wells formation)¹Dugout beds¹Earnest sand¹ (subsurface)†Eastland formation¹†Eastland limestone member (of Caddo Creek formation)¹Eastland sandstone (in Graham formation)¹Elliott Creek bed (in Strawn formation)¹Elm Creek limestone¹Eolian limestone member (of Pueblo formation)¹Finis shale member (of Graham formation)¹Fox Ford bed (in Strawn formation)¹Fry sand¹ (subsurface)**Gaptank formation**¹Goen limestone (in Millsap Lake formation)¹Gonzales Creek shale member (of Graham formation)¹†Gonzales shale¹Gordon sandstone (in Strawn formation)¹Gose sand¹ (subsurface)†Graford limestone member (of Graford formation)¹Grindstone Creek member (of Millsap Lake formation)¹†Gunsight formation¹Gwinnup sand¹ (subsurface)Hanna Valley bed (in Strawn formation)¹Harris sand¹ (subsurface)**Haymond formation**¹Hill Creek beds member (of Millsap Lake formation)¹Hodges sand¹ (subsurface)Hog Mountain sandstone (in Mineral Wells formation)¹Horse Creek clay and shale (in Strawn formation)¹Hudson Bridge limestone (in Palo Pinto formation)¹Indian Creek bed (in Strawn formation)¹†Jacksboro formation¹Jasper Creek shale (in Graford formation)¹Keechi Creek shale and sandstone (in Mineral Wells formation)¹Kickapoo Falls limestone (in Millsap Lake formation)¹Kissinger sand¹ (subsurface)Lake sandstone¹ (subsurface)

United States—Continued

Texas—Continued

Pennsylvanian—ContinuedLake Bridgeport shale¹La Tuna member (of Magdalena formation)²Lazy Bend member (of Millsap Lake formation)¹Lone Camp limestone (in Mineral Wells formation)¹Lower Freeman-Hampton sand¹ (subsurface)Lynch Creek bed (in Strawn formation)¹McClesky sand¹ (subsurface)McMillan sand¹ (subsurface)Martin Lake limestone (in Palo Pinto formation)¹Meek Bend limestone (in Millsap Lake formation)¹Milburn shale¹†Millsap division (in Strawn group)¹Moutray sand¹ (subsurface)Necessity shale member (of Graham formation)¹Noodle Creek lime¹ (subsurface)Nimrod limestone¹Nimrod shale (in Pueblo formation)¹Olden sand¹ (subsurface)Oran sand lentil (in Graford formation)¹Posideon shale member (of Graford formation)¹†Ranger formation¹Ranger oil sand¹ (subsurface)†Ranger series¹Ray sand¹ (subsurface)†Richland sandstone¹Ricker Station limestone member (of Grindstone Creek formation)²Rochelle conglomerate (in Graford formation)¹Rockhill limestone (in Graford formation)¹Rough Creek bed (in Strawn formation)¹†Rough Creek shale member (of Tesnus formation)¹Salesville shale member (of Mineral Wells formation)¹Sanders Bridge limestone (in Palo Pinto formation)¹Santo limestone (in Millsap Lake formation)¹Seaman Ranch shale member (of Brad formation)¹Shadrick Mill sandstone (in Strawn formation)¹South Bend sandstone and shale (in Graham formation)¹†Speck Mountain clay (in Thrifty formation)¹

United States—Continued

Texas—Continued

Pennsylvanian—Continued

Spring Creek bed (in Strawn formation)¹

Stephens lime¹ (subsurface)

Steussy shale member (of Mill-sap Lake formation)¹

Swastika sand¹ (subsurface)

Tesnus formation¹

Thurber sand¹ (subsurface)

†Trickham bed (in Graham formation)¹

Veale sand¹ (subsurface)

Ventioneer bed (in Brad formation)¹

Village Bend limestone (in Mineral Wells formation)¹

†Waldrip bed¹

†Waldrip division¹

†Waldrip limestone member (of Harpersville formation)¹

White Ranch limestone (in Graham formation)¹

Wilbarger Creek bed (in Strawn formation)¹

Willow Point limestone (in Palo Pinto formation)¹

Wilmot¹ [sand] (subsurface)

Wizard Wells limestone (in Graford formation)¹

Wolf Mountain shale member (in Graford formation)¹

Upper Pennsylvanian

Adams Branch limestone member (of Graford formation)¹

Avis sandstone member (of Graham formation); (as member of Thrifty formation)¹

Belknap limestone member (of Thrifty formation); (as member of Harpersville formation)¹

Blach Ranch limestone member (of Thrifty formation)¹

Bluff Creek shale member (of Graham formation)¹

Brad formation¹

Breckenridge limestone member (of Thrifty formation)¹

Brownwood shale member (of Graford formation)¹

Bunger limestone member (of Graham formation)¹
Caddo Creek formation²

Canyon group¹

Cedarton shale member (of Graford formation)¹

Chaffin limestone member (of Thrifty formation)¹

Cisco group¹

Colony Creek shale member (of Caddo Creek formation); (as shale²)

Craddock clay²

United States—Continued

Texas—Continued

Upper Pennsylvanian—Continued

Crystal Falls limestone member (of Thrifty formation); (as member of Harpersville formation)¹

Curry clay²

Fincher sand¹ (subsurface)

Gonzales limestone member (of Graham formation)¹
Graford formation¹
Graham formation¹
Gunsight limestone member (of Graham formation)¹

†Harpersville formation¹

†Hog Creek shale member (of Caddo Creek formation)¹
Home Creek limestone member (of Caddo Creek formation)¹
Ivan limestone member (of Graham formation); (as member of Thrifty formation)¹
Jacksboro limestone member (of Graham formation)¹
Lohn shale member (of Thrifty formation)¹
Merriman limestone member (of Graford formation)¹
North Leon limestone member (of Graham formation)¹

Obregon formation²
Palo Pinto limestone¹
Parks Mountain sandstone member (of Thrifty formation)¹
Placid shale member (of Brad formation)¹

Quinn clay²
Ranger limestone member (of Brad formation)¹
Rocky Mound limestone member (of Graham formation)¹

Rough Mountain conglomerate lentil (in Brownwood shale)²
Salem School limestone member (of Graham formation)²
Specks Mountain limestone member (of Thrifty formation)¹
Staff limestone member (of Graford formation)¹
Thrifty formation¹
Wayland shale member (of Graham formation)¹

Whitt group²
Wiles limestone member (of Graford formation)¹
Winchell limestone (as member of Graford formation)¹

Wynn limestone member (of Palo Pinto formation)²

Middle Pennsylvanian

Brazos River conglomerate member (of Garner formation)¹
Capps limestone member (of Mineral Wells formation)¹

United States—Continued

Texas—Continued

Middle Pennsylvanian—ContinuedColony School conglomerate ²**East Mountain shale member**
(of Mineral Wells formation)¹**Garner formation**¹Gibson limestone member (of
Grindstone Creek formation)²**Lake Pinto sandstone member**
(of Mineral Wells formation)¹**Millsap Lake formation**¹**Mineral Wells formation**¹**Mingus shale member** (of Garner
formation)¹**Ricker sandstone member** (of
Mineral Wells formation)¹**Strawn group**¹**Turkey Creek sandstone member**
(of Mineral Wells formation)¹*Lower and Middle Pennsylvanian***Bend group**¹**Marble Falls limestone**¹**Smithwick shale**¹*Lower Pennsylvanian*Aylor member (of Big Saline
formation)²Big Saline group ²Brister member (in Big Saline
formation)²Brook lentil (of Big Saline
formation)²Caddo Pool formation ² (sub-
surface)Comyn formation ² (subsurface)De Leon formation ² (subsurface)Eastland Lake formation ² (sub-
surface)Gibbons conglomerate lentil (in
Marble Falls formation)²Kickapoo Creek group ²Lampasas series ²Lemons Bluff member (of Marble
Falls formation)²Parks formation ² (subsurface)Rayville formation ²Sipe Springs formation ² (sub-
surface)Sloan member (of Marble Falls
formation)²Soldiers Hole member (of Big
Saline formation)²*Mississippian***Barnett shale**¹ or formation**Chappel formation**¹Espey Creek limestone member
(of Chappel formation)²**Helms formation**¹King Creek marl member (of
Chappel formation)²Whites Crossing coquina member
(of Chappel formation)²*Upper Mississippian*Las Cruces formation ²Rancheria formation ²

United States—Continued

Texas—Continued

*Devonian*Canutillo formation ²*Devonian(?)***Caballos novaculite**¹†Santiago chert ¹*Upper(?) Devonian*†Zesch formation ²*Middle(?) and Upper Devonian***Ives breccia member** (of Houy
formation); (as breccia²) (see p. 621)*Middle Devonian***Bear Spring formation**²*Lower or Middle Devonian***Stribling formation**²*Lower Devonian***Pillar Bluff limestone**²*Silurian***Fusselman limestone**¹*Ordovician*El Pasan series ¹*Upper Ordovician***Burnam limestone**²**Maravillas chert**¹**Montoya limestone**¹Montoyan series ¹Persimmon Gap shale or forma-
tion ²*Upper Ordovician(?)*Solitario formation ¹*Middle Ordovician*†Brewster formation ¹Connell sandstone member (of
Oil Creek formation)² (sub-
surface)**Fort Peña formation**¹McKee sandstone ² (subsurface)Waddell sandstone ² (subsurface)**Woods Hollow shale**¹*Lower Ordovician***Alsate shale**¹Deep Creek division ¹**Ellenburger group** (as lime-
stone ¹)**El Paso limestone**¹ or formation**Gorman formation**²**Honeycut formation**²**Marathon limestone**¹**Monument Spring dolomite mem-
ber** (of Marathon limestone)¹**Staendebach member** (of Tan-
yard formation)²**Tanyard formation**²**Threadgill member** (of Tanyard
formation)²*Cambrian and Ordovician***Bliss sandstone**¹Burnet marble ¹†Marathon series ¹*Cambrian***Erna member** (of Wilberns for-
mation)²

United States—Continued

Texas—Continued

Upper Cambrian or Lower Ordovician

Beaver division ¹

Hinton division ¹

Hoover division ¹

Wyo division ¹
Upper Cambrian and Lower Ordovician(?)

Leon series ¹
Upper Cambrian

Buttrill Ranch member (of
Dagger Flat formation)²

Cap Mountain limestone member (of Riley formation); (as
formation ¹)

Dagger Flat sandstone ¹

Hickory sandstone ¹ member (of
Riley formation)

Katemcy series ¹

Lion Mountain sandstone member (of Riley formation); (as
member of Cap Mountain
formation ¹)

Morgan Creek limestone member (of Wilberns formation)²

†Pedernales dolomite member (of Wilberns formation)²

Point Peak shale member (of
Wilberns formation)²

Point Rock shale member (of
Wilberns formation)²

Riley formation ²

†Riley series ¹

Roberts Ranch member (of Dag-
ger Flat formation)²

San Saba limestone member (of Wilberns formation); (as
series ¹)

Welge sandstone member (of
Wilberns formation)²

Wilberns formation ¹
Precambrian

Allamore limestone or forma-
tion ²

Bear Mountain granite ²

Big Branch gneiss ²

†Bodeville series ¹

†Burnetan system ¹

Carrizo Mountain schist ¹

†Click series ¹

Coal Creek serpentine ²

†Diabolo sandstone ¹

†Fernandan system ¹

Hazel sandstone ¹ or formation

Hye granite ²

†Iron Mountain series ¹

Lanoria quartzite ¹

Legion Creek granite ²

Llano series ¹

†Lone Grove series ¹

†Long Mountain series ¹

†Mason series ¹

†Millicam formation ¹

Oatman Creek granite ¹

United States—Continued

Texas—Continued

Precambrian—Continued

Packsaddle schist ¹

Red Bluff granite ²

Red Mountain gneiss ²

Sixmile granite ¹

†Texan system ¹

Town Mountain granite ¹

Valley Spring gneiss ¹
Precambrian(?)

Van Horn sandstone ¹

Age(?)

†Altuda granite ¹

Utah

Recent

Ice Springs Craters flow ²
Pleistocene

Alpine formation ²

Bonneville formation ²

Lake Bonneville group (as beds)¹

Provo formation ²
Pleistocene(?)

Salt Creek fanglomerate ¹
Pleistocene, upper

Tabernacle flow ¹
Tertiary

Bullion Canyon volcanics ²

Crab Creek formation ²

Crazy Hollow formation ²

Delano Peak latite member (of
Bullion Canyon volcanics) ²

Dry Hollow latite ²

Gray Gulch formation ²

Joe Lott tuff ²

Moroni formation ²

Mount Belknap rhyolite ²

Orient granite porphyry ²

Oro Plata granite porphyry ²

Roger Park basaltic breccia ²

†Tintie andesite ¹
Tertiary, upper(?)

Axtell formation ²

Swansea quartz monzonite (as
rhyolite ¹)

Pliocene

Harkers fanglomerate ²

Huntsville fanglomerate ²
Pliocene(?)

Cache Valley group ¹

Malade Valley group ¹

Parunuweap formation ²
Probably Pliocene

Salt Lake formation ¹
Pliocene, upper, or Pleistocene, lower

Pavant flow ²

Sevier River formation ²
Pliocene, lower to middle

West Spring formation ²
Miocene to Pliocene

Collinston conglomerate ²
Miocene(?)

Brian Head formation ²
Miocene, middle to Oligocene(?)

Jordan Narrows unit ²

United States—Continued

Utah—Continued

*Oligocene*Duchesne formation ¹Halfway horizon (in Duchesne River formation) ¹Lapoint horizon (in Duchesne River formation) ¹**Norwood tuff** ²Randlett horizon (in Duchesne River formation) ¹*Oligocene(?)*Fool Creek conglomerate ²*Oligocene(?) to Pliocene(?)*Camp Williams unit ²*Oligocene, lower*Park City volcanics ²*Post-Eocene*†Sunbeam monzonite ¹*Post-Eocene(?)***Fernow rhyolite** ¹*Eocene or Oligocene***Duchesne River formation** ¹*Eocene*Godiva limestone ¹; *see also*Goldiva limestone ¹Goldens Ranch formation ²†Manti beds ¹**Packard quartz latite** (as rhyolite) ¹†Pink Cliff series ¹†Raddatz porphyry ¹†Vermilion Creek group ¹*Eocene(?)***Eagle Hill rhyolite** ¹**Shaggy Peak rhyolite** ¹**Tickville rhyolite** ¹**White Sage formation** ¹*Eocene, upper, or Oligocene*Bald Knoll formation ²*Eocene, upper*Myton member ¹ (of Uinta formation)**Uinta formation** ¹*Eocene, middle or upper*Sage Valley limestone member (of Goldens Ranch formation) ²*Eocene, middle***Evacuation Creek member** (of Green River formation) ¹**Horse Bench sandstone bed** (in Evacuation Creek member of Green River formation) ¹*Eocene, lower***Colton formation** ²**Wasatch group** ¹ or formation ¹Wasatchan series ¹*Paleocene or Eocene, lower*Cowly Canyon limestone member (of Wasatch group) ²*Paleocene*Fayette facies (of Flagstaff formation) ²Jones Valley member (of North Horn formation) ²Pulpit conglomerate division (of Almy conglomerate) ²

United States—Continued

Utah—Continued

*Paleocene—Continued*Saw Mill conglomerate division (of Almy conglomerate) ²Valley Mountain facies (of Flagstaff formation) ²Willow Creek facies (of Flagstaff formation) ²*Paleocene, upper and lower Eocene(?)***Flagstaff limestone** ¹*Cretaceous and (or) Eocene***Claron limestone** ¹*Cretaceous*Foxian series ¹†Pinto sandstone ¹*Upper Cretaceous or Tertiary, lower*†Alta granodiorite ¹†Clayton Peak quartz diorite ¹†Little Cottonwood granite ¹*Upper Cretaceous and Paleocene***North Horn formation** ²*Upper Cretaceous***Aberdeen sandstone member** (of Blackhawk formation) ¹**Allen Valley shale** ²Asphalt Ridge sandstone ²Bearian series ¹**Blackhawk formation** ¹**Bluecastle sandstone member** (of

Price River formation) west of Green River; member (of

Neslen formation) east of Green River; (as bed) ¹**Blue Gate sandstone member** (of Mancos shale) ¹; sometimes**shale member**Bob Wright coal group ¹Brownian series ¹**Buck tongue** (of Mancos shale) ¹†Castlegate coal group (in Blackhawk formation) ¹**Castlegate sandstone member** (ofPrice River formation) ¹**Cedar Mountain formation** ²Cedar Mountain group ²Desert member (of Blackhawk formation) ²**Emery sandstone member** (of Mancos shale) ¹**Farrer formation** (as non-coal-bearing member of Price River formation) ¹**Ferron sandstone member** (of Mancos shale) ¹**Funk Valley formation** ²**Garley Canyon sandstone member** (of Mancos shale) ¹Grassy member (of Blackhawk formation) ²Henefer formation ²Hinshaw sandstone ¹**Indianola formation** ² or group ²**Kaiparowits formation** ¹

United States—Continued

Utah—Continued

Upper Cretaceous—Continued

Kelvin formation (as conglomerate)¹

Kenilworth member (of Blackhawk formation)²

Masuk member (of Mancos shale); (as sandstone member of Mesaverde formation)¹

†Masuk shale (in Mancos shale)¹
Masukian series¹

Neslen formation (as coal-bearing member of Price River formation)¹

Panther tongue (of Star Point sandstone)¹

†Pennell sandstone¹

Price River formation¹

Rim Rock sandstone²

Rockport formation¹

Sanpete formation²

Sego sandstone (as member of Price River formation)¹

Sixmile Canyon formation²

South Flat formation²

†Spring Canyon coal group (in Blackhawk formation)¹

Spring Canyon tongue (of Star Point sandstone)¹

Star Point sandstone¹

Storrs tongue (of Star Point sandstone)¹

Straight Cliffs sandstone¹

Sulphur Canyon sandstone bed (in Price River formation)¹

Sunnyside member (of Blackhawk formation)²

Thompson Canyon sandstone bed (in Price River formation)¹

Tropic shale¹

Tununkian series¹

Tununk shale (in Mancos shale)¹;
†sandstone member (of Mancos shale)¹

Tuscher formation¹

Wanship formation²

Wahweap sandstone¹

Upper Cretaceous(?)

Currant Creek formation²

Iron Springs formation²

Marshall Creek breccia²

Lower Cretaceous(?)

Buckhorn conglomerate²

Jurassic

Homestake limestone¹ member
(of Carmel formation)

Jurassic and Jurassic(?)

Lamb Point tongue (of Navajo sandstone)²

Shurtz sandstone tongue (of Navajo sandstone)²

Temple Cap member (of Navajo sandstone)²

United States—Continued

Utah—Continued

Jurassic(?)

Cedar City tongue (of Kayenta formation)²

†Colob sandstone¹

†Gray Cliff group¹

Tenney Canyon tongue (of Kayenta formation)²

†White Cliff sandstone or group¹

†White Wall sandstone¹

Upper Jurassic and Upper Cretaceous

Henryan series¹

†Henrys Ford group¹

Upper Jurassic

Arapien shale²

Bishop sandstone¹

Bluff sandstone (as member of Morrison formation)¹

Brush formation¹

Brushy Basin shale member (of Morrison formation)¹

Curtis formation¹

Duchesne limestone¹

Entrada sandstone¹

†Flaming Gorge group¹

Junction limestone¹

Moab sandstone member or tongue (of Entrada sandstone)¹

Recapture shale member (of Morrison formation)¹

Red Mesa member (of Entrada formation)²

Salt Wash sandstone member (of Morrison formation)¹

Summerville formation¹

Twelvemile Canyon member (of Arapien shale)²

Twist Gulch member (of Arapien shale)²

Westwater Canyon sandstone member (of Morrison formation)¹

†White Cliff limestone¹

Winsor formation²

Middle and Upper Jurassic

Carmel formation¹

San Rafael group¹

Triassic and Jurassic

Glen Canyon group¹

†Kanab sandstone¹

Triassic

Ankareh shale¹, formation, or redbeds

Mahogany member (of Ankareh formation)²

Shinarump clay¹

†Shinarump group¹

Shinarumpian series¹

Triassic(?)

Hoskinnini tongue or member (of Moenkopi formation); (as tongue or member of Cutler formation)¹

United States—Continued

Utah—Continued

Upper Triassic

Duffin sandstone and shale (in Chinle formation)²

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 sandstone¹

Stanaker formation²

Suicide grit²

Tecumseh sandstone (in Silver Reef sandstone member of Chinle formation)²

Trail Hill sandstone (in Chinle formation)²

†Vermilion Cliff group¹

Upper Triassic(?)

Springdale sandstone member (of Moenave formation)²

Lower Triassic

Emigration formation¹

Harrington formation¹

Pinecrest formation¹

Red Wash formation²

Shnabkaib shale member (of Moenkopi formation)¹ or member (of Moenkopi formation)

Sinbad limestone member (of Moenkopi formation)¹

Thaynes limestone¹, formation, or group

Timpoweap member (of Moenkopi formation)²

Virgin limestone member (of Moenkopi formation)¹

†Verkin shales¹

Woodside formation (as shale)¹

Paleozoic

Allah quartzite²

Orient formation²

Permian and Triassic

†Oljeto sandstone member¹ (of Moenkopi formation)

Permian

Baby sand¹ (subsurface)

†Bogus tongue (of Cutler formation)¹

Cedar Mesa sandstone member (of Cutler formation)¹

Diamond Creek sandstone¹

Gerster formation¹ or **limestone**

Goodridge sand¹ (subsurface)

United States,—Continued

Utah—Continued

Permian—Continued

Halgaito tongue or member (of Cutler formation)¹

Harrisburg gypsiferous member (of Kaibab limestone)¹

Kirkman limestone²

Little Loop oil sand¹ (subsurface)

Mackentire "red-beds" tongue (of Phosphoria formation)²

Mendenhall sand¹ (subsurface)

†Monument Valley shale¹

Organ Rock tongue or member (of Cutler formation)¹

Park City formation¹ or group

†Shafer limestone¹

White Rim sandstone member (of Cutler formation)¹

Post-Pennsylvanian

Last Chance quartz monzonite²

Carboniferous

Heber limestone¹

Oquirrh quartzite¹

Park sandstone¹

†Weberan series¹

Carboniferous(?)

Phelan limestone²

Vipont limestone²

Wardlaw shale²

Pennsylvanian or Permian

Arcola sand¹ (subsurface)

Pennsylvanian and Permian

†Goodridge formation¹

Oquirrh formation¹

Pennsylvanian

Amber sand¹ (subsurface)

Argenta limestone¹

Bingham quartzite¹

Bullard limestone¹

Butterfield limestone member (of Bingham quartzite)¹

Columbus quartzite¹

Commercial limestone member (of Bingham quartzite)¹

Elephant limestone¹

Galena King limestone¹

Goose Neck sand¹ (subsurface)

Hercules limestone¹

Highland Boy limestone member (of Bingham quartzite)¹

Hobble formation²

Honaker sand¹ (subsurface)

Honerine limestone¹

Jordan limestone member (of Bingham quartzite)¹

Kelly formation²

Lenox limestone member (of Bingham quartzite)¹

Maverick limestone¹

Morgan formation¹

North Ada limestone¹

†Ontario quartzite¹

Parnell limestone¹

†Petro limestone lentil (of Bingham quartzite)¹

United States—Continued

Utah—Continued

Pennsylvanian—Continued

Phoenix limestone lentil (of

Bingham quartzite)¹

†Rambler formation¹
Round Valley limestone²
Tilden limestone lentil (of Bingham quartzite)¹

Utah Metals limestone¹

Weber conglomerate¹
Weber quartzite¹, sandstone, formation, or shale

Yampa limestone lentil (of Bingham quartzite)¹

†Yampa sandstone¹

Pennsylvanian(?)

Talisman quartzite¹

Mississippian

†Humbug limestone¹

Mississippian and Devonian(?)

Topache limestone¹

Upper Mississippian and Pennsylvanian

Manning Canyon shale¹

Upper Mississippian

Brazer limestone¹, dolomite, or group

Deseret limestone¹
Doughnut formation²

†Garber limestone¹

†Gold Ledge porphyry¹
Great Blue limestone¹ or formation

Herat shale member (of Ochre Mountain limestone)¹
Humbug formation¹

Humbug sandstone¹

Lion Hill formation¹
Long Trail shale member (of Great Blue formation)¹
Ochre Mountain limestone¹

Mono limestone¹

†Pine Canyon limestone¹

Reed formation¹

†Silver Ledge porphyry¹
Tetro member (of Deseret limestone); (as limestone)¹

Utah Queen formation¹
Woodman formation¹

Lower and Upper(?) Mississippian

Benson limestone¹

Lower Mississippian

†Buckhorn limestone¹

Hidden Treasure limestone¹

Leatham formation²

Midridge limestone²

Devonian

Becks limestone²

Beirdneau sandstone member (of Jefferson formation)²

Hyrum dolomite member (of Jefferson formation)²

Upper Devonian and Mississippian

†Gardner dolomite¹
Pinyon Peak limestone¹

United States—Continued

Utah—Continued

Upper Devonian

Aneth formation² (subsurface)

City Creek limestone²

Hades quartzite¹

McCracken member (of Elbert formation)² (subsurface)

Mowitza shale¹
Victoria formation (as quartzite¹)

Middle Devonian

Guilmette formation¹
Sevy dolomite¹
Simonson dolomite¹

Lower Devonian

Water Canyon formation²

Silurian

Dora member (of Bluebell formation)²
Laketown dolomite¹

Noah member (of Bluebell formation)²

†Paradise limestone¹

Silurian(?) and Devonian(?)

Red Warrior limestone¹

Middle Silurian

Bell Hill dolomite²
Harrisite dolomite²
Lost Sheep dolomite²
Thursday dolomite²

Ordovician to Mississippian

†Godiva limestone¹

†Wasatch limestone¹

Ordovician

Chief Consolidated limestone¹

Gemini limestone¹

Ordovician and Cambrian(?)

Grampian limestone¹

Upper Ordovician, Silurian, and Devonian

Bluebell dolomite¹

Upper Ordovician and Silurian

Beecher member (of Bluebell formation)²

Upper Ordovician and (or) Silurian

Floride dolomite²

Upper Ordovician

Eagle member (of Bluebell formation)²

Middle Ordovician

Swan Peak formation (as quartzite¹)

Lower Ordovician

Box Elder limestone¹

Fillmore limestone²
Garden City formation (as limestone¹)

†Geneva quartzite¹

House limestone²

Juab limestone²

Kanosh shale²
Opohonga limestone¹

Wahwah limestone²

United States—Continued

Utah—Continued

Cambrian and Lower Ordovician†Eureka limestone ¹†Mammoth limestone ¹*Cambrian*Busby quartzite member (of Langston formation) ²Butlerville quartzite ¹Dagmar limestone member (of Ute formation) ²Holliday shale ¹†Milliard limestone ¹Naomi Peak limestone member (of Langston formation) ²**Opex formation** (as dolomite) ¹**Pine Valley quartzite** ²Timpanogos shales ¹*Cambrian(?)***Morehouse quartzite** ¹Sentinell limestone ²Sentinell quartzite ²*Upper Cambrian and Ordovician(?)***Chokecherry dolomite** ¹*Upper Cambrian***Ajax dolomite** (as limestone) ¹**Emerald member** (of Ajax dolomite) ¹**Hicks formation** ¹**Lamb dolomite** ¹**Notch Peak limestone** ¹**Orr formation** ¹**Weeks limestone** ¹*Upper and Middle(?) Cambrian***Lynch dolomite** ¹*Middle Cambrian to Lower Ordovician*Centennial limestone ¹*Middle and Upper(?) Cambrian***Maxfield limestone** ¹*Middle Cambrian***Abercrombie formation** ¹**Blacksmith limestone** ¹**Bluebird dolomite** ¹**Bowman limestone** ¹**Cole Canyon dolomite** ¹**Dagmar limestone** ¹**Dome Canyon limestone** ¹Golden Ray limestone ¹**Hartmann limestone** ¹**Herkimer limestone** ¹**Hodges shale member** (of Bloomington formation) ¹**Howell formation** ¹Landston formation ¹**Marjum limestone** ¹Millard limestone ²**Swasey formation** ¹**Teutonic limestone** ¹**Trippe limestone** ¹**Ute limestone** ¹**Wheeler formation** ¹**Young Peak dolomite** ¹*Middle and Lower(?) Cambrian***Brigham quartzite** ¹

United States—Continued

Utah—Continued

Lower and Middle Cambrian†Alta shale ¹†Ogden quartzite ¹**Ophir formation** ¹ or shale†Tintic slate ¹*Lower Cambrian***Barkley quartzite** ¹**Busby quartzite** ¹**Cabin shale** ¹Dale quartzites ¹†Robinson quartzite ¹**Tatow limestone** ²Uintan series ¹*Lower Cambrian and Precambrian(?)***Tintic quartzite** ¹*Precambrian***Bald Mountain formation** ²**Big Cottonwood formation** (as quartzite series) ¹Box Canyon member (of Mutual quartzite) ²Cottonwood schists and gneisses ¹Emmons Peak quartzite ¹Farmington Canyon complex ²**Little Willow series** ²**Mineral Fork tillite** ²**Mutual formation** ²**Red Creek quartzite** ¹Red Pine shale ²†Uinta quartzite and sandstone ¹**Uinta Mountain group** ¹

Vermont

*Eocene*Brandon lignite ¹*Paleozoic*Belvidere Mountain amphibolite ¹Lowell Mountain formation ¹*Upper Paleozoic*Plymouth granite ¹*Carboniferous*Mount Ascutey granite ¹*Devonian***Barre granite** ¹Bethel granite ¹Calais granite ¹Craftsbury granite ¹Groton granite ¹Hardwick granite ¹Irasburg granite ¹Newark granite ¹Newport granite ¹Orange granite ¹Pomfret granite ¹Randolph granite ¹Ryegate granite ¹Tunbridge granite ¹Vernon limestone ¹West Dummerston granite ¹Williamstown granite ¹Woodbury granite ¹*Devonian and Silurian(?)***Gile Mountain formation** ²

United States—Continued

Vermont—Continued

Upper or post-Devonian

Durkee Hill greenstones ²
Upper Devonian(?)

Brocklebank granite ²
Silurian(?) and Devonian(?)
Waits River formation (as limestone ¹)

Silurian or Lower Devonian

Westmore formation ²
Silurian

Barton River formation ²
Silurian(?)

Guilford slate ¹
Middle Silurian
Northfield slate ¹
Middle or Lower(?) Silurian
Shaw Mountain formation ²
Post-Ordovician

Bellows Falls granite gneiss ¹
Ordovician (see also Cambrian and Ordovician)
Bascom formation ²

†Bradford schist ¹

Brattleboro phyllite ¹

Columbian marble ¹

Coventry limestone ¹
Fairlee quartz monzonite (as granite gneiss ¹)

Memphremagog slate ¹

†Montpelier slate ¹
Moretown formation ²

Morgan Corners formation ¹

Orleans phyllite ¹
Vershire schist ¹

†Washington limestone ¹

Woodstock schist ¹
Ordovician and Cambrian(?)
Stowe formation ²
Ordovician(?)
Irasburg conglomerate ¹
Waterford slate ¹
Upper Ordovician(?)

Bird Mountain grit ¹
Middle Ordovician to Upper Devonian

Vermont sequence ²
Middle Ordovician

Addison formation ¹

Beldens formation ²

Burchards limestone ²

Carman quartzite ²

Chipman group ²
Cram Hill formation ²
Harlow Bridge quartzite member (of Cram Hill formation) ²
Hortonville slate ¹
Hyde Manor limestone ¹

Larrabee member (of Glens Falls formation) ²

Maquam group ²

Middlebury limestone ²

Orwell limestone ²

Randolph phyllite ¹

United States—Continued

Vermont—Continued

Middle Ordovician—Continued

Shoreham member (of Sherman Fall formation) ²
Sudbury marble ¹
West Rutland marble ¹

Weybridge member (of Beldens formation) ²

Whipple member (of Berkshire schist) ²

Youngman formation ²
Middle Ordovician(?)
Meetinghouse slate ²
Standing Pond volcanics ²
Lower or Middle Ordovician
Walloomsac slate ¹
Lower and Middle Ordovician

Highgate Springs series ¹

Isle La Motte marble ¹
Lower Ordovician

Albany conglomerate ¹

Boardman formation ²

Bridport dolomite ²

Cassin formation ¹
Corliss conglomerate ¹

Coventry conglomerate ¹

Cutting dolomite ²

Fort Cassin formation ¹
Georgia slate ¹

Grandge slate ²
Ira slate ¹

Isle La Motte sandstone ¹

Monastery formation ¹

Morses Line slate ²

Northfield conglomerate ¹
Poultney slate ¹

Province Island limestone ²
Shelburne marble ¹

Sutherland Falls marble ¹

Wing conglomerate ¹
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 ¹

†Eolian limestone ¹

Grahamville formation ²

Whetstone Hill member (of Moretown formation) ²
Cambrian

Barnard gneiss ¹

Newbury granite gneiss ¹
Ottawaquechee formation ¹
Cambrian(?)

Pico Peak series ²

Plymouth Union series ²

Springfield conglomerate ¹
Upper Cambrian

Bethel group ¹

Bethel schist ¹

United States—Continued

Vermont—Continued

Upper Cambrian—ContinuedCavendish schist ¹**Clarendon Springs dolomite** ¹Gorge formation ¹Hungerford formation ²**Lunenburg schist** ¹**Milton dolomite** ¹†Missisquoi formation ¹Reading gneiss ¹Rockledge limestone breccia ²Russell slate ²Saxe Brook formation ²**Williston limestone** ¹*Upper Cambrian(?)*Gassetts schist ¹Halifax chlorite schist ¹Heartwellville schist ¹**Highgate slate** ¹Missisquoi schist ¹Readsboro schist ¹Whittingham schist ¹*Middle or Upper Cambrian*Skeels Corners formation ²*Middle Cambrian*Boucher formation ²**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** ¹Battell member (of Monastery formation) ²**Beebe limestone** ¹Bennington quartzite ¹Bomoseen grit ¹**Breeze phyllite** ¹Brigham Hill graywacke ²**Bull slate** ¹†Colchester formation ¹Connor facies (of Dunham dolomite) ²**Danby formation** ¹†Georgian epoch or series ¹Granville formation ²Hancock member (of Pinney Hollow formation) ²**Hooker slate** ¹**Hubbardton slate** ¹**Mallet dolomite** ¹Monastery formation ²**Monkton quartzite** ¹Noah Parker horizon ¹**Parker slate** ¹Pine Hill quartzite ¹Pinney Hollow schist ¹Plymouth conglomerate ¹**Plymouth marble** ¹**Rutland dolomite** ¹Sherburne conglomerate ¹

United States—Continued

Vermont—Continued

Lower Cambrian—Continued**Stiles phyllite** ¹†Swanton marble ¹†Swanton slate ¹Tyson member (of Monastery formation) ²†Vermont formation ¹ or quartzite ¹Wallace Ledge formation ²**Wallingford dolomite** ¹**Winooski marble** ¹Zion Hill quartzite ¹*Lower Cambrian(?)*Brackett member (of Stowe formation) ²Sherman marble ¹*Precambrian***Forestdale marble** ¹**Green Mountain gneiss** ¹Harmon Hill gneiss ¹Lana conglomerate ¹Lana shale ¹Mendon dolomite ¹**Mendon schist** ¹**Moosalamoo phyllite** ¹**Mount Holly gneiss** ¹**Nickwaket graywacke** ¹Ripton conglomerate ¹Rochester quartzite ¹Romance arkose ¹Saltash formation ²**Stamford granite gneiss** ¹Westford schist ²Wilcox formation ²†Woodford gneiss ¹*Precambrian(?)*East Mountain schist ¹Fairfax schist ²*Age(?)*Averill granite ¹Beadle Green granite ¹Black Mountain granite ¹Bull Hill gneiss ¹Kirby granite ¹Knox Mountain granite ¹Roll Quarry limestone ¹

Virginia

Pleistocene†Dismal Swamp formation ¹†Franconia gravel ¹**Princess Anne formation** ¹*Pleistocene or Pliocene(?)*†Appomattox formation ¹†Norfolk formation ¹*Miocene*Bermuda earth ²†Richmond earth ¹†Virginian ¹ [deposits]*Miocene, upper***Yorktown formation** ¹*Eocene, upper***Chickahominy formation** ² (sub-surface)

United States—Continued

Virginia—Continued

Eocene, lower and middle
Pamunkey group¹
Woodstock greensand marl member (of Nanjemoy formation)¹
Eocene, lower
Aquia formation¹ or **greensand Paspotansa 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

†**Boscabel boulder beds**¹

†**Bull Run shales**¹

†**Chesterfield group**¹

†**Otterdale sandstones**¹

†**Tuckahoe group**¹

†**Vinita beds**¹
Paleozoic(?)

†**Arch marble**²

†**Archer Creek formation**²

†**Candler formation**²

†**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

†**McClure 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

†**Sequoiah formation**¹

†**Tellowa 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** (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 Keyser 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

United States—Continued

Virginia—Continued

Silurian—Continued

- †Ingles conglomerate member ¹
(of Price formation)

Middle Silurian

- Cacapon sandstone member** (of
Clinton formation) ¹

- Iron Gate facies (of Clinton for-
mation) ²

Lower Silurian

- Hagen shale member** (of Clinch
sandstone) ²

- Poor Valley Ridge member** (of
Clinch sandstone) ²

Post-Ordovician

- Stafford Store quartz monzonite ¹

Upper Ordovician and Silurian

- †Massanutten sandstone ¹

*Upper Ordovician***Arvonian slate** ¹

- House Mountain shales ¹

Quantico slate ¹*Middle Ordovician*

- Benbolt limestone ²

- Ben Hur limestone** ²

- Blackford formation** ²

- Bolarian series ²

- Botetourt limestone member (of
Edinburg formation) ²

- Bowen formation** ²

- Burkes Garden limestone mem-
ber (of Benbolt limestone) ²

- Clifffield formation ²

- Collierstown limestone ²

- Dot limestone** ²

- Edinburg formation ²

- Effna limestone ²

- Eggleston limestone** ¹

- Elway limestone** ²

- Five Oaks limestone member (of
Clifffield formation) ²

- Gratton limestone ²

- Hardy Creek limestone** ²

- Hurricane Bridge limestone** ²

- Lantz Mills facies (of Edinburg
formation) ²

- Lexington limestone ¹

- Lincolnshire limestone** ²

- Martin Creek limestone** ²

- Moccasin limestone** ¹ or forma-
tion

- New Market limestone** ²

- Oranda formation ²

- Peery limestone member (of
Clifffield formation) ²

- Poteet limestone** ²

- Rob Camp limestone** ²

- Rockdell limestone** ²

- St. Clair facies (of Murfreesboro
formation) ²

- St. Luke limestone member (of
Edinburg formation) ²

- Shannondale limestone member
(of Benbolt limestone) ²

- Thompson Valley limestone ²

United States—Continued

Virginia—Continued

Middle Ordovician—Continued

- Tumbez limestone** ²

- Walker Mountain sandstone
(of Moccasin formation)

- (Charles Butts and R. S. Ed-
mundson, 1943, Geol. Soc.
America Bull., v. 54, no. 11,
p. 1678)

- Ward Cove limestone member
(of Clifffield formation) ²

- Wardell formation ²

- Whistle Creek limestone ²

- Witten limestone** ²

- Woodway limestone** ²

Lower and Middle(?) Ordovician

- Pearisburg limestone ¹

Lower Ordovician

- Draper dolomite member (of
Nittany formation) ²

- Everona limestone** ¹

- †Liberty Hall limestone ¹

- †Murat limestone ¹

- Narrows chert (in Beekmantown
limestone) ¹

- Oglesby marble member (of
Nittany formation) ²

Cambrian

- Mechunck limestone ¹

- Oronoco formation ²

Upper Cambrian

- Chances Branch dolomite mem-
ber** (of Maynardville lime-
stone) ²

- Low Hollow limestone member**
(of Maynardville limestone) ²

Middle and Upper Cambrian

- †Natural Bridge limestone ¹

Middle Cambrian

- Honaker limestone or dolomite** ¹

Lower and Middle Cambrian

- †Buena Vista shale ¹

- Graysonton formation ¹

- †Russell formation ¹

Lower Cambrian

- Austinville dolomite member (of
Shady dolomite) ²

- Ivanhoe limestone member** (of
Rome formation); (as member
of Shady dolomite) ¹

- Loudoun formation** ¹

- Patterson limestone member** (of
Shady dolomite) ¹

- †Sherwood limestone ¹

- Snowden member (of Harpers
formation) ²

Precambrian

- Abbyville gabbro ¹

- Air Point granite ¹

- Amelia-Goochland quartz mon-
zonite gneiss ¹

- Buffalo granite ¹

- Carsonville granite** ²

- Cartersville granite ¹

- †Columbia granite ¹

United States—Continued

Virginia—Continued

Precambrian—Continued

- Crest Hill granite ²
- Elk Hill complex ¹
- Fauquier formation ²
- Fredericksburg gneiss ¹
- Fredericksburg granite ¹
- Goshen schist ¹
- Grayson granodiorite gneiss** (as granite gneiss ¹)
- Hycow quartz porphyry ¹
- Leatherwood granite** ¹
- Locust Grove diorite ¹
- Locust Grove granite ¹
- Lovington granite gneiss** ¹
- Lynchburg gneiss** ¹
- Marshall granite** ¹
- Melrose granite facies (of Columbia granite) ¹
- Moneta biotite - hornblende gneiss ¹
- Monticello rhyolites ¹
- Monticello schist ¹
- Mount Athos greenstone ¹
- Occoquan granite ¹
- Old Rag granite ¹
- Pedlar formation ²
- Redoak granite** ¹
- Rockfish conglomerate** ¹
- Roseland anorthosite** ²
- Schuyler soapstone ¹
- Shelton granite gneiss ¹
- Somerville granite ¹
- State Farm gneiss ²
- Striped Rock granite** ²
- Swift Run formation** ²
- Virgilina group, volcanic group, or greenstone ¹
- Warrenton agglomerate member (of Catoctin series) ²

Precambrian(?)

- Neabco Run diorite ¹
- Point Lookout granite ¹

Age(?)

- Charlottesville formation ²
- East Waynesboro formation ²
- Esmont slate facies (of Candler formation) ²
- Flat Rock Creek granite ²
- Johnson Mill graphite schist ²
- Lydia granodiorite ²
- Mount Jefferson sandstone member (of Rockfish conglomerate) ²
- †Sheep Rock conglomerate ¹
- Swannanoa formation ²

Washington

Quaternary

- Dogs Head andesites ²
- Drumheller silts ²
- Glacier Peak volcanics ¹
- Goat Rock pyroclastic deposits ²
- Mount Baker lava** ¹
- Mount Rainier lavas ¹
- Mount St. Helens lavas ²

United States—Continued

Washington—Continued

Recent

- Colwood formation ¹

Pleistocene

- Admiralty drift** ¹ or clay
- Arlington gravel member** (of Vashon drift) ²
- Cowiche gravel ¹
- †Douty gravel ¹
- Esperance sand member** (of Vashon drift) ²
- Gale sand ¹
- Logan Hill formation** ²
- Marysville sand member** (of Vashon drift) ²
- Midland sand ¹
- Nespelem silt** ¹
- Okanogan ¹ (till)
- Orting drift** (as gravel ¹)
- Osceola clay ¹
- †Osceola glacial drift ¹
- Palouse formation** ¹
- Pilchuck clay member** (of Vashon drift) ²
- Puyallup formation** (as sand ¹)
- Queets beds ²
- Ringold formation** ¹
- Satsop formation** ¹
- Steilacoom gravel** ¹
- Stillaquamish sand member** (of Vashon drift) ²
- Taholah formation ²
- Tieton andesite** ¹
- Tifis member (of Wahluke formation) ²
- Touchet beds ²
- Vashon drift** ¹
- Wahluke formation ²
- Willapa clays ²

Tertiary

- Camas basalt ¹
- Cathedral granite ¹
- Cloudy Pass diorite ²
- Tiger formation** ²

Tertiary(?)

- Palmer volcanics ¹
- Phalen Lake volcanics ¹
- Underwood lava ¹

Tertiary, upper(?)

- Pend Oreille Valley andesite ²

Pre-Tertiary

- Mount Stuart granodiorite** ¹
- Peshastin formation** ¹

Pre-Tertiary(?)

- Newaukum series ¹

Pliocene

- Quinalt formation** ¹
- Soleduck formation ¹

Pliocene(?)

- Hoko formation ¹
- Howson andesite** ¹
- Raft River formation ¹

Miocene or Pliocene

- Snipes conglomerates ²
- Sugarloaf andesite ²

United States—Continued

Washington—Continued

Miocene or Pliocene—ContinuedSummit conglomerate ²*Miocene and Pliocene*Elephant Mountain flow ²Selah Butte flow ²Skamania andesite series ²*Miocene*Browns Point formation ²**Clallam formation** ¹**Eagle Creek formation** ¹**Fifes Peak andesite** ²**Hammer Bluff formation** ¹Selah tuff member (of Ellensburg formation) ²Silver Star granodiorite ²Squaw Creek diatomite member (of Yakima basalt) ²**Taneum andesite** ¹*Miocene and Oligocene*(?)Hoh formation ¹*Miocene*(?)Howard arkose ¹Quillayute formation ¹*Miocene, upper, and Pliocene, lower***Ellensburg formation** ¹*Miocene, upper*Enumclaw volcanic series ¹Douglas Canyon formation ¹Lake Vantage lavas ²Montesano formation ¹*Miocene, middle or upper***Latah formation** ¹*Miocene, lower and middle***Yakima basalt** ¹ member (of Columbia River basalt)*Miocene, lower*Chehalis formation ¹Wahkiakim formation ¹**Wenas basalt** ¹*Oligocene*Blakeley formation ¹**Gerome andesite** ¹Lincoln formation ¹Marrowstone shale ²Porter shale ¹Restoration Point horizon ¹Seattle formation ¹*Oligocene*(?)**Snoqualmie granodiorite** ¹*Oligocene, middle*Orchard Point conglomerate member (of Blakeley formation) ²*Oligocene, lower***Gries Ranch formation** (as horizon ¹); see also Greece Ranch horizon ¹Quimper sandstone ²Townsend shale ²*Eocene or Miocene*West Index andesitic series ¹

United States—Continued

Washington—Continued

*Eocene to Miocene***Keechelus andesite series** ¹**Twin River formation** ¹*Eocene*Bayne series ¹Bellingham beds ¹**Burnett formation** ¹**Carbonado formation** ¹Carbon River (coal) series ¹Chehalis sandstone ¹Evans Creek coal series ¹Fairfax ¹ (coal bearing rocks)Franklin sandstone ¹Franklin series ¹**Guye formation** ¹**Kachess rhyolite** ¹Knob Hill andesite ²† Kittitas system ¹Kummer sandstone ¹Kummer series ¹**Lyre formation** ²**Manastash formation** ¹Melmont ¹ (coal bearing rocks)**Naches formation** ¹Natapoc formation ¹Olequa formation ¹† Pittsburg formation ¹**Puget group** ¹Puyar formation ¹**Roslyn formation** ¹South Prairie formation ¹Sumas shales (in Chuckanut formation) ²Swauk formation ¹**Teanaway basalt** ¹Wilkeson [coal] series ¹**Wilkeson formation** ¹*Eocene*(?)Pipestone Canyon formation ²*Eocene, upper***Cowlitz formation** ¹**Northcraft formation** ²Olequa Creek member (of Cowlitz formation) ²Pe Ell volcanics member (of Cowlitz formation) ²**Skookumchuck formation** ²Stillwater Creek member (of Cowlitz formation) ²*Eocene, middle to upper***McIntosh formation** ²*Eocene, middle and lower*(?)**Crescent formation** ¹*Eocene, lower*Chuckanut formation ¹*Mesozoic*Kruger Mountain malignite ²Whiskey Mountain granodiorite ²*Cretaceous*Cle Elum formation ²Winthrop sandstone ¹

United States—Continued

Washington—Continued

Cretaceous(?)

Bogachiel formation ¹
Loon Lake granite ¹

Soleduck formation ¹
Probably Cretaceous

†Colville granite ¹ or granodiorite ¹
Upper Cretaceous

Midnight Peak formation ²
Lower and Middle Cretaceous

Virginian Ridge formation ²
Lower Cretaceous
Pasayten formation ¹

†Similkameen formation ¹

Spieden formation ¹
Jurassic

Tye granite ¹
Jurassic(?)

Eagle Cliff porphyrite ¹

Index granodiorite ¹

Meteor granodiorite ¹

Osoyoos granodiorite ¹

Rommel granodiorite ¹
Upper Jurassic

Shuksan formation ²

Turtleback complex ¹
Upper Jurassic(?)

Chelan granodiorite ¹
Pre-Jurassic
Hawkins formation ¹
Triassic(?)

Fidalgo formation ¹

Newby formation ²

Ventura formation ¹
Upper Triassic

Haro formation ¹
Paleozoic

Chewalah argillite ¹

Colville quartzite ¹

Deer Lake argillite ¹

Eagle Mountain quartzite ¹

Old Dominion limestone ¹
Paleozoic(?)

Boundary argillites ¹

Cedar Creek argillite ¹

Clugston limestone ¹

Deep Lake argillite ¹

Fish Creek argillite ¹

Lead Point argillite ¹

Mission argillite ¹

Red Top limestone ¹

Republican Creek limestone ¹

Stevens series ¹
Upper Paleozoic or Mesozoic

Jumbo volcanics ¹

Sheep Creek conglomerate ¹
Carboniferous

Hozomeen series ¹

Leech River group ¹
Carboniferous(?)

Chopaka basic intrusives ¹

Chopaka schist ¹

Gunn Peak formation ¹

United States—Continued

Washington—Continued

Pennsylvanian and (or) Permian

Granite Falls limestone ²
Devonian and Carboniferous

San Juan series ¹
Probably Devonian, Carboniferous, and Mesozoic
Covada group ¹
Upper and Middle(?) Devonian and Mississippian

Oreas group ¹
Ordovician
Ledbetter slate ²

Maloney metamorphic series ¹
Pre-Ordovician(?) or Carboniferous(?)
Easton schist ¹
Pre-Ordovician

Chiwaukee schist ²

Swakane gneiss ¹
Pre-Ordovician(?)

Buckskin schist ²

Fernow gneiss ²

Martin Ridge schist ²
Cambrian
Gypsy quartzite ²
Middle Cambrian
Metaline limestone or formation ²
Northport limestone ¹
Lower or Middle Cambrian
Maitlen phyllite ²
Lower Cambrian
Addy quartzite ¹
Precambrian

Bead Lake formation ²
Buffalo Hump formation ²
Deer Trail group (as argillite ¹)

Edna dolomite ²
Huckleberry formation (based on Huckleberry conglomerate ² and Huckleberry greenstone ²)

Leola volcanics ²
McHale slate ²

Moon Hill quartzite member (of Skookum formation) ²

Newport group ²

No Name argillite ²
Shedroof conglomerate ²

Skookum formation ²
Stensgar dolomite (as dolomite member ¹)

Togo formation ²
Precambrian(?)

Marshall diorite ²

Orient gneiss ¹

Ribbon gneiss ¹
Age(?)

Carson lava ¹

Leecher metamorphics ²

Methow gneiss ²

West Virginia

Pleistocene

Barboursville silts ²

Teay formation ¹
Pliocene(?)

Shepherdstown gravel ¹

United States—Continued

West Virginia—Continued

Permian

- Belton coal group (in Greene and Washington formations)¹
- Bristol limestone (in Washington formation)¹
- Burton sandstone (in Greene formation)¹
- Cassville shale member** (of Washington formation)¹
- Creston shale (in Washington formation)¹
- Dolls Run sandstone (in Washington formation)¹
- Elm Grove limestone member** (of Washington formation)¹
- Fish Creek shale (in Greene formation)¹
- Gilmore limestone (in Greene formation)¹
- Hundred sandstone (in Washington formation)¹
- Mannington sandstone (in Washington formation)¹
- Proctor sandstone (in Greene formation)¹
- Rockport limestone (in Greene formation)¹
- Rush Run sandstone (in Greene formation)¹
- St. Cloud sandstone (in Greene formation)¹
- Shannon Run limestone (in Washington formation)¹
- Washington fire clay shale (in Washington formation)¹

Pennsylvanian

- Albright limestone (in Conemaugh formation)¹
- Ames shale (in Conemaugh formation)¹
- Annabelle shale (in Monongahela formation)¹
- Arnoldsburg limestone (in Monongahela formation)¹
- Arnoldsburg sandstone (in Monongahela formation)¹
- Bald Knob shale (in Kanawha formation)¹
- Bens Creek sandstone (in Kanawha formation)¹
- Blackwater shale and limestone¹
- Braxton formation¹
- Breedon sand¹ (subsurface)
- Brownstown sandstone (in Kanawha formation)¹
- Brush Creek fire clay shale (in Conemaugh formation)¹
- Brush Creek shale (in Conemaugh formation)¹
- Buffalo Creek limestone (in Kanawha formation)¹
- Burning Springs sand¹ (subsurface)

United States—Continued

West Virginia—Continued

Pennsylvanian—Continued

- Cairo gas, silt, or oil sand¹ (subsurface)
- Cambridge red bed (in Conemaugh formation)¹
- Campbell Creek limestone (in Kanawha formation)¹
- Campbell Creek (Lower) sandstone (in Kanawha formation)¹
- Canaan Mountain fire clay¹
- Cannelton limestone (in Kanawha formation)¹
- Cannelton shale (in Kanawha formation)¹
- Carroll sand¹ (subsurface)
- Cedar Grove sandstone (in Kanawha formation)¹
- Cedarville sandstone (in Monongahela formation)¹
- Charleston sandstone¹
- Chilton sandstone (in Kanawha formation)¹
- Clark formation¹
- Clarksburg fire clay shale (in Conemaugh formation)¹
- Clarksburg red shale (in Conemaugh formation)¹
- Cleveland sandstone (in Kanawha formation)¹
- Coalburg sandstones (in Kanawha formation)¹
- Coalburg shale (in Kanawha formation)¹
- Corinth sandstone (in Conemaugh formation)¹
- Decota sandstone (in Kanawha formation)¹
- Dingess limestone (in Kanawha formation)¹
- Dingess sandstone (in Kanawha formation)¹
- Dingess shale (in Kanawha formation)¹
- Dorothy limestone and shale (in Kanawha formation)¹
- Dotson sandstone¹
- Dotson (Lower) sandstone¹
- Douglas shale (in Kanawha formation)¹
- Eagle limestone (in Kanawha formation)¹
- Eagle sandstone (in Kanawha formation)¹
- Eagle shale (in Kanawha formation)¹
- East Lynn sandstones (in Allegheny formation)¹
- Eckman sandstone (in Pottsville group)¹
- Elk fire clay (in Conemaugh formation)¹
- †Elkgarden formation¹
- †Elk River series¹
- Fairfax formation¹

United States—Continued

West Virginia—Continued

Pennsylvanian—Continued

Fairfax limestone ¹
†Fayette sandstone ¹
Flattop Mountain sandstone ¹
Gilbert sandstones (in Kanawha formation) ¹
Gilbert shale (in Kanawha formation) ¹
Grafton sandstone (in Conemaugh formation) ¹
Grampus ¹ (sand) (subsurface)
Grapevine sandstone (in Kanawha formation) ¹
Guayandot sandstone (in Sewell formation) ¹
Hammond fire clay (in Kanawha formation) ¹
Hardman fire clay (in Allegheny formation) ¹
Hartridge shale ¹
Harvey conglomerate lentil (in Sewell formation) ¹
Hernshaw sandstone (in Kanawha formation) ¹
Homewood (Lower) sandstone (in Kanawha formation) ¹
Horseneck sand ¹ (subsurface)
Horsepen ¹ (coal group)
Hughes River flint (in Conemaugh formation) ¹
Jaeger sandstones (in New River formation) ¹
Indian Gap limestone (in Kanawha formation) ¹
Irontdale limestone (in Conemaugh formation) ¹
Island Run sand ¹ (subsurface)
Jane Lew sandstone (in Conemaugh formation) ¹
Kanawha black flint (in Kanawha formation) ¹
Keystone sandstone ¹
Landgraff sandstone (in Pocahontas formation) ¹
†Logan sandstone (in Kanawha formation) ¹
Malden sandstones (in Kanawha formation) ¹
Mason shale (in Conemaugh formation) ¹
Matewan sandstone (in Kanawha formation) ¹
Minshall sand ¹ (subsurface)
Mona limestone (in Conemaugh formation) ¹
Monitor sandstone (in Kanawha formation) ¹
Monitor (Lower) sandstone (in Kanawha formation) ¹
Moundsville sand ¹ (subsurface)
Murphy sand ¹ (subsurface)
Naugatuck sandstone (in Kanawha formation) ¹

United States—Continued

West Virginia—Continued

Pennsylvanian—Continued

Newlon limestone and shale (in Kanawha formation) ¹
†New River coal series ¹
†New River system ¹
North Fork shale ¹
Nuttall (Lower) sandstone ¹
Oceana limestone (in Kanawha formation) ¹
Orlando limestone (in Conemaugh formation) ¹
Peerless sandstone (in Kanawha formation) ¹
Pickens sandstone ¹
†Piedmont sandstone (in Pottsville formation) ¹
Pierpont sandstone ¹
Pineville sandstone ¹
Piney Creek conglomerate ¹
Quakertown slate (in Kanawha formation) ¹
†Quinnimont beds or coal group ¹
Quinnimont sandstone ¹
Raymond limestone (in Monongahela formation) ¹
Rich Mountain conglomerate ¹
Rift shale ¹
Ritchie red beds (in Monongahela formation) ¹
†Roaring Creek sandstone (in Kanawha formation) ¹
Rosedale gas sand ¹ (subsurface)
Royal formation ¹
Royal shale ¹
Ruffner fire clay (in Allegheny formation) ¹
Sandy Huff shale ¹
Seth limestone (in Kanawha formation) ¹
Skelt shale ¹
Stockton limestone (in Kanawha formation) ¹
Stockton shale (in Kanawha formation) ¹
Stockton slate (in Kanawha formation) ¹
Summers series ²
Sutton limestone (in Conemaugh formation) ¹
Thornton fire clay (in Conemaugh formation) ¹
Twomile limestone (in Conemaugh formation) ¹
Tyler red beds (in Monongahela formation) ¹
Vivian sandstone ¹
War Eagle sandstone (in Kanawha formation) ¹
Welch sandstone ¹
Weston sandstone (in Monongahela formation) ¹
Weston shale (in Monongahela formation) ¹

United States—Continued

West Virginia—Continued

Pennsylvanian—ContinuedWharnciffe sandstone ¹Wheeling group ¹Williamson sandstone (in Kanawha formation) ¹Winifrede limestone (in Kanawha formation) ¹Winifrede sandstone (in Kanawha formation) ¹*Upper Pennsylvanian***Benwood limestone member** (of Monongahela formation) ¹**Clarksburg limestone member** (of Conemaugh formation) ¹**Fulton shale member** (of Monongahela formation) ¹**Gilboy sandstone member** (of Monongahela formation) ¹**Morgantown sandstone member** (of Conemaugh formation) ¹**Uffington shale member** (of Conemaugh formation) ¹*Middle Pennsylvanian***Kanawha formation** ¹**Pugh formation** ¹**Quinnimont shale** ¹**Thurmond formation** ¹**Upshur sandstone** ¹*Lower Pennsylvanian***Bayard formation** ¹**Bearwallow conglomerate** ¹**Blackwater formation** ¹**New River formation** (as group ¹ or series ¹)**Nuttall sandstone member** (of Sewell formation) ¹**Raleigh sandstone** ¹**Sequoayah formation** ¹**Sewell formation** ¹**Tellowa formation** ¹**Welch formation** ¹*Mississippian*Ada shale (in Bluefield formation) ¹Alderson limestone (in Greenbrier limestone) ¹Anawalt sandstone ¹Avis limestone (in Hinton formation) ¹Avis sandstone (in Hinton formation) ¹Avis shale (in Hinton formation) ¹Ballard Harmon sandstone ¹Beckett sand ¹ (subsurface)Belcher sandstone (in Bluestone formation) ¹Belcher shale (in Bluestone formation) ¹Bellepoint limestone (in Hinton formation) ¹Bellepoint sandstone (in Hinton formation) ¹

United States—Continued

West Virginia—Continued

Mississippian—ContinuedBellepoint shale (in Hinton formation) ¹Bent sandstone (in Bluestone formation) ¹Bent shale (in Bluestone formation) ¹Bertha sandstone (in Bluefield formation) ¹Bertha shale (in Bluefield formation) ¹Bickett shale (in Bluefield formation) ¹Big Spruce Knob sandstone ¹Big Spruce Knob shale ¹Bradshaw limestone (in Bluefield formation) ¹Bradshaw sandstone (in Bluefield formation) ¹Bradshaw shale (in Bluefield formation) ¹Bratton sandstone (in Bluestone formation) ¹Bratton shale (in Bluestone formation) ¹†Canaan formation ¹Clayton sandstone (in Bluefield formation) ¹Clayton shale (in Bluefield formation) ¹Coney limestone (in Bluefield formation) ¹Coney shale (in Bluefield formation) ¹Dawson sand ¹ (subsurface)Denmar formation ²Droop sandstone (in Bluefield formation) ¹Edray sandstone (in Bluefield formation) ¹Fivemile shale (in Hinton formation) ¹Gladly Fork sandstone (in Bluestone formation) ¹Glenray limestone (in Bluefield formation) ¹Goodwyn sandstone (in Hinton formation) ¹Goodwyn shale (in Hinton formation) ¹†Greenbrier series ¹†Greenbrier shales ¹Greenville shale (in Greenbrier limestone) ¹Hackett sandstone (in Hinton formation) ¹Hackett shale (in Hinton formation) ¹Hartwell sandstone ¹†Hinton limestone (in Hinton formation) ¹Hinton sandstone ¹Hunt sandstone (in Bluestone formation) ¹

United States—Continued

West Virginia—Continued

Mississippian—Continued

Hunt shale (in Bluestone formation)¹

Indian Mills sandstone (in Bluefield formation)¹

Indian Mills shale (in Bluefield formation)¹

Keener sand ¹ (subsurface)

†Lewisburg limestone ¹

Lillydale shale (in Bluefield formation)¹

Lindside sandstone (in Pocono sandstone)¹

Low Gap limestone (in Hinton formation)¹

Low Gap sandstone (in Hinton formation)¹

Low Gap shale (in Hinton formation)¹

Maxton sand ¹ (subsurface)

Pageton sandstone ¹

Patton limestone (in Greenbrier limestone)¹

Patton shale (in Greenbrier limestone)¹

Payne Branch sandstone (in Hinton formation)¹

Payne Branch shale (in Hinton formation)¹

Pickaway limestone (in Greenbrier limestone)¹

Pipestem shale (in Bluestone formation)¹

Pluto limestone (in Hinton formation)¹

Pluto shale (in Hinton formation)¹

Possumtot shale (in Bluefield formation)¹

Pride shale (in Bluestone formation)¹

Raines Corner limestone (in Bluefield formation)¹

Raines Corner shale (in Bluefield formation)¹

Reynolds limestone (in Bluefield formation)¹

Rouzer sand ¹ (subsurface)

Sinks Grove limestone (in Greenbrier limestone)¹

Taggard limestone (in Greenbrier limestone)¹

Talcott shale (in Bluefield formation)¹

Tallery limestone (in Hinton formation)¹

Tallery sandstone (in Hinton formation)¹

Tallery shale (in Hinton formation)¹

Terry limestone (in Hinton formation)¹

Terry shale (in Hinton formation)¹

United States—Continued

West Virginia—Continued

Mississippian—Continued

Tophet sandstone (in Hinton formation)¹

Tophet shale (in Hinton formation)¹

Union limestone (in Greenbrier limestone)¹

Webster Springs sandstone (in Bluefield formation)¹

Upper Mississippian

Bent Mountain member (of Bluestone formation)²

Bluefield shale ¹ or formation

Greenbrier limestone ¹

Hillsdale member (of Greenbrier limestone)¹

Mud Fork member (of Bluestone formation)²

Taggard red member (of Greenbrier limestone) (as shales ¹)

Stony Gap sandstone member (of Hinton formation)¹

Princeton sandstone ¹

Lower Mississippian

Hedges shale ¹

Myers shale ¹

Pinkerton sandstone ¹

Purslane sandstone ¹

Rockwell formation ¹

Upper Devonian

Benson sand ¹ (subsurface)

Burnside sand ¹ (subsurface)

Childress sand ¹ (subsurface)

Elkins sandstone ¹

Hampshire formation ¹

Hendricks sandstone ¹

Riley sand ¹ (subsurface)

Rowlesburg sandstone (in Chemung formation)¹

Valley Head sandstone ¹

Whetstone Run sand ¹ (subsurface)

Woodmont shale member (of Jennings formation)¹

Middle Devonian

Landes limestone ¹

Romney shale ¹

Lower Devonian

Big Mountain shale member (of Keyser limestone)¹

Huntersville chert ¹

Keyser limestone (as member of Helderberg limestone ¹)

†Lewistown chert lentil ¹ (in Lewistown limestone)

Morgan series ¹

Ridgeley sandstone ¹

Silurian

Williamsport sandstone ¹

Middle and Upper Ordovician

Martinsburg shale ¹

Lower Cambrian

Antietam sandstone ¹ or quartzite

Harpers formation (as shale ¹)

United States—Continued

West Virginia—Continued

*Lower Cambrian to Middle Ordovician***Shenandoah limestone**¹

Wisconsin

Pleistocene (Wisconsin)†East Wisconsin formation¹Two Creeks forest bed²**Wisconsin drift or till**¹*Cretaceous or Tertiary***Windrow formation**¹*Devonian*Belgium member¹ (of Lake

Church formation)

Lake Church formation¹*Middle Devonian***Berthelet member**¹ (of Milwaukee formation)**Lindworm member**¹ (of Milwaukee formation)**Milwaukee formation**¹**North Point member**¹ (of Milwaukee formation)Ozaukee member¹ (of Lake Church formation)**Thiensville formation**¹*Silurian*Byron beds¹Iron Ridge ore bed¹**Mayville limestone**¹†Mound limestone¹**Wauwatosa formation**²*Upper Silurian***Waubaukie dolomite**¹*Middle Silurian***Racine dolomite**¹Waukesha limestone¹*Lower Silurian***Burroughs dolomite**¹*Upper Ordovician***Neda formation**¹ or member (of Maquoketa shale)*Middle Ordovician***Beloit dolomite**¹Magnolia member (of Platteville limestone)¹Mifflin member (of Platteville limestone)²**Platteville limestone**¹ or formation**Quimbys Mill member** (of Platteville formation)²*Lower Ordovician*Genoa member (of Oneota formation)²Hickory Ridge member (of Oneota formation)²Mound Ridge member (of Oneota formation)²**New Richmond sandstone**¹**Prairie du Chien group**¹Stoddard member (of Oneota formation)²†Willow River limestone¹

United States—Continued

Wisconsin—Continued

*Cambrian*Port Wing brownstone member (of Orienta formation)²*Upper Cambrian*Arcadia member (of Trempealeau formation)²Birkmose member (of Franconia formation)²†Black Earth dolomite member (of St. Lawrence formation)¹Eau Claire grit¹**Eau Claire sandstone**¹**Devils Lake sandstone**¹Goodenough member (of Franconia sandstone)¹Hudson member (of Franconia sandstone)¹**Ironton sandstone member** (of Franconia sandstone)¹**Lodi member** (of Trempealeau formation); (as member of St. Lawrence formation)¹**Madison sandstone**¹**Mazomanie sandstone**¹**Mendota dolomite member** (of St. Lawrence formation)¹**Mount Simon sandstone**¹Myers Hill sandstone¹**Norwalk sandstone member** (of Jordan sandstone)¹Sparta shale¹Sunset Point formation²Tomah member (of Franconia formation)²**Trempealeau formation**¹Woodhill member (of Franconia formation)²*Precambrian to Upper Cambrian*Sauk sequence²*Precambrian*Alloa rhyolite¹**Amnicon formation**¹Arpin conglomerate and quartzite¹Athelstane granite¹**Bad River dolomite**¹†Bad River gabbro¹†Bad River sandstone¹**Baraboo quartzite**¹Baraboo series¹**Barron quartzite**¹**Bayfield group**¹Berlin rhyolite gneiss¹†Black River iron-bearing series¹Breakwater quartzite¹**Chequamegon sandstone**¹**Chippewa quartzite**¹Conover slate¹Copper Creek beds¹Dake quartzite¹Denzer diorite¹Denzer tuff¹**Devils Island sandstone**¹Douglas County traps¹

United States—Continued

Wisconsin—Continued

Precambrian—Continued

- Eileen sandstone**¹
- Endeavor granite¹
- Flambeau quartzite¹
- Freedom dolomite**¹
- †Hamburg slate¹
- Junction City quartzite¹
- Lohrville granite¹
- Lower Narrows rhyolite¹
- Marathon conglomerate¹
- Marcellon quartz porphyry¹
- Marion granite¹
- Marquette quartz porphyry¹
- Marquette rhyolite¹
- Marshall Hill conglomerate¹
- Mellen or High Bridge granite¹
- Merrimac rhyolite¹
- Montello granite¹
- Mosinee conglomerate¹
- Moundville quartz porphyry¹
- Mukwa granite¹
- Necedah quartzite¹
- North Mound conglomerate and quartzite¹
- Observatory Hill quartz porphyry¹
- Orienta sandstone**¹
- Oronto group**¹
- Otter Creek granite¹
- Pence ferruginous slate member** (of Ironwood-iron formation)¹
- †Penokee series¹
- Pike River granite¹
- Plymouth ferruginous chert member** (of Ironwood-iron formation)¹
- †Portland quartzite¹
- Powers Bluff quartzite¹
- Rib Hill quartzite**¹
- Rowley Creek slate¹
- Rudolph quartzite¹
- St. Cloud granite¹
- Seneca quartz porphyry¹
- Sunday quartzite**¹
- Uteley metarhyolite¹
- Washburn beds¹
- Waterloo quartzite**¹
- Wausau granite¹
- Wausau graywacke¹
- Waushara granite¹
- †Western sandstone¹
- Wisconsin Valley slates¹

Age(?)

- Baxter Hollow granite²

Wyoming

Quaternary

- Hot Springs formation**¹

Quaternary(?)

- Salt Lake conglomerate¹

Recent

- Kaycee formation**²

- Lightning formation**²

Recent(?)

- Ucross formation**²

United States—Continued

Wyoming—Continued

Pleistocene

- Arvada formation**²
- Buffalo drift**¹
- Bull Lake drift**¹
- Pinedale drift**¹

Tertiary

- †Carbon group¹
- Castle rhyolite²
- Cataract basalt²
- Clear Creek gravels²
- Elkhorn basalt²
- Lodgepole rhyolite and obsidian²
- Meadow rhyolitic tuff²
- Ramshorn volcanic series¹
- Sheepeaters basalt²

Tertiary, upper

- Sylvan intrusives¹

Pliocene

- †Canyon conglomerate¹
- †South Pass group¹
- Tower Creek conglomerate**¹
- †Yellowstone Lake group¹

Pliocene, lower

- Camp Davis formation**²

Miocene and (or) Pliocene

- Canyon basalt²
- Crescent Hill basalt²
- Elk Creek basalt²
- Geode Creek basalt²
- Lost Creek trachyte¹
- Oxbow Creek basalt²

Miocene or Pliocene

- Burnt Gulch conglomerate²

Miocene

- Electric Peak intrusives**¹
- Ishawooa intrusives**¹
- Sherman diorite**¹
- Sunlight intrusives**¹

Miocene(?)

- Bishop conglomerate**¹
- †Wyoming conglomerate¹

Miocene, upper, and Pliocene, lower

- Spoon Butte beds¹

Post-Oligocene(?)

- Caldwell Canyon volcanics²

Oligocene

- Hat Creek beds¹
- Sweetwater group¹
- Sweetwater member¹ (of White River group)

- Wiggins formation**²

Oligocene(?)

- Tatman Mountain gravels¹

Oligocene, lower

- Beaver Divide conglomerate member (of Chadron formation)²

- Yoder formation¹

Eocene and Oligocene

- Sand Draw sandstone lentil** (of White River formation)²

Eocene

- Bates Hole formation¹
- †Bitter Creek group¹

United States—Continued

Wyoming—Continued

Eocene—ContinuedBlack Rock coal group ¹Blacks Fork member (of Bridger formation)¹Burnt Fork white layer ¹Green Cove beds ¹Greenian series ¹**Hanna formation** ¹**Knight formation** ¹†Pinyon Peak conglomerate ¹Twin Buttes member (of Bridger formation)¹Ulm coal group (in Wasatch formation)¹Ulm formation ¹Wagonhound member ¹ (of Uinta formation)*Eocene, upper***Fowkes formation** ¹**Tepee Trail formation** ²*Eocene, upper(?)*Continental Peak formation ²*Eocene, middle and upper(?)***Bridger formation** ¹†Bridgerian series ¹Lone Tree white layer ¹†Washakie formation ¹*Eocene, middle***Aycross formation** ²Cottonwood white layer ¹**Fontenelle member** (of Green River formation)²**Laney shale member** (of Green River formation)¹Pass Peak conglomerate ²Sage Creek white layer ¹**Tower sandstone lentil** (of Green River formation)¹*Eocene, lower and middle***Battle Spring formation** ²**Green River formation** ¹*Eocene, lower*Alkali Creek ¹ (red stratum in Wind River formation)**Cathedral Bluffs tongue** (of Wasatch formation)¹†Clark Fork beds ¹Cottonwood Draw banded layers ¹ (in Wind River formation)†Gray Bull beds ¹Hoback formation ²**Indian Meadows formation** ²**Kingsbury conglomerate member** (of Wasatch formation)¹**Lost Cabin member** (of Wind River formation); (as formation ¹)**Luman tongue** (of Green River formation)²**Lysite member** (of Wind River formation); (as formation ¹)**Moncrief member** (of Wasatch formation)²

United States—Continued

Wyoming—Continued

Eocene, lower—ContinuedNewberger sand ¹ (subsurface)**New Fork tongue** (of Wasatch formation)²†Morrow Creek member (of Green River formation)¹**Niland tongue** (of Wasatch formation)²†Ralston formation ¹**Red Desert tongue** (of Wasatch formation)²†Sand Coulee beds ¹**Tatman formation** ¹**Tipton shale member or tongue** (of Green River formation)¹Wilson sand ¹ (subsurface)**Wind River formation** ¹*Paleocene to Eocene***Willwood formation** ²*Paleocene***Almy formation** ¹ or conglomerate†Evanstonian series ¹Mantua lentil (of Polecat Bench formation)²**Pinyon conglomerate** ¹Polecat Bench formation ²Rock Bench quarry beds (of Polecat Bench formation)²Silver Coulee beds (of Polecat Bench formation)²**Tongue River member** (of Fort Union formation)¹*Cretaceous*Custerian series ¹*Upper Cretaceous and Paleocene*†De Smet formation ¹**Evanston formation** ¹**Ferris formation** ¹†Shoshone group ¹*Upper Cretaceous***Adaville formation** ¹**Almond formation** ¹**Bacon Ridge sandstone** ²Basin shale ¹**Baxter shale** ¹†Beaver Creek chalky member (of Niobrara formation)¹**Belle Fourche shale member** (of Graneros shale)¹Black Buttes coal group ¹†Black Butte quartzite ¹**Blair formation** ¹Bow formation or group ¹Chimney Rock tongue (of Blair formation)²**Cody shale** ¹**Elk Basin sandstone member** (of Telegraph Creek formation)¹**Ericson sandstone** ¹ or formationFitzhugh sands ¹ (subsurface)**Frontier formation; ¹ sandstone member** (of Mancos shale) in NW Colorado and NE Utah

United States—Continued

Wyoming—Continued

Upper Cretaceous—Continued

Gammon ferruginous member
(of Pierre shale)¹

†Gebo formation¹

†Golden Wall sandstone (in Blair formation)¹

Hailey shale¹

Hilliard formation¹ or shale

†Ilo formation¹

Kimball sand¹ (subsurface)

Knobs-Cherokee coal group¹

Lance formation¹

Lazear sandstone member (of Adaville formation)¹

Little Missouri lens (in New-castle formation)²

†Little Pine Ridge sandstone¹

Medicine Bow formation¹

Meeteetse formation¹

Mitten black shale member (of Pierre shale)¹

Monument Hill bentonitic mem-ber (of Pierre shale)¹

Muddy sandstone member (of Thermopolis shale); (as sand¹)

†Nefsy shale member (of Gran-eros shale)¹

Newcastle lens (in Newcastle formation)²

New Haven lens (in Newcastle formation)²

Oeth Louie sand¹ (subsurface)

Osage lens (in Newcastle forma-tion)²

Oyster Ridge sandstone member (of Frontier formation)¹

Parkman sandstone; locally, member¹ of several forma-tions

Peay sandstone member (of Frontier formation)¹

Pedro bentonite bed (in Pierre shale)¹

Pine Ridge sandstone member (of Mesaverde formation)¹

Piney formation¹

†Point of Rocks group¹

Quealy sand¹ (subsurface)

Rawlins sandstone¹

Rock Springs formation¹

Sage Breaks member (of Carlile shale); (as shale member of Niobrara formation)¹

†Salt Wells group¹

Shannon sandstone member (of Steele shale)¹ or member (of Cody shale)

Steele shale¹

†Sulphur Creek group¹

Sussex sandstone member (of Cody shale)²

Teapot sandstone (as member of Mesaverde formation¹)

United States—Continued

Wyoming—Continued

Upper Cretaceous—Continued

Torchlight sandstone member (of Frontier formation)¹

Torrington member (of Lance formation)¹

Turner sandy member (of Car-lile shale)¹

Wall Creek sandstone member (of Frontier formation)¹

Lower Cretaceous

Aspen shale¹

Barrett shale¹

Bear River formation¹

Clay Spur bentonite bed (in Mowry shale)¹

†Como beds¹

Cloverly formation¹

Greybull sandstone member (of Cloverly formation)¹

Hay Creek formation¹

Inyan Kara group¹

Mowry shale¹ or member (of Mancos shale)

Newcastle sandstone (as mem-ber of Graneros shale¹)

Oak Creek beds¹

Skull Creek shale (as member of Graneros shale¹)

Thermopolis shale¹

Upper Jurassic and Cretaceous

Beckwith formation¹

Upper Jurassic

†Beulah clays¹ and shale¹

Canyon Springs sandstone mem-ber (of Sundance formation)²

Gypsum Spring formation²

Hulett sandstone member (of Sundance formation)²

Lak member (of Sundance forma-tion)²

†Shirley stage¹

Stockade Beaver shale member (of Sundance formation)²

Sundance formation¹

Middle and Upper Jurassic

Twin Creek limestone¹ or forma-tion

Lower Jurassic

Nugget sandstone¹

Triassic

Crow Mountain sandstone mem-ber (of Chugwater formation)²

Little Medicine tongue (of Din-woody formation)¹

Red Peak member (of Chug-water formation)²

Wyopo formation²

Triassic(?)

†Freezeout limestone¹

Upper Triassic

Alcova limestone member (of Chugwater formation)¹

Jelm formation¹

United States—Continued

Wyoming—Continued

Upper Triassic—Continued

Popo Agie member (of Chugwater formation); (as beds ¹)

Lower Triassic

Dinwoody formation ¹

Upper Paleozoic

Pope Springs sandstone ²

Permian and Triassic

Chugwater formation ¹

†Embar formation ¹ or group ¹

†Teton formation ¹

Permian

Cassa group ²

Ervey carbonate member (of Park City formation); (as tongue ² of Phosphoria formation ¹)

Forelle limestone ¹

Freezeout tongue (of Chugwater formation) ¹

Glendo shale ²

Satanka shale ¹

Sybillie tongue (of Phosphoria formation) ¹

Pennsylvanian, Permian, and Mississippian(?)

Hartville formation ¹

Pennsylvanian or Permian

Broom Creek group ²

Pennsylvanian

Amsden formation ¹

Darwin sandstone member (of Amsden formation); (as Darwin ¹)

Fairbank formation ²

Hayden group ²

Meek group ²

Quadrant formation ¹ or quartzite ¹

Reclamation group ²

Roundtop group ²

Tensleep sandstone ¹

Wendover group ²

Upper Pennsylvanian and Permian

Casper formation ¹

Mississippian

Sacajawea formation ¹

Lower Mississippian

†Littlehorn limestone ¹

Muddy Mountain chert member (of Madison limestone) (J. D. Love, 1939, Geol. Soc. America Special Paper 20, p. 25)

Devonian and Mississippian

Guernsey formation ¹

Middle and Upper Devonian

Darby formation ¹

Lower Devonian

Beartooth Butte formation ¹

Upper Ordovician

Bighorn dolomite ¹

Lander sandstone member (of Bighorn dolomite) ¹

Leigh dolomite member (of Bighorn dolomite) ¹

United States—Continued

Wyoming—Continued

Middle Ordovician

Aladdin sandstone ²

Cambrian

Buck Spring formation ²

Bull Lake Creek shales ¹

Open Door limestone ²

Shoshoni limestone ¹

Upper Cambrian

Boysen formation ²

Du Noir member (of Gallatin formation) ¹

Middle Cambrian

Death Canyon member (of Gros Ventre formation) ¹

Depass formation ¹

Gros Ventre formation ¹

Precambrian

Anderson phyllite ¹

Deep Lake metaquartzite ¹

French slate ¹

Headquarters schist ¹

Heart metagraywacke ¹

Lookout schist ¹

Medicine Bow Peak quartzite ²

Medicine Peak metaquartzite ¹

Nash marble series ¹

Ranger marble ¹

Seeley slate ¹

Seminole formation ¹

†Sheridan quartzite ¹

Sherman granite ¹

Sugarloaf metaquartzite ¹

Towner greenstone ¹

Whalen group ¹

Age(?)

Jardine "basalt" ²

Canada

Alberta

Pleistocene

Drywood soil ²

Lenzie silt ²

Strathcona sand and silt ²

Tofield sand ²

Tertiary(?)

Foothills series ¹

Eocene (see *Upper Cretaceous* or *Eocene*)

Palocene

Coalspur beds ²

Post-Cretaceous

Ice River intrusive complex ¹

Cretaceous

Allison Creek sandstone ¹

Bad Heart sandstone member ¹
(of Smoky River formation)

Bellyan series ¹

Berland River shales ¹

Bighorn formation ¹

Blood Reserve sandstone ¹

Bulwark sandstone ¹

Cardium sandstone ¹

Clearwater shale ¹

Crownsnest volcanics ¹

Dalhousie sand ¹ (subsurface)

Canada—Continued

Alberta—Continued

Cretaceous—Continued

- Eastend formation ¹
- Elk conglomerates ¹
- Kaskapau member ¹ (of Smoky River formation)
- Lea Park formation ¹
- Lineham member ¹ (of Cardium formation)
- Peace River sandstone ¹
- Ribstone Creek formation ¹
- Rocky Mountain limestone ¹
- St. John formation ¹
- Saunders group ²
- Viking sand or sandstone ² (sub-surface)

Cretaceous(?)

- Brazeau formation ¹

Upper Cretaceous or Eocene

- Porcupine Hill series ¹

Upper Cretaceous and Eocene(?)

- Paskapoo formation ¹

Upper Cretaceous

- Alberta shale ¹
- Allison formation ¹
- Bassand member (of Bearpaw shale) ¹
- Baytree member (of Cardium formation) ²
- Belly River formation ¹
- Birch Lake sandstone ¹
- Black Eagle sandstone (in Bearpaw formation) ²
- Blackstone shale ¹
- Brousseau formation ¹
- Chinook member (of Wapiabi formation) ²
- Chungo member (of Brazeau formation) ²
- Doe Creek sandstone (in Dunvegan formation) ²
- Drumheller marine tongue (of Edmonton formation) ²
- Dunvegan sandstone ¹
- Edmonton formation ¹
- Entrance conglomerate (in Edmonton formation) ²
- Foremost formation ¹
- Grizzly Bear formation ¹
- Highwood sandstone (in Wapiabi formation) ²
- Howard Creek sand (in Kaskapau formation) ²
- Jumpingpound member (of Alberta shale) ²
- Kipp sandstone (in Bearpaw shale) ¹
- Kneehills tuff ²
- La Biche shales ¹
- Lethbridge member (of Oldman formation) ²
- Lloydminster shale ² (subsurface)
- Loon River shale ¹
- Magrath sandstone (in Bearpaw shale) ¹

Canada—Continued

Alberta—Continued

Upper Cretaceous—Continued

- Manyberries member (of Bearpaw formation) ²
- Medicine Lodge member (of Bearpaw formation) ²
- Milk River sandstone ¹
- Mulga tongue ² (subsurface)
- Myrtle Creek formation ¹
- Oldman formation ²
- Pakan formation ¹
- Pakowki formation ¹
- Pelican shale or sandstone ¹
- Pouce Coupe sandstone (in Smoky River shale) ²
- Ryegrass sandstone (in Bearpaw shale) ¹
- St. Mary River formation ¹
- Sawridge formation ¹
- Shandro shale ¹
- Solomon sandstone member (of Brazeau formation) ²
- Tar sands ¹
- Vanesti tongue ²
- Verdigris sandstone ¹
- Victoria sandstone ¹
- Wapiabi shale ¹
- Wapiti formation ¹

Lower or Upper Cretaceous

- Joli Fou formation ²

Lower and Upper Cretaceous

- Blairmore formation ¹

Lower Cretaceous

- Bluesky formation ² (subsurface)
- Borradaile member (of Mannville formation) ² (subsurface)
- Bull Head Mountain sandstone ¹
- Cadomin conglomerate ¹
- Cadotte member (of Peace River formation) ²
- Cummings member (of Mannville formation) ² (subsurface)
- Déville formation ² (subsurface)
- Dina member (of Mannville formation) ² (subsurface)
- Ellerslie member (of Blairmore formation) ² (subsurface)
- Falher member (of Spray River formation) ² (subsurface)
- Grand Rapids sandstone ¹
- Harmon member (of Peace River formation) ²
- Islay member (of Mannville formation) ² (subsurface)
- Kootenay formation (Kootenai formation ¹ of U.S.)
- Looma member (of Grand Rapids formation ² (subsurface))
- Luscar formation ¹
- McLeod member (of Kootenai formation) ¹
- McMurray formation ¹
- Mannville formation ² (subsurface)

Canada—Continued

Alberta—Continued

Lower Cretaceous—Continued

- Moose Mountain member (of Kootenay formation)²
- Mountain Park formation¹
- Nikanassin formation¹
- Notikewin member (of Spirit River formation)²
- O'Sullivan member (of Mannville formation)² (subsurface)
- Paddy member (of Peace River formation)²
- Pocaterra Creek member (of Blairmore formation)²
- St. Edouard member (of Grand Rapids formation)² (subsurface)
- St. Paul member (of Grand Rapids formation)² (subsurface)
- Spirit River formation² (subsurface)
- Sunset sandstone¹
- Tovell member (of Mannville formation)² (subsurface)
- Vanalta sand¹ (subsurface)
- Wabiskaw member (of Clearwater formation)² (subsurface)
- Wilrich member (of Spirit River formation)² (subsurface)

Jurassic

- Conrad sandstone member (of Sawtooth formation)² (subsurface)
- Crow Indian Lake member (of Sawtooth formation)² (subsurface)
- Lille member (of Fernie formation)²
- Nordegge member (of Fernie formation)²
- Pigeon Creek member (of Fernie formation)²

Triassic

- Spray River formation¹
- Sprayan series¹

Lower Triassic

- Sulphur Mountain member (of Spray River formation)²

Permian (see *Pennsylvanian to Permian*)*Permian and Pennsylvanian*(?)

- Norquay Mountain member (of Rocky Mountain formation)²
- Tunnel Mountain member (of Rocky Mountain formation)²

Carboniferous

- Banner silt (in Turner Valley member of Livingstone formation)²
- Baril member (of Mount Head formation)²
- Carnarvon member (of Mount Head formation)²

Canada—Continued

Alberta—Continued

Carboniferous—Continued

- Cummings member (of Mount Head formation)²
- Etherington member (of Rocky Mountain formation)²
- Greenock formation²
- Livingstone formation²
- Marston member (of Mount Head formation)²
- Mount Head formation²
- Pekisko member (of Livingstone formation)²
- Rocky Mountain quartzite¹
- Salter member (of Mount Head formation)²
- Wileman member (of Mount Head formation)²

Carboniferous and Devonian(?)Banff series¹*Pennsylvanian to Permian*Storm Creek formation²*Mississippian and Pennsylvanian*(?)Tunnel Mountain member (of Rundle formation)²*Mississippian*

- Bedson limestone¹
- Debolt formation² (subsurface)
- Dyson Creek member (of Rundle formation)²
- Loomis member (of Mount Head formation)²
- Mooshorn limestone¹
- Shunda member (of Rundle formation)²
- Turner Valley member (of Tunnel Mountain formation)² (subsurface)

*Devonian and Carboniferous*Turtle Mountain group¹*Devonian*

- Beaverhill Lake formation² (subsurface)
- Blackface Mountain shale¹
- Blue Ridge member (of Graminia formation)² (subsurface)
- Cairn formation²
- Calmar member (of Winterburn formation)² (subsurface)
- Cheviot formation²
- Chinchaga formation² (subsurface)
- Cooking Lake member (of Woodbend formation)² (subsurface)
- Duvernay member (of Woodbend formation)² (subsurface)
- Fairholme formation²
- Graminia member (of Winterburn formation)² (subsurface)
- Ireton member (of Woodbend formation)² (subsurface)
- Keg River formation² (subsurface)
- Leduc member (of Woodbend formation)² (subsurface)

Canada—Continued

Alberta—Continued

Devonian—Continued

 Miette member (of Minnewanka formation)²

 Minnewanka formation¹

 Mount Wilson quartzite¹

 Muskeg formation² (subsurface)

 Nisku member (of Winterburn formation)² (subsurface)

 Palliser formation²

 Roche Miette limestone¹

 Southesk formation²

 Wabamun formation² (subsurface)

 Watt Mountain formation² (subsurface)

 Winterburn formation² (subsurface)

 Woodbend formation² (subsurface)

Devonian(?)

 Ghost River formation¹

Upper Devonian

 Alexo formation²

 Banffian series¹

 Big Valley member (of Wabamun formation)² (subsurface)

 Boule limestone¹

 Cinquefoil limestone¹

 Coronach shale¹

 Costigan member (of Palliser formation)²

 Delburne formation²

 Delia member (of Woodbend group)²

 Donalda formation²

 Exshaw shale²

 Fenn formation²

 Fiddle limestone¹

 Grosmont member (of Woodbend formation)² (subsurface)

 Hondo member (of Woodbend formation)² (subsurface)

 Kiln shale¹

 Leahurst formation²

 Morro member (of Palliser formation)²

 Mount Hawk formation²

 Perdrix shale¹

 Spence River shale² (subsurface)

 Stettler member (of Wabamun formation)² (subsurface)

 Territories formation² (subsurface)

 Waterways formation²

Middle Devonian

 Fort Vermilion member (of Slave Point formation)²

 Flume dolomite¹

 Steen River formation¹ (subsurface)

Silurian

 Elk Point formation¹ (subsurface)

Canada—Continued

Alberta—Continued

Ordovician

 Sarceen series¹

 Skoki formation¹

Lower Ordovician

 Mons formation¹

 Sarbach formation¹

Cambrian and Lower Ordovician(?)

 Sawback formation¹

Cambrian

 Barker shale¹

 Bosche formation¹

 Chetang limestone¹

 Mahto sandstones¹

 Sullivanian series¹

 Tatei formation¹ (see also Tatay limestone)

 Thompson dolomite¹

 Titkana limestone¹

Upper Cambrian

 Arotomys formation¹

 †Bosworthian series¹

 Chetamon limestone¹

 Lyell formation¹

 Pika formation²

 Sawbackian series¹

 Snaring formation¹

 Sullivan formation¹

 Tangle Ridge formation²

Middle Cambrian

 Eldon limestone¹

 Eldonian series¹

 Murchison formation¹

 Naiset formation²

 Ptarmigan limestone¹

 Sunwapta Peak formation²

Lower Cambrian

 Cavell formation¹

 Fairview formation¹

 Gog formation²

 Lake Louise shale¹

 Louise formation¹

 Mount Whyte formation¹

 Piran series¹

 St. Piran sandstone¹

 Whyte formation¹

Precambrian and (?) Lower Cambrian

 Jonas Creek formation²

Precambrian

 Albertian series¹

 Athabasca sandstone¹

 Blackfoot Canyon facies (of Belt series)²

 Carthew member (of Altyn formation)²

 Corral formation¹

 Corral Creek formation¹

 Cour d'Alene facies (of Belt series)²

 Glacier Park facies (of Belt series)²

 Goat River horizon of McBride group)²

 Hector formation¹

Canada—Continued

Alberta—Continued

Precambrian—ContinuedHell Roaring member (of Altyn formation)²Jasper series¹McBride group²Meagher facies (of Belt series)²Miette formation¹Mount Rowe member (of Miller Peak formation)²Tete Jaune horizon (of McBride group)²Waterton dolomite¹ (*see also* Watertown formation¹)

British Columbia

*Quaternary*Cordilleran formation¹Hoodoo lavas²Iskut River lava²Stikine lavas²*Recent*Alouette gravel²Capilano group²Salish group²Tseax River lava flow¹*Pleistocene to Recent*Bose gravel²Cloverdale sediments²Sunnyside sand²*Post-Pleistocene(?)*Bellabella formation¹*Pleistocene*Abbotsford gravel²Colebrook gravel²Colwood sands and gravels¹Cordova sands and gravels¹Garibaldi volcanic formation¹Lynn outwash²Marysville sands¹Maywood clay¹Newton stony clay²Nicomekl silt (*see also* Nikomeki sand and silt¹)Point Grey formation¹Quadra group²Saanich formation¹St. Eugene silts¹Sapperton sediments²Semiamu group²Semiamu till²Seymour group²Seymour till²Sisters varved clay²Surrey till²Thompson River silts¹Wreck Bay formation¹Wycliffe glacial epoch and drift¹*Tertiary* (*see also Mesozoic or Tertiary; and Cretaceous or Tertiary*)Boundary Bay formation¹Coquihalla series¹Etheline volcanics¹Kitsilano formation¹

Canada—Continued

British Columbia—Continued

Tertiary—ContinuedKruger alkaline body¹Mann Creek formation¹Masset volcanics¹Park granite¹Rapid formation²Rexmont porphyry¹Rossland alkali granite¹Sheppard granite¹Similkameen beds¹Skonun formation¹Sophie Mountain conglomerate¹Spence Bridge series¹Sunloch metagabbro¹Tranquille beds¹Tuya lavas¹Valhalla granite¹White Lake formation²*Tertiary(?)*Similkameen granite¹*Miocene* (*see also Oligocene or Miocene*)Carmanah Point beds¹Nipple Mountain series²Otter granite¹Skull Hill formation¹*Miocene(?)*Chilliwack granodiorite¹Lightning Creek diorite¹Salmon River monzonite¹Slesse diorite¹*Oligocene and (or) Miocene*Sooke formation¹*Oligocene or Miocene*Kamloops volcanic group¹Midway volcanic group¹*Oligocene*Allenby formation²Cedar volcanic series¹Coldwater group¹Curry Creek series¹Escalante formation²Franklin monzonite¹Sooke gabbro group or intrusives¹*Oligocene(?)*Ashcroft rhyolite porphyry¹French Bar formation¹Kettle River formation¹Taseko formation¹*Oligocene or younger*Endako group²*Eocene or Oligocene*Princeton group²*Post-Eocene*Prospect Point eruptives¹*Eocene*Burrard formation¹Chu Chua formation¹Huntingdon formation¹Marron formation²Metchosin volcanics¹Springbrook formation²

Canada—Continued

British Columbia—Continued

Eocene(?)

- Beaverdell quartz monzonite ¹
- Kishenehn formation ¹
- Rexmount volcanics ¹

Eocene or older

- Australian members (of Fraser River formation) ²

Mesozoic or Tertiary

- Beaver Mountain group ¹

Mesozoic

- Rosslund monzonite ¹

Mesozoic(?) and older(?)

- Phoenix volcanic group ¹

Mesozoic and Carboniferous(?)

- Wallace group ²

Lower Mesozoic

- Shonektaw formation ²

Cretaceous or Tertiary

- Bulkeley eruptives ¹
- Skagit volcanic formation ¹
- Sloko group ²
- Whitemans Creek granite ²

Cretaceous (see also Jurassic or Cretaceous)

- Cedar District formation ¹
- Comox formation ¹
- Eagle diorite ¹
- Eldorado series ¹ or granodiorite ¹
- Fraser River formation ¹
- Ganges formation ¹
- Gates formation ¹
- Gething member ¹ (of Bullhead Mountain formation)
- Haida member (of Queen Charlotte series) ¹
- Honna formation ¹
- Komooks beds ¹
- Moosebar formation ¹
- Quesnal River beds ¹
- Skidegate formation ¹

Cretaceous(?)

- Baker gabbro ¹
- Beady formation ¹
- Bitter Creek peridotite ¹
- Duncan formation ¹
- Fife gabbro ¹
- Quesnal River series ¹
- Silver King porphyry ²
- Tamihy series ¹

Upper Cretaceous or Tertiary

- Sheba group ²

Upper Cretaceous

- Benson formation ¹
- Cowichan group ¹
- Cranberry formation ¹
- De Courcy formation ¹
- Denman formation ²
- Departure Bay calcarenites ¹
- East Wellington formation ¹
- Extension formation ¹
- Fort Nelson formation ²
- Gabriola formation ¹
- Goffrey formation ²
- Haslam formation ¹

Canada—Continued

British Columbia—Continued

Upper Cretaceous—Continued

- Helveker volcanics ²
- Hornby formation ²
- Kotanelee formation ²
- Lambert formation ²
- Nanaimo group ¹
- Newcastle formation ¹
- Northumberland formation ¹
- Protection formation ¹
- Qualicum formation ²
- Smoky group ²
- Smoky River series ¹
- Spray formation ²
- Sukunka member (of Dunvegan formation) ¹
- Sustut group ²
- Tribune formation ²
- Vancouver group ¹
- Wapiti River sandstones ¹

Upper Cretaceous(?)

- Sifton formation ²

Lower or Upper Cretaceous

- Leekie group ²

Post-Lower Cretaceous

- Bridge River augite diorite ¹

Lower Cretaceous

- Brew group ²
- Brockenback Hill formation ¹
- Buckinghorse formation ²
- Bullhead group ²
- Canyon sandstone member (of Gething formation) ²
- Commotion formation ²
- Cruiser formation ²
- Curved Tree Point sandstone member (of Gething formation) ²
- Cust Island sandstone member (of Gething formation) ²
- Dunlevy formation ²
- Elk conglomerate ²
- Galloway sandstone member (of Gething formation) ²
- Garbutt formation ²
- Goodrich formation ²
- Hasler formation ²
- Heron Creek sandstone member (of Gething formation) ²
- Jackass Mountain conglomerate group ¹
- Jackass Mountain group ¹
- Kingsvale group ²
- Larry sandstone member (of Gething formation) ²
- Lepine formation ²
- Lillooet group ²
- Nechacco series ¹
- One Tree formation ²
- Peninsula formation ¹
- Queen Charlotte Island formation ¹
- Scatter formation ²
- Shaftesbury formation ²
- Sikanni formation ²

Canada—Continued

British Columbia—Continued

Lower Cretaceous—ContinuedSkagit River beds ¹Skeena sandstone, ¹ series, ¹ or formation ¹Uslika formation ²*Lower Cretaceous*(?)Brian Boru formation ²Inklin group ²*Pre-upper Lower Cretaceous*Hedley diorite-gabbro ²*Jurassic or Cretaceous*Open Bay group ¹Spearing group ²Spence Bridge volcanic group ¹*Jurassic or Cretaceous*(?)

Bonnington complex (R. Mulligan, 1952, Canada Geol. Survey Paper 52-13, p. 10-13).

Tachek group ²*Jurassic* (see also *Triassic or Jurassic*; and *Triassic and Jurassic*)Agassiz series ¹Ashcroft series ²Basque formation ¹Black Canyon formation ¹Boulder granite ¹Colquitz gneiss ¹Cornwall formation ¹Coryell syenite ²Dewdney Creek series ¹Dolly Varden formation ¹Eagle granodiorite ¹Fernian series ¹Ferne formation ¹Franklin granodiorite ¹Harbledown formation ¹Hurley formation ²Image member (in Queen Charlotte group) ¹Kaslo schists ¹Kitzault River formation ¹Ladner series ¹Langara quartz diorite ¹Maude argillites ¹Minabariet formation ¹Mount Sicker formation ¹Nelson granodiorite ¹Ntlakapamux formation ¹Opuntia formation ²Rock Creek granodiorite, ¹ or gabbro and diorite ¹Rock Creek member (of Fernie formation) ²Saanich granodiorite ¹Salmon River conglomerate ¹Sicker series ¹Smelter granite ¹Taylor group ²Thompson series ²Trail granodiorite ²Tye porphyrite ¹Wark gneiss ¹Yakoun volcanics ¹

Canada—Continued

British Columbia—Continued

Jurassic(?)Baldie granite ¹Beale diorite ¹Bralorne intrusives ²Camp Cove series ¹Custer granite gneiss ¹Darlington granodiorite ¹Denain formation ¹Fairview granodiorite ²Gillies intrusives ¹Goose Bay formation ¹**Hazelton group** ¹Kano quartz diorite ¹Kootenay granite ¹Mount Murray diabase ¹Olalla pyroxenite ²Oliver granite ¹Osoyoos granodiorite ¹Peterson Creek syenite ¹Pine River formation ¹Rykert granite ¹Sinwa group ²Sumas diorite ¹Sumner gabbro ²Westkettle quartz diorite ¹Yonakina group ²*Upper Jurassic and Lower Cretaceous*Armagosa member (of Red Rose formation) ²Blind Boy member (of Red Rose formation) ²Dawn member (of Red Rose formation) ²Mill member (of Red Rose formation) ²Red Rose formation ²*Upper Jurassic or Lower Cretaceous*Beattie Peak formation ²Chuchi Lake syenite ²Duckling Creek syenite ²Monach formation ²Monteith formation ²*Upper Jurassic*Agassiz Prairie formation ¹Billhook formation ¹Kent formation ¹Mysterious Creek formation ¹*Middle or Upper Jurassic*John Brown formation ²*Middle Jurassic*Echo Island formation ¹Harrison Lake formation ¹*Lower to Middle Jurassic*Nazcha formation ²*Lower Jurassic*Takwahoni group ²*Jurassic and Triassic*(?)Nitinat formation ¹Sutton formation ¹*Jurassic and (or) younger*Olalla syenite ²Oliver syenite ²

Canada—Continued

British Columbia—Continued

Triassic or Jurassic

- Bear River formation ¹
- Bitter Creek formation** ¹
- Goat Mountain formation ¹
- Marble Bay formation ¹
- Nass formation ¹

Triassic and Jurassic

- Sansum formation ²
- Vancouver series ¹

Triassic (see also Carboniferous or Triassic; and Carboniferous and Triassic)

- Aberdeen formation ¹
- Anderson Bay formation ¹
- Baldonnel formation ²
- Cadwallader series ¹
- Charlie Lake formation ²
- China Creek andesite ²
- Cultus formation ¹
- Franklin Creek basalt ²
- Hall series ¹
- Hedley formation ²
- Henry formation ²
- Karmutsen volcanics ¹
- Kaslo series ¹
- Lucky Jim limestone (in Zintcon member of Slocan series) ²
- Nicola series ¹
- Pardonet member (of Schooler Creek formation) ²
- Parson Bay group ¹
- Quatsimo limestone ¹
- Redtops formation ¹
- Sollicum series ¹
- Thibert series ¹
- Toad formation ²
- Valdes group ¹
- Whitewater limestone ²
- Zintcon member (of Slocan series) ²

Triassic(?)

- Elise formation ²
- Kitsalas formation ¹
- Shulaps volcanics ¹
- Topley granite ²
- Tulameen group ¹
- Wolf Creek formation ²

Triassic(?) and (or) older

- Bowen Island group ²
- Gambier group ²

Upper Triassic to Upper Jurassic

- Takla group ²

Upper Triassic or Jurassic

- Pioneer formation ²

Upper Triassic and Lower Jurassic(?)

- Bonanza group ¹

Upper Triassic

- Honakta formation ²
- King Salmon group ²
- Noel formation ²
- Schooner Creek formation ¹
- Stuhini group ²
- Tyaughton group ²

Canada—Continued

British Columbia—Continued

Middle Triassic

- Liard formation ²
- Whitehorse member (of Spray River formation) ²

Lower Triassic

- Grayling formation ²

Triassic and (or) older

- Barslow formation ²
- Bradshaw formation ²
- Independence formation ²

Triassic or older

- Old Tom formation ²
- Shoemaker formation ²

Triassic and older(?)

- Ymir group ²

Paleozoic (see also Precambrian or Paleozoic)

- Ainsworth formation ¹ or series ¹
- Josephine formation ¹

Paleozoic(?)

- Caulfield formation ¹

Upper Paleozoic

- Bear River beds ¹
- Stoddard formation ² (subsurface)

Upper Paleozoic(?)

- Highland formation ¹

Permian

- Blind Creek formation ²
- Buttle Lake group ¹
- Kedahda formation ²
- Teslin formation ²

Permian(?)

- Fergusson series ²

Permian and older(?)

- Asitka group ²

Permian to Ordovician(?)

- Dease series ¹

Post-Carboniferous(?)

- Lardeau diabase schists ¹

Carboniferous or Triassic

- Boston Bar group ¹
- Prince Rupert formation ¹
- Red Mountain formation ¹
- Slocan series ¹
- Sunnyside limestone ¹

Carboniferous and Triassic

- Milford group ¹

Carboniferous and (or) Permian

- Jackpot limestone ²

Carboniferous and Permian

- Mount Stevens greenstone and amphibolite ²

Carboniferous

- Brooklyn formation ¹
- Cache Creek group or series ¹
- Campbell Creek beds ¹
- Franklin group ¹
- Kaslo volcanics ¹
- Kingston limestone ¹
- Marble Canon limestone ¹
- Mount Roberts formation ¹
- Rawhide formation ¹

Canada—Continued

British Columbia—Continued

Carboniferous—ContinuedRedtop formation ¹Ruth argillite ¹Silver Hoard formation ¹Siwash series ¹Skyline formation ¹Star limestone ¹Stevenson limestone ²*Carboniferous and older*(?)Chilliwack series ¹*Carboniferous*(?), *Triassic*(?), *Jurassic*(?)Rossland volcanic group ¹*Carboniferous*(?)Anarchist series ¹Ashnola gabbro ¹Attwood series ¹Brittania formation ¹Cascade series ¹Kobau group ²Kruger schist ¹Lemieux Creek formation ¹Malahat volcanics ¹Nickel Plate formation ¹Sutherland schistose complex ¹Vaseaux formation ²Vedder greenstone ¹*Carboniferous*(?) and *older*(?)Pend Oreille group ¹*Carboniferous and younger*Leach River (formation) ²Thompson group ²*Carboniferous or pre-Carboniferous*Early Bird formation ¹Point Woodbury formation ¹Princess formation ¹*Pre-Carboniferous*Knob Hill group ¹*Pennsylvanian or Permian*(?)Bridge River series ¹*Pennsylvanian*Rundle limestone ¹Rundlian series ¹*Mississippian*Antler formation ¹Dessa Dawn formation ²Greenbury formation ¹Guyet formation ¹Kindle formation ²Slide Mountain series ¹Wardner limestone ¹Waverly formation ¹*Devonian*(?), *Mississippian*, and *Pennsylvanian*(?)Wadin group ²*Upper Mississippian and Pennsylvanian*(?)Nizi formation ²Proserpine intrusives ¹*Devonian or Carboniferous*Victoria series ¹Whitecap schist series ¹

Canada—Continued

British Columbia—Continued

*Devonian*Harrogate limestone ¹McConnell formation ²Messines formation ¹Muncho formation ²Pipestem formation ¹Starbird formation ¹*Devonian*(?)Mount Foster formation ¹Perkins group ¹Taku group ¹*Post-Middle Devonian, pre-Upper**Mississippian*Sylvester group ²*Middle Devonian*Harrogate formation ¹Nahanni formation ²*Pre-Middle Devonian*Mountain Creek formation ¹*Silurian and Devonian*Hidden Valley group ²*Silurian and (or) Middle Devonian*Burnais formation ²*Silurian*Brisco formation ¹*Ordovician* (see also *Cambrian or Ordovician*; and *Cambrian and Ordovician*)Active formation ²Glenogle shale ¹Gloucester formation ¹Robson limestone ²Sinclair formation ¹Wapta formation ¹Wonah quartzite ¹*Ordovician*(?) and *younger*Seeman group ²*Upper Ordovician and Lower Silurian*Sandpile group ²*Upper Ordovician*Beaverfoot formation ¹*Lower and Middle Ordovician*Walker group ²*Lower Ordovician*Chushina formation ¹*Cambrian or Ordovician*Bluebell limestone ²*Cambrian and Ordovician*Goodsir formation ¹*Cambrian and Ordovician*(?)Fieldian series ¹*Cambrian* (see also *Precambrian or Cambrian*; *Precambrian and (or) Cambrian*; *Precambrian and Cambrian*)Adolphus formation ¹Chancellor formation ¹Chancellorian series ¹Cranbrook formation ¹Eager formation ¹Elko formation ¹

Canada—Continued

British Columbia—Continued

Cambrian—Continued

- Hitka formation ¹
- Hota formation ¹
- Jubilee limestone ¹
- McNaughton sandstones ¹
- Mumm limestone ¹
- Mural limestone ¹
- Ottertail formation ¹
- Ottertail limestone ¹
- Ottertailian series ¹
- Redwall breccia ¹
- Sir Donald formation ¹
- Tah formation ¹

Cambrian(?)

- Mount Selwyn formation ¹
- Nisconlith series ¹

Upper Cambrian and Ordovician

- McKay group ¹

Upper Cambrian

- Bosworth formation ¹
- Lynx formation ¹
- Paget limestone ¹
- Sabine formation ¹
- Sherbrooke limestone ¹
- Sherbrookian series ¹

Middle Cambrian

- Burgess shale ¹
- Burton formation ¹
- Cathedral limestone ¹
- Cathedralian series ¹
- Lake Agnes shale lentil (of Mount Whyte formation) ²
- Nelway formation ²
- Ross Lake shale member (of Ptarmigan formation) ²
- Stephen formation ²
- Stephensian series ¹
- Yoho shale lentil (of Mount Whyte formation) ²

Middle Cambrian(?)

- Canyon Creek slate ¹

Lower, Middle and Upper Cambrian

- Castle Mountain group ¹
- Galton series ¹

Lower and Middle Cambrian

- Atan group ²
- Horseranch group ²

Lower Cambrian

- Donald strata ¹
- Fort Mountain sandstone ¹
- Ingenika group ²
- Laib group ²
- Peyto limestone member (of St. Piran sandstone) ²

Precambrian or Paleozoic

- Eagle Bay formation ²
- King Edward formation ²
- Larkin formation ²
- Mara formation ²
- Mount Ida group ²

Precambrian or Cambrian

- Badger Creek formation ¹
- Barriere formation ¹

Canada—Continued

British Columbia—Continued

Precambrian or Cambrian—Con.

- Fennell formation ¹
- Ishpa formation ²
- Kimball formation ²
- Lostway member (of Richfield formation) ²
- Matthew formation ²
- Roundtop member (of Richfield formation) ²

Precambrian and (or) Cambrian

- Cunningham limestone ²
- Midas formation ²
- Midas limestone member (of Midas formation) ²
- Snowshoe formation ²
- Yankee Belle formation ²
- Yanks Peak quartzite ²

Precambrian and Cambrian

- Bow River group ¹
- Creggan Creek formation ²
- Reeves limestone member (of Reeves McDonald formation) ²
- Reeves McDonald formation ²

Precambrian to Lower Cambrian(?)

- Bee member (of Richfield formation) ²

Precambrian

- Adamsian ¹ (series)
- Adams Lake series ¹ or group ¹
- Albert Canyon division ¹
- Aldridge conglomerate ¹
- Aldridge formation ¹
- Badshot formation ¹
- Baker member (of Richfield formation) ¹
- Bakerville formation ¹
- Bastion schist ¹
- B. C. member ¹ (of Richfield formation)
- Beehive formation ¹
- Cariboo schists ¹
- Chase quartzite member (in Shuswap series) ¹
- Cinnemousum limestone ¹
- Cougar formation ¹
- Cougarian series ¹
- Creston quartzite ¹
- Dewdney formation ¹
- Dutch Creek formation ¹
- Elkoan series ¹
- Fort Steele formation ²
- Glacier division ¹
- Hamill series ¹
- Horsethief formation ¹
- Horsethief Creek formation ¹
- Hudson member (of Richfield formation) ²
- Illecillewaet quartzite ¹
- Kitchener quartzite ¹
- Lardeau series ¹
- Laurie formation ¹
- Lewis series ¹
- Lone Star formation ¹

Canada—Continued

British Columbia—Continued

Precambrian—Continued

Lourian series ¹
 Lowhee member (of Richfield formation) ¹

McDonald formation ¹
 Misinchinka schists ¹
 Monk formation ¹
 Moose meta-argillite ¹
 Motherlode series ²
 Mount Nelson formation ¹
 Moyie argillite ¹ (*see also* Mooyie argillite or formation ¹)

Moyie sill (gabbro) ¹
 Nakimu limestone ¹
 Nakimuan series ¹
 Nisconlithian series ¹

Nugget series ²
 Phillips formation ¹
 Pleasant Valley formation ¹

Priest River group (as terrane) ¹

Purcell basalt ¹

Purcell series ¹

Quartzite Range formation ¹

Quesnal Lake crystalline series ¹

Rainbow member (of Richfield formation) ¹

Reno formation ¹

Richfield formation ¹

Ripple quartzite ¹

Roosville formation ¹

Ross quartzite ¹

Rossian series ¹

Ruby group ²

Saddleback series ¹

Salmon series ¹

Salmon Arm schist ¹

Selkirk series ¹

Shuswap granite ¹

Sicamous limestone ¹

Sicamous series ¹

Sujeh formation ¹

Tenakihi group ²

Three Sisters formation ¹

Toby conglomerate ¹

Tonkawatla formation ¹

Tshinakin formation ¹

Wigwam formation ¹

Windermere series ²

Wolf formation ¹

Yahk quartzite ¹ (*see also* Yaak quartzite ¹)

Precambrian(?) and younger

Wolverine complex ²

Precambrian(?)

Azure River series ¹

Hobson Lake series ¹

Irene conglomerate ¹

Irene volcanic formation ¹

Navada member (or Quartzite Range formation) ²

Age(?)

Anderson River group ¹

Bear River greenstones ¹

Big Sheep volcanics ¹

Canada—Continued

British Columbia—Continued

Age(?)—Continued

Goose Bay argillite ¹
 Grand Forks schist ¹
 Ice River formation ¹
 Krao limestone ¹
 Lost Creek granite body ¹
 Lost Horse intrusives ¹
 Oblique Creek formation ²
 Port Renfrew series ¹
 Proserpine quartz porphyry ¹
 Providence Cove beds ¹
 Richter Mountain hornblendite ¹
 Tagish series ¹
 Texado group ¹
 Trent River shales ¹
 Tutshi series ¹
 Verde Creek granite ¹
 Wark diorite ¹

Manitoba

Pleistocene

Keewatin till ¹ or drift ¹

Tertiary

Boissevain sandstone ¹

Paleocene

Turtle Mountain formation ²

Cretaceous

Ashville beds ¹
 Assiniboine series ¹
 Boyne beds ¹
 Keld beds ¹
 Morden beds ¹
 Pembina beds ¹
 Pembina Mountain ¹ (group)
 Riding Mountain beds ¹
 Vermilion River beds ¹

Upper Cretaceous

Cheval beds ²
 Favel formation ²
 Millwood formation ¹
 Odanah series ¹
 Souris lignitic ¹
 Swan River beds ¹

Jurassic or older

Amaranth formation ²

Upper Jurassic

Melita formation ²
 Waskada formation ²

Middle Jurassic

Reston formation ²

Devonian

Elm Point limestone ¹
 Hudson Bay formation ² (sub-surface)
 Lyleton shale ² (subsurface)
 Manitoba formation ¹
 Moose Jaw Group ² (subsurface)
 Qu'Appelle group ² (subsurface)
 Stony Mountain shales ¹

Upper Devonian(?)

Manitoban ¹ (series)

Middle or Upper Devonian

Point Wilkins member (of Manitoban formation) ²

Canada—Continued

Manitoba—Continued

Middle Devonian

Dawson Bay formation² (sub-surface)

Mafeking formation²

Winnipegosis formation¹

Silurian or Lower Devonian

Ashern formation²

Silurian

Interlake group²

Port Nelson limestone¹

Stonewall limestone¹

Ordovician

Nelson limestone¹

Nelson River limestone¹

Selkirk limestone¹

Shammattawa limestone¹

Stony Mountain limestone¹

Upper Ordovician

Birse member (of Stony Mountain formation)²

Cat Head limestone¹

Dog Head limestone¹

Gunton member (of Stony Mountain formation)²

Penitentiary member (of Stony Mountain formation)²

Red River formation¹ (subsurface in Williston basin, U.S.)

Stony Mountain formation¹ (subsurface in Williston basin, U.S.)

Stony Mountain shale member (of Stony Mountain formation)²

Middle Ordovician

Winnipeg sandstone¹ (subsurface in Williston basin, U.S.)

Cambrian

Churchill arkose sandstone¹

Precambrian

Aikens Lake granite²

Alberts Lake granodiorite²

Amisk group or series¹

Assean Lake series²

Beresford phase¹

Bird River intrusive complex²

Black Trout diorite²

Bulger Lake granite²

Churchillian group¹

Cliff Lake granite porphyry¹

Cross Lake group¹

Dismal Lake granodiorite-gneiss²

File granite²

Ham granite²

Hayes River group¹

Hughes Lake conglomerate²

Island Lake series¹

Kaminis granite¹

Kiski volcanics¹

Laguna series²

Manigotagan granite¹

Naosap granodiorite²

Nekik granodiorite²

Nokomis group²

Canada—Continued

Manitoba—Continued

Precambrian—Continued

Noriss granite²

Oxford group²

Ralph Lake conglomerate²

Reed granite²

Rice Lake series¹

San Antonio formation²

Sherridon group²

Sickle series¹

Snow group²

Squall Lake granite²

Tapukok granodiorite²

Vamp Creek granodiorite²

Wallace Lake granite²

Wanipigow diorite²

Wasekwan series²

Wekusko group¹

Wekuskoan group²

New Brunswick

Quaternary

Grand Falls drift²

St. Jacques drift²

Triassic

Lepreau formation²

Quaco conglomerate¹

Carboniferous

Bathurst formation¹

Boyd series¹

Hillsborough series¹

Red Head formation¹

Weldon series¹

Woodstock conglomerate¹

Upper Carboniferous

Courtenay Bay formation²

Cranberry Point formation²

McCoy Head formation²

Partridge Island formation²

Tynemouth Creek formation²

Post-middle Carboniferous

Chance Harbour granite²

Lower or Upper Carboniferous

Hammond River formation²

Lower Carboniferous

Boar Head formation²

Kennebecasis formation or series²

Pre-Carboniferous

Caledonia group¹

Duck Lake gabbro²

Fairville granite²

Germaine Brook granite²

Golden Grove intrusives²

Grand Lake formation¹

Indiantown gabbro²

Kennebecasis granite²

Mayflower Lake quartz diorite²

Milkish Head granite and granodiorite²

Portland series¹

Rockwood Park granodiorite²

Pennsylvanian

Clifton formation¹

Coal Creek formation¹

Enragé formation²

Grande Anse formation²

Canada—Continued

New Brunswick—Continued

Pennsylvanian—Continued

- Hurley Creek formation ²
- Macdonald Glen formation ²
- Minto formation ²
- Newcastle Creek formation ¹
- Petitocodiac series ¹
- Richibucto formation ²
- Salisbury formation ²
- Scoudouc formation ²
- Shepody formation ²
- Sunbury Creek formation ²
- Tormentine formation ²

Pennsylvanian or older

- Hardwood Ridge flow ²

Mississippian and (or) Pennsylvanian

- Balls Lake formation ²
- Maringouin formation ²
- West Beach formation ²

Mississippian

- Albert formation ²
- Demoiselle formation ¹
- Gautreau formation ¹
- Memramcook formation ²
- Moncton group ²
- Upham formation ²
- Weldon formation ¹

Devonian or Carboniferous

- Bloomsbury formation ¹
- Lancaster formation ¹

Devonian (see also Silurian or Devonian; and Ordovician to Devonian)

- Barberie andesite ¹
- Bon Ami andesite ¹
- Campbellton formation ¹
- Inch Arran latites ¹
- Maple Green andesite ¹
- Mispec group ¹
- Restigouche volcanic series ¹
- Saint George granite or plutonics ²

- Scauminac formation ²

- Stewart andesites ¹

- Sugar Loaf dacites ¹

Devonian(?)

- Nipisiguit granite ¹

Middle Devonian(?)

- Lepreau diorite ²

- Musquash granite ²

Lower Devonian

- Dalhousie shales ¹

Silurian to Mississippian

- Coal Creek formation ¹

Silurian or Devonian

- Little River group ¹

Silurian and Devonian(?)

- Mascarene series ¹

Silurian

- Belledune group ¹
- Dalhousie limestones ¹
- Elmtree slates ¹
- Oak Bay formation ²
- Turgeon formation ¹

Canada—Continued

New Brunswick—Continued

Upper Silurian

- Jones Creek formation ²
- Long Reach formation ²

Post-Ordovician

- Austin Brook quartz porphyry ¹

Ordovician to Devonian

- Fournier group ¹

Ordovician

- Beccaguimic formation ¹
- Millstream series ¹
- Tetagouche series ¹

Ordovician(?)

- Charlotte group ²

Lower Ordovician

- Navy Island formation ²
- Suspension Bridge formation ²

Cambrian (see also Precambrian or Cambrian)

- Narrows formation ²

Upper Cambrian

- Agnostus Cove formation ²
- Black Shale Brook formation ²

Middle Cambrian

- Fossil Brook formation ²
- Hastings Cove formation ²
- Loch Lomond series ²
- Porter Road formation ²
- St. Jean group ¹
- St. John group ¹
- St. Johns shales ¹

Lower Cambrian

- Etcheminian series ¹ or group ¹
- Glenn Falls formation ²
- Hanford formation ¹
- Hanford Brook formation ²
- Hanfordian series ¹
- Ratcliffe Brook formation ²

Precambrian or Cambrian

- Coldbrook group ¹

Precambrian

- Coastal group ¹
- Green Head formation ²
- Kingston group ¹
- Portland group ¹
- Robin Hood formation ²
- Saint John volcanics ²
- St. Martins intrusives and extrusives ²

Age(?)

- Gauvin andesite ¹

Newfoundland (proper)

Carboniferous

- Humber grit series ¹

Upper Carboniferous

- Barachois series ²

Mississippian

- Anguille series ²
- Aquathuna limestone ²
- Black Point formation or limestone ²
- Boswarlis beds ²
- Cape Anguille sandstone ²
- Cape Rouge series ²

Canada—Continued

Newfoundland (proper)—Continued

Mississippian—Continued

- Codroy breccia ²
- Codroy series ²
- Codroy shale ²
- Cormorant limestone ²
- Crabbs limestone ²
- Deer Lake (group) ²
- Fishells conglomerate ²
- Fishells limestone ²
- Heatherton limestone ²
- Highlands sandstone ²
- Humber Falls formation ²
- Jeffreys limestone ²
- Rocky Brook formation ²
- Seacliffs sandstone ²
- Searston beds ²
- Ships Cove limestone ²
- Snakes Bight shale ²
- Spear Point formation ²
- Woody Cove shale ²
- Woody Head beds ²
- Woody Point sandstone ²

Devonian or Mississippian

Rencontre formation ²

Devonian(?) or Carboniferous(?)

Smiths Hole conglomerate ²

Devonian

- Baggs Hill granite ²
- Burlington granite ²
- Cape Brule granite ²
- Chetwynd granite ²
- Dolman gneiss ²
- Dunamagon granite ²
- La Poile group ²
- Roti granite ²

Devonian(?)

- Colchester granodiorite-quartz diorite ²
- Dollond Arm Head quartz diorite ²
- Grand Beach rhyolite-porphry ²
- Mansfield Head granodiorite ²
- North Bay granite ²
- Northern Bight granite ²
- Powder Horn diorite ²
- South Brook biotite-quartz-monzonite ²

Lower or Middle Devonian

Bay du Nord group ²

Lower Devonian

Clam Bank series ²

Pre-Devonian

- Keepings gneiss ²
- Victoria River series ²

Post-Silurian

Ackley granite ²

Silurian

- Botwood formation ²
- Gander Lake series ²
- Goldson formation ²
- Herring Head conglomerate ²
- Indian Island group ²
- Natlines Cove formation ²
- Notre Dame series ²

Canada—Continued

Newfoundland (proper)—Continued

Silurian—Continued

- Pike Arm formation ²
- Pikes Island conglomerate ²
- Sops Island member (of Natlines Cove formation) ²

Silurian(?)

- Baie d'Espoir series ²
- Springdale formation ²

Upper Silurian or younger

Garrison Hills granite ²

Post-Ordovician

- North Brook granite ²
- Twillingate granite ²

Ordovician (see also Cambrian and Ordovician)

- Andersons Cove slates ²
- Baie Verte formation ²
- Bide Arm formation ²
- Breakheart basalt ²
- Cape St. John group ²
- Cutwell group ²
- Deadmans Cove member (of Giles Cove formation) ²
- Englee formation ²
- Exploits series ²
- Fortune tuffs and cherts ²
- Foulke Cove slate and shale ²
- Giles Cove formation ²
- Goose Tickle slate ²
- Gravel Head formation ¹
- Hornet conglomerate ²
- Ireland Point volcanics (in Maiden Point sandstone) ²
- Jacksons Arm conglomerate member (of Giles Cove formation) ²

Lawrence Harbour shale ²

Luke Arm formation ²

Maiden Point sandstone ²

Mortons volcanics ²

Nippers Harbour group ²

Northwest Arm formation ²

Parsons Pond beds ²

Round Head breccia ²

St. Pauls group ²

Sansom graywacke and quartz ²

Simms Ridge shale ²

Sivier formation ²

Snooks Arm series ²

Taylors Pond shale member (of Giles Cove formation) ²

Ordovician(?)

- Belle Bay volcanics ²
- Brent Island limestone ²
- Burin series ²
- Farewell group ²
- Fogo group ²
- Goose Cove schist ²
- Goss Pond volcanics ²
- Little Lawn formation ²
- Long Harbor series ²
- Lushs Bight group ²
- Mings Bight formation ²

Canada—Continued

Newfoundland (proper)—Continued

Ordovician (?)—ContinuedMooring Cove volcanics ²Mount Margaret volcanics ²Pilleys series ²Red Cliff volcanics ²Wellmans Cove diorite ²*Upper Ordovician or Devonian*Blow-me-down complex ²*Middle and Upper Ordovician*Canada Head formation ²Humber Arm series ¹*Post-Middle Ordovician*Bay of Islands complex ²Bluff Head volcanics ²Mount Barren metamorphic complex ²*Middle Ordovician*Cooks limestone tongue (of Humber Arm series) ²Cow Head limestone breccia ¹Hare Island limestone ²Long Point series ¹Portland Head group ²Table Head series ¹*Middle Ordovician* (?)Badger Bay series ²Beaver Bight formation ²Burtons Head group ²Crescent Lake formation ²Gull Island formation ²Julies Harbour group ²Roberts Arm volcanics ²Shoal Arm formation ²Wild Bight volcanics ²*Lower Ordovician*Apsey formation ¹Beach formation ¹Bell Island series ¹Brown Mead formation ¹Chimney Arm formation ²Clarenville series ¹Dominion ore bed ¹Eastern Head formation ¹Green Point series ¹Kelly Island formation ¹Lance Cove formation ¹Little Bay Head lavas ²Little Bell Island formation ¹McGraw bed ¹Maidment formation ¹Redmond formation ¹Riders Brook formation ¹St. George series ¹Scotia ore bed ¹Southern Arm limestone ²Wabana series ¹Western Arm basalts or group ²Western Brook Pond group ²*Cambrian or Ordovician*Buchans series ¹Waban formation ¹

Canada—Continued

Newfoundland (proper)—Continued

Cambrian (see also *Precambrian and Cambrian*)Beaver Brook shale ²Belle Isle shale ¹Chamberlins Brook formation ¹Doucers marble and limestone ²Grand Lake Brook series ²Kippens formation ²Long Pond formation ¹Newfoundland series ¹Random Sound series ¹St. Johns slate ¹Youngs Cove group ²*Upper Cambrian*East Arm formation ²Elliot Cove formation ¹March Point formation ¹*Middle Cambrian*Cloud Rapids formation ²Killigrews Brook formation ¹ (see also Killigrews Brook formation ¹)Manuels formation ¹Petit Jardin formation ²Treytown Pond formation ²*Middle* (?) *Cambrian*Sound Island formation ²*Lower and Middle Cambrian*Fortune Brook formation ²*Lower Cambrian*Bonavista formation ¹Brigus formation ¹Devils Cove formation ²Doten Cove formation ²Goose Cove formation ²Hawke Bay formation ¹ or quartzite ¹Placentia ¹ (terrane)Pools Cove formation ²Smith Point formation ¹Terra Nova ¹ (series)*Lower Cambrian and Precambrian* (?)Dantzic group ²*Precambrian and later*Terranovan ¹ (series)*Precambrian and Cambrian*Bay d'Est formation ²Bull Arm felsite member (of Musgravetown group) ²Cloud Mountain series ¹Salt Water Fund series ¹Spoon Cove formation ²Spyglass Cove formation ²Tilt Point formation ²*Precambrian*Avalon group ¹Avalonian formation ¹Avondale volcanics ¹Barrys zone (in Headland gneiss) ²Birchy schist ²Blackhead formation ²Cabot group ²

Canada—Continued

Newfoundland (proper)—Continued

Precambrian—Continued

 Caplin Cove member (of Logy formation)²

 Capta zone (in Headland gneiss)²

 Carbonear formation²

 Cloud River granite²

 Conception slate¹

 Connecting Point group²

 Fleur de Lys group²

 Fresh Pond granodiorite²

 Grand Bank series¹

 Great Harbour Deep granite²

 Halls Town formation²

 Harbour Main volcanics²

 Headland gneiss²

 Hibbs Hole formation²

 Highlands formation²

 Hodgewater group²

 Lanse a Loup series¹

 Lince-a-Jardin member (of Logy formation)²

 Logy formation²

 Lue Point member (of Logy formation)²

 Movable slates¹

 Pardee gneiss²

 Partridge granite²

 Pigeon gneiss²

 Random formation¹

 St. Lawrence granite²

 Signal Hill formation¹

 Shoalrocks gneiss²

 Snows Pond formation²

 Starboard gneiss²

 Torbay slate¹

 Whiteway formation²

 Woody Cove member (of Logy formation)²

 Ygol member (of Logy formation)²
Precambrian(?)

 Musgravetown group²

 Rattling Brook group²
Age(?)

 Humber limestone¹

 Newfoundland coal formation¹

 North Arm complex²

 Port au Port shale and gritstone¹

 Trinity Bay sandstone¹

 White Bay group²

Newfoundland (Labrador)

Quaternary

 Labrador formation¹
Paleozoic

 Double Mer sandstone¹
Cambrian

 L'Anse au Loup limestones¹
Lower Cambrian

 Bradore formation¹

 Forteau formation¹

 Labrador series²
Precambrian

 Aillik formation²

 Domino gneiss¹

Canada—Continued

Newfoundland (Labrador)—Con.

Precambrian—Continued

 Duley Lake group¹

 Ferriman series²

 Hamilton series²

 Harp Lake anorthosite²

 Holyrood granite²

 Hopedale gneiss²

 Kaipokok gneiss²

 Kaniapiskau series²

 Kaumajet volcanic series²

 Makkovik granite²

 Mealy Mountains anorthosite²

 Mountnais formation²

 Mugford series¹

 Nain anorthosite²

 Point series²

 Ramah series¹

 Red Wine anorthosite²

 Sandgirt Lake formation²

 Sims group²

 Strawberry granite²

 Wapussakatoo group¹

 Zebra slate²

Northwest Territories (Franklin)

Cretaceous or Cenozoic

 Eureka Sound group²
Cretaceous or Tertiary(?)

 Intrepid Bay formation²
Lower Cretaceous or younger

 Christopher formation²

 Hassel formation²

 Isachsen formation²
Lower Cretaceous

 Deer Bay formation²
Lower Jurassic(?)

 Cape With formation²
Middle to Upper Triassic

 Blaa Mountain formation²
Paleozoic (see *Precambrian or Paleozoic*)

Upper Paleozoic or Mesozoic

 Disappointment Bay formation²
Permian

 Greely Fjord group²
Permian or older

 Sail Harbor group²

 View Creek group²
Carboniferous or Permian

 Feilden group²

 Guide Hill group²
Middle Pennsylvanian

 Canyon Fjord formation²
Devonian

 Dana Bay beds²

 Snowblind Bay formation²
Silurian and Ordovician(?)

 Allen Bay formation²
Ordovician and Silurian

 Read Bay formation²
Ordovician

 Cape Baird limestone²

 Putnam Highland formation²

 Thorup Fjord limestone²

Canada—Continued

Northwest Territories (Franklin)—
Continued*Upper Ordovician*Cornwallis formation ²Silliman Mount formation ²*Middle or Upper Ordovician*Croker Bay limestone ²*Lower Ordovician*Mingo River formation ²Nadlo Point limestone ²*Middle Cambrian*Bear Point limestone ²Ooyahgah formation ²*Lower Cambrian*Police Post limestone ²Rabbit Point sandstone ²*Precambrian or Paleozoic*Cape Columbia group ²Mount Disraeli group ²

Northwest Territories (Keewatin)

*Precambrian*Belcher series ¹Belcher Island series ²Dubawnt group ²Hurwitz group ²Keepaloo iron formation ¹Marble Island quartzite ²Tookcarak diabase ¹

Northwest Territories (Mackenzie)

*Cretaceous*Meander shales ¹Mountain shales ¹Rabbitskin sandstone ¹*Upper Cretaceous*East Fork formation or series ²Little Bear formation ²Slater River formation ²*Lower Cretaceous*San Sault group ²*Devonian*Beavertail limestone ¹Bosworth sandstone and shale ¹Camp Creek series ¹Carcajou Mountain beds ¹Fort Creek shale ¹Hare Indian River shale ¹Hare River shales ¹Horn River shales ¹Mount Charles formation ¹Pine Point limestone ¹Presqu'île dolomite ¹Rampart limestone ¹Simpson shale ¹Slave Point limestone ¹*Upper Devonian*Alexandra formation ²Canyon sandstone (in Fort Creek formation) ²Carcajou series ²Grumbler formation ²Hay River series ²Imperial formation ²Jungle Ridge limestone member
(of Fort Creek formation) ²

Canada—Continued

Northwest Territories (Mackenzie)—
Continued*Upper Devonian*—ContinuedKee Scarp limestone member (of
Fort Creek formation) ²Trout River formation ²*Middle Devonian*Amco horizon (of Slave Point
formation) ²*Silurian or Devonian*Bear Rock formation ²*Silurian*Bear Mountain formation ¹Franklin Mountain formation ¹Fitzgerald limestones ¹Lone Mountain dolomite ¹Mount Kindle formation ¹North Nahanna River dolomite ¹Ronning group ²*Ordovician*Sunblood formation ²*Cambrian*Macdougall group ²Saline River formation ¹*Middle Cambrian*Mount Cap formation ¹*Cambrian and (or) older*Katherine group ²*Precambrian*Akaitecho flow (in Yellowknife
group) ²Baker Creek member (in Yellow-
knife group) ²Bode conglomerate ²Bow Lake flow (in Yellowknife
group) ²Brock group ²Cameron Bay series ¹Charlton group ¹Coppermine River series ¹Drill Camp flow (in Yellowknife
group) ²Echo Bay series ¹Epworth dolomite ¹Et-Then series ²Fox flows ²Goulburn quartzite ¹Great Slave group ¹Hornby Bay series ²Kahochella formation ²Kanuyak formation ¹Lindsley Bay granite porphyry ¹Lone Land formation ¹Marian group ²Millsite flow (in Yellowknife
group) ²Murky conglomerate ¹Negus flow ²Nob Hill flow (in Yellowknife
group) ²Nonacho series ²Pearson formation ²Pekanatui series ¹Pethei formation ²

Canada—Continued

Northwest Territories (Mackenzie)—Continued

Precambrian—Continued

Point Lake phase (of Point Lake-Wilson Island group)²

Point Lake-Wilson Island group²

Powder House flow (in Yellowknife group)²

Preble formation²

Prosperous Lake granite²

River Lake granite²

Runa Lake granodiorite²

Snare group²

Snowdrift series¹

Sosan formation²

Staff House flow (in Yellowknife group)²

Stalk group¹

Stark formation²

Stock flow²

Tazin series¹

Teshierpi granite²

Tochatwi group¹

Townsite flows²

Union Island group²

Wilson Island phase (of Point Lake-Wilson Island group)²

Yellorex flow²

Yellowknife group²

Age(?)

Coppermine series¹

Nova Scotia

Pleistocene

Bridgewater conglomerate²

Triassic

Annapolis formation¹

Blomidon shale¹

Cape Spencer flow²

Five Islands volcanics¹

Grande Pre formation¹

North Mountain basalt¹

Scots Bay formation¹

Wolfville sandstone¹

Carboniferous (see also Devonian or Carboniferous)

Canary lime¹

Cape John formation¹

Gaspereau formation¹

Hopewell sandstone¹

Horton Bluff formation¹

Joggins formation¹

Mabou formation¹

Merigomish formation¹

Middleborough member¹ (of River John series)

Middle River formation¹

Millville member¹ (of Lismore formation)

New Glasgow conglomerate¹

Pictou formation¹

Pictou freestones¹

Plymouth member¹

Ribbon limestone¹

Canada—Continued

Nova Scotia—Continued

Carboniferous (see also Devonian or Carboniferous)

Riversdale formation¹

Shulie formation¹

Smalls Brook limestone¹

Smelt Brook formation¹

Stellarton formation¹

Westville formation¹

Pennsylvanian (see also Mississippian or Pennsylvanian)

Albion member (of Stellarton series)²

Boss Point formation¹

Broad Cove formation²

Canso series²

Cape Dauphin formation¹

Coal Brook member (of Stellarton series)²

Cumberland series¹

Harrington River formation¹

Hawkesbury series²

Inverness formation²

Lismore formation¹ (also as Listmore formation¹)

Mabou Mines formation²

McLellan Brook sub-member (of Thorburn member of Stellarton series)²

Marsh Brook submember (of Thorburn member of Stellarton series)²

Morien series¹

Parrsboro formation¹

Point Edward formation¹

Port Hood coal measures¹

Riverside series²

St. Ann formation²

Shale Brook submember (of Thorburn member of Stellarton series)²

Skinner Brook member (of Stellarton series)²

Thorburn member (of Stellarton series)²

West Bay formation²

Lower Pennsylvanian

Millville conglomerates¹

Pennsylvanian(?)

Claremont formation²

MacFarlane redbeds¹

Middle Bridge formation¹

Mississippian or Pennsylvanian

Scotch Village formation²

Mississippian

Ainslie sandstone¹

Ardness formation¹

Avon River limestone¹

Cheverie formation¹

Grantmire member (of Windsor series)²

Horton series¹

Judique series¹

Kennetcook limestone¹

Canada—Continued

Nova Scotia—Continued

Mississippian—ContinuedMcAras Brook formation ¹Macumber formation ²Maxner limestone ¹Miller limestone ¹Pembroke formation ²River John series ¹Tennycapc formation ²Windsor group ¹*Mississippian*(?)Dunbar series ¹Kewstoke conglomerate ¹*Lower Mississippian*Pilier conglomerate and sandstone ²*Devonian or Carboniferous*Union formation ¹*Devonian*Bear River formation ²Knoydart formation ¹*Lower or Middle Devonian*McAdam Lake formation ²*Silurian or Lower Devonian*Middle River group ²*Silurian*Arisaig series ¹Beechhill formation ¹Beechhill Cove formation ¹Cobequid series ¹Kentville formation ¹McAdam formation ¹Moydart formation ¹Nictaux beds ²Ross Brook formation ¹Stonehouse formation ¹Torbrook sandstone ¹*Silurian*(?)New Canaan formation ²*Ordovician*Baxters Brook formation ¹Browns Mountain group ¹James River formation ¹Malignant Cove formation ¹Stewart 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 ¹Barachois slate ¹Bears Brook formation ¹Guysborough formation ¹Mira series or formation ¹*Cambrian and older*(?)Morrison formation ²*Upper Cambrian*Bretonian ¹ (series)MacNeil formation ²*Middle Cambrian*Bourinot group ²Coldbrookian series ²

Canada—Continued

Nova Scotia—Continued

Middle Cambrian—ContinuedDugald formation ²Dugald Brook series ²Dugaldian series ²Eskasoni formation ²Gregwa formation ²Kelvin Glen group ²MacLean Brook formation ²MacMullin formation ²Trout Brook formation ²*Middle Cambrian*(?)Myrabayan series ²*Lower Cambrian*Canoe Brook formation ²MacCodrum formation ²Morrison River formation ²*Precambrian or Cambrian*Goldenville formation ¹Halifax formation ¹Whiterock quartzite ¹*Precambrian*Fourchu group ²George River series ¹Meguma series ¹*Precambrian*(?)Clyburn formation ¹Ingonish gneiss ¹*Age*(?)Chegoggin Point formation ¹Franey granite ¹George River limestone ¹South Mountain granite ²

Ontario

*Pleistocene*Algoma sand ¹Artemisia gravel ¹Clarke interglacial ¹ (sands and clays)Don beds (in Toronto formation) ¹Erie clay ¹Iroquois clay ¹Nipissing clay ¹Patrician drift ¹Saugeen clay ¹Scarboro beds ¹Toronto formation ¹Warren gravel ¹*Upper Jurassic or Lower Cretaceous*Mattagami series ¹*Devonian*Abitibi River formation ¹Arkona beds ¹Ippeewash limestone ¹Ippeewash limestone member ¹
(of Hamilton formation)Long Rapids shale ¹Norfolk formation ²Petrolia shale ¹Petrolia shale member (of Hamilton formation) ¹Port Lambton beds ¹Sextant formation ¹

Canada—Continued

Ontario—Continued

Devonian—Continued

Thunder Bay shales ¹

Widder beds ¹

Williams Island limestone ¹

Upper Devonian

Kettle Point black shale ²

William Island formation ²

Middle Devonian

Anderdon limestone member (of Lucas formation); (as member of Detroit River dolomite ¹)

Decewsville formation ¹

Hungry Hollow formation ²

Springvale sandstone ¹

Lower and Middle Devonian

Moose River formation ²

Silurian

Attawapiskat coral reef ¹

Attawapiskat limestone ¹

Barton beds ¹

DeCew limestone ¹

Ekwan limestone ¹

Ekwan River limestone ¹

Eramosa member ¹ (of Lockport formation)

Galt limestone ¹

Kenogami River formation ¹

Pagwa River formation ¹

Severn limestone ¹

Severn River limestone ¹

Wabin formation ¹

Wingfield formation ²

Middle Silurian

Albemarle group ²

Amabel formation ²

Ancaster member (of Eramosa formation) ²

Assignack member (of Burnt Bluff formation) ²

Billings member (of Burnt Bluff formation) ²

Colpo Bay member (of Amabel formation) ²

Fossil Hill formation ²

Guelph dolomite ¹

Lion Head member (of Manistique formation) ²

Speedwell member (of Eramosa formation) ²

Suspension Bridge member (of Lockport dolomite) ²

Warton member (of Gasport formation) ²

Lower Silurian

Bidwell member (of Cataract formation) ²

Cabot Head shale member (of Cataract formation) ¹

Cataract formation ¹

Dyer Bay dolomite lentil (of Cabot Head shale member) ¹

Grimsby sandstone ¹

Kagawong member (of Cataract formation) ¹

Canada—Continued

Ontario—Continued

Lower Silurian—Continued

Keppel dolomite ¹

Manitoulin dolomite member (of Cataract formation) ¹

Power Glen formation ²

St. Edmund dolomite lentil (of Cabot Head shale member) ¹

Thorold sandstone member (of Albion sandstone) ¹

Ordovician (see also *Cambrian and Ordovician*)

Billings formation ²

Blue Mountain formation ¹

Christie member (of Dundas formation) ¹

Coboconk limestone ¹

Cobourg limestone ¹

Cragleith formation ²

Danforth member (of Dundas formation) ¹

Eastview formation ²

Halleybury formation ¹

Kirkfield limestone group ¹

Liskeard formation ¹

Nottawasaga group ² (subsurface)

Ottawa beds ¹

Picton formation ¹

Rideau sandstone ¹

Rouge River formation ²

St. Marys sands ¹

Simeoe group ² (subsurface)

Verulam formation ²

Vincent member (of Meaford formation) ¹

Whitby group ² (subsurface)

Winnipeg limestone ¹

Upper Ordovician

Carlsbad formation ²

Collingwood formation ¹

Credit member ¹ (of Dundas formation)

Davenport member ¹ (of Dundas formation)

Don River member ¹

Dundas formation ¹

Erindale member ¹

Humber member ¹ (of Dundas formation)

Humber River ¹ (member)

Kagawong beds ¹

Meadowvale member ¹

Meaford member ¹

Queenston shale ¹

Rosedale member ¹ (of Dundas formation)

Russell formation ²

Sheguindah beds ¹

Streetsville member ¹

Wekwemikongsing beds ¹

Middle Ordovician

Cloche Island beds ¹

Glenburnie member (of Chaumont formation) ¹

Gull River formation ²

Canada—Continued

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

- March formation ²
- Oxford formation ²

Lower Ordovician and Upper Cambrian(?)

- Nepean sandstone ²

Cambrian and Ordovician

- Battlemill beds ²
- Brockville beds ²
- Maitland beds ²
- Prescott series ²

Upper Cambrian

- Sault St. Mary sandstones ¹

Precambrian

- Abram conglomerate ¹
- Abram series ¹
- Aeme porphyry ²
- †Agawa iron-formation member (of Knife Lake slate) ¹
- Ament Bay arkosites ¹
- Animikie group ¹; group in Minnesota, series in Michigan
- Anstruther granite gneiss ²
- Atic Oban series ¹
- Atikokan series ¹
- Attewell Lake gabbro ²
- Aweres formation ¹
- Bad Vermilion 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
- Clarabell 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 ²
- Crowduck Lake conglomerate ¹
- Daredevil formation ¹
- Deer Lake syenite ²
- Deloro group ²
- Dobie volcanics ²
- Dome conglomerate ¹
- Dome dacite (in Vipond formation) ²
- Doré conglomerate ¹
- Doré series ¹
- Driving Creek formation ¹
- Duncan greenstone ¹
- Dysart granite gneiss ²
- East Bay formation ²
- East Bull Lake gabbro ²
- Eleanor slate ¹
- Elsie 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
- Grenville series ¹
- Gros Cap greenstone ¹
- Gullwing Lake conglomerate ²
- Gullwing Lake volcanics ²
- Hallnor conglomerate ²
- Handy Lake volcanics ¹
- Hardrock "porphyry" ²
- Hastings series ¹
- Helen iron-formation ¹
- Hill group ²
- Hinchinbrooke granite ²
- 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
- Kaministiquia group ¹ (see also Kaministiquia formation ¹)
- Kashabowie series ²
- Kennebec volcanics ²
- Kenoran volcanics ²
- Kiask series ¹

Canada—Continued

Ontario—Continued

Precambrian—Continued

Killarnean granites ²
 Killarney granite ¹
 Krist fragmental (unit) ²
 Lac Seul series ¹
 Larder Lake series ¹
 Levack granite ²
 Linklater formation ²
 Long Lake diorite ¹
 Lorrain granite ¹
 Lorrain quartzite ¹
 McIntyre series ¹
 MacKenzie Island graywacke ²
 McKim graywacke ¹
 Mallard Lake metagabbro ²
 Maminse diabase ¹
 Mallorytown granite ¹
 Marshall Lake series ¹
 Marten River granite ²
 Matachewan series ¹
 Mather sediments ²
 Meach Lake conglomerate ²
 Miller Lake porphyry ²
 Millerton porphyry ²
 Miminiska series ²
 Mining Mountain granite gneiss ²
 Miniss series ¹
 Mississagi quartzite ¹
 Moira granite ¹
 Monck Lake leuco-granite gneiss ²
 Mud Lake granite ¹
 Murray granite ²
 Neepawa volcanics ²
 Newfield diabase ²
 Nipogon group ¹
 Oconto gabbroic anorthosite ²
 Olden gabbro ²
 Onaping tuff ¹
 Onwatin slate ¹
 Osler series ¹
 Ottawa gneiss ¹
 Ottetail white quartzite ¹
 Pamour conglomerate ²
 Parham gabbro ²
 Patara schist or series ¹
 Pearl Lake porphyry ²
 Peewatai Lake granite ²
 Phantom Island slate ²
 Philcot-Crosseho Lakes volcanics ²
 Proctors Lake limestone ¹
 Quadeville metagabbro ²
 Raglan metagabbro ²
 Ramsey Lake graywacke conglomerate ¹
 Rest Island granite ¹
 Rice Bay granite gneiss ¹
 Ridout series ¹
 Rove slate ¹
 St. Andrew gabbroic anorthosite ²
 Savant group ¹
 Seine conglomerate ¹
 Seine series ¹

Canada—Continued

Ontario—Continued

Precambrian—Continued

Seine River series ¹
 Serpent quartzite ¹
 Shabu series ¹
 Shoal Lake conglomerate ¹
 Sibley series ¹
 Silver Lake granite ²
 Slate Lake series ²
 Snider series ²
 Soo series ¹
 Soultan series ¹
 Steep Rock series or group ¹
 Steep Rock Lake series ¹
 Stobie series ²
 Sudbury norite ¹
 Sudbury series ¹
 Sudbury-Bruce series ²
 Swayze series ²
 Tait volcanics ²
 Thanet gabbro ¹
 Thessalon group ¹
 Thunder Bay slates ¹
 Thunder Lake sediments ²
 Thunder River volcanics ²
 Tichborne gabbroic anorthosite ²
 Tichborne-Buck Bay granite and alaskite ²
 Tisdale group ²
 Tot-Gullwing Lakes granite ²
 Trembling Lake limestone ¹
 Trout Lake conglomerate ¹
 Uchi series ²
 Umfraville gabbro ¹
 Varennesic period ¹
 Vermilion-Bluett Lakes conglomerate ²
 Vermilion-Centrefire Lakes volcanics ²
 Victoria gabbroic anorthosite ²
 Vipond series ¹
 Wabigoon volcanics ²
 Wanapitei quartzite ¹
 Wanipigow series ¹
 Warclub Lake series ¹
 Warden-Munroe complex ²
 Wawa tuff ¹
 White Lake syenite ²
 Whitewater series ¹
 Wilkinson anorthosite ²
 Windegokan series ¹
 Winnipeg River granite ¹
 Zealand sediments ²
 Age(?)
 Bear Passage granite ¹
 Knuckle Island granite ¹
 Michipicoten schists ¹
 Nowhere Island granite gneiss ¹
 Redgut Bay granite ¹

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 ¹
- Montreal formation ¹
- Rupert formation ¹
- St. Maurice sand ¹
- Sorel sand ¹

Pleistocene

- Hochelagan formation ¹
- Lawrencian clay ¹
- St. Lawrencian terrane ¹

Pennsylvanian

- Cannes de Roche formation ¹

Mississippian or Pennsylvanian

- Bonaventure formation ¹

Devonian and Mississippian

- Gaspé series ¹

Post-Devonian(?)

- Stanstead granite ¹

Devonian or younger

- Breeches Lake granite ²
- Mount Aylmer granite ²
- Waterloo lava ²
- Winslow granite ²

Devonian

- Barré limestone ¹
- Big Megantic nordmarkite or granite ²
- Bon Ami beds ¹
- Cape Barré beds ¹
- Cape Bon Ami limestone ¹
- Causapsal formation ¹
- Cranbourne series ²
- Famine series ¹
- Fortin series ²
- Gaspé limestone ¹
- Gaspé sandstone ¹
- Griffon Cove River beds ²
- Lake Aylmer series ¹
- Lake Branch formation ²
- Lambton formation ¹
- Levis shale ¹
- Malbaie conglomerate ¹
- Pic d'Aurore series ¹
- Price conglomerate ²
- St. Alban formation ¹
- St. Gerrard member (of Lake Alymer formation) ²
- St. Lawrence shale ²
- Scotstown granite ²
- Seventeen-Mile Brook beds ²
- Sonneau Brook member (of Gaspé sandstone) ²
- York River sandstone ¹

Devonian(?)

- Mount Wissick group ¹
- St. Helens Island breccia ²
- Talon formation ¹
- Weedon granite and aplite ²

Upper Devonian or post-Devonian

- Bolton igneous series ¹

Upper Devonian

- Escuminac beds ¹
- Fleurant conglomerate ¹
- Four Mile Brook member (of Heppel sandstone) ²

Canada—Continued

Quebec—Continued

Upper Devonian—Continued

- Pirate Cove formation ¹

Middle or Upper Devonian

- Ladystep intrusives ¹

Middle Devonian

- Battery Point formation ²
- Heppel formation ¹

Lower Devonian

- Copper Mountain group ²
- Federal sediments ²
- Grande Greve limestones ¹
- Mount Joli formation ¹
- Murailles formation ¹
- Needle chert ²
- Needle Mountain group ²
- Needle Mountain limestone ²
- Percé formation ¹
- Percé Rock beds ²
- Porphyry Mountain group ²
- St. Albans limestones ¹

Lower(?) Devonian

- York Lake series ²

Silurian or Devonian

- Eustis porphyry ²

Silurian(?) or Devonian(?)

- St. Juste group ²

Silurian and Devonian

- Dartmouth River series ²
- Grande River-Portage River formation ²
- St. Jean River series ²

Silurian

- Anticosti group ¹
- Beesie formation ¹
- Beesie River formation ¹
- Bouleaux formation (in Chaleur series) ¹
- Cabano River limestone ¹
- Chaleur series ¹
- Chatte River limestones ¹
- Chicotte formation ¹
- Clemville formation (in Chaleur series) ¹
- Gascons formation (in Chaleur series) ¹
- George Pond breccia ²
- Glenbrooke shale ²
- Gun River formation ²
- Indian Point formation ¹
- Jupiter formation ¹
- Jupiter River formation ¹
- La Vieille formation (in Chaleur series) ¹
- Marsouin series ¹
- Peasley Pond conglomerate and sandstone ²
- St. Leon formation ¹
- Sargent Bay limestone ²
- Sayabec formation ¹
- Sherbrooke group ²
- Temiscouata group ¹
- Val Brilliant formation ¹
- West Point formation (in Chaleur series) ¹

Canada—Continued

Quebec—Continued

Middle Silurian

Anse Cascon formation ²

Mount Alexander series ²
Ordovician or Silurian

Ladystep volcanics ¹

Moulton Hill granite ²
Ordovician

Basswood Creek formation ¹

Beauceville series ¹

Beauharnois formation ¹

Becancour River formation ²

Bedford formation ¹

Breault member (of Nicolet River formation) ²

Carmel River member (of Becancour River formation) ²

Charleton formation ¹

Citadel series ¹

Compton formation ¹

Corey limestone ¹

Ellis Bay formation ²

English Head formation ¹

Eustis-Moulton Hill series ²

Farnham limestone ¹

Gamachian series ¹

Iberville formation ¹

Lachine formation ²

Lacolle conglomerate ¹

Leclercville shale ²

Lotbinière shale ²

Magog formation ¹

Matapedia series ¹

Mingan formation ¹

Mystic ¹ (formation)

Nicolet River formation ²

Pierreville member (of Becancour River formation) ²

Pohenagamuk formation ¹

Pontgravé River formation ²

Quebec City formation ¹

Romaine formation ¹

St. Armand limestone ¹

St. Francis series ²

Sr. Hilaire member (of Nicolet River formation) ²

St. Marc limestone ¹

Sherbrooke series ²

Tomifobia slates and limestone ¹

Vaurial formation ¹

Wallace Creek formation ¹
Ordovician(?)

Cabano conglomerate ¹

Frontiere group ²

Gagne Brook series ¹

Maquereau series ¹

Shickshock formation ¹

Weedon schist ¹
Upper Ordovician

Cape Blanc formation ¹

Cape Canon formation ¹

Limekiln conglomerate ¹

Little Indian Pool beds ²

Macastey black shale ¹

Canada—Continued

Quebec—Continued

Upper Ordovician—Continued

Pabos formation ¹

Whitehead formation ¹
Middle and Upper Ordovician

Mictaw series ¹
Middle and Upper(?) Ordovician

Stanbridge slate ¹
Middle Ordovician

Ayers Cliff formation ²

Blondeau limestone conglomerate ²

Caughnawaga member (of Laval formation) ²

Galet beds ²

Hull limestone ¹

Laval formation ²

Mile End formation ²

Montreal formation ²

Ouareau transition beds ²

Rosemount member (of Montreal formation) ²

St. Dominique formation ²

St. Martin formation ²

St. Michel member (of Montreal formation) ²

Sainte Thérèse member (of Laval formation) ²

Shipshaw beds ²

Simard beds ²

Stony Creek formation ²

Terrebonne formation ²

Tetreauville formation ²

Tremblay beds ²
Lower Ordovician

Aylmer formation ¹

Hastings Creek formation ¹

Large Island beds (of Romaine formation) ²

Luke Hill limestone ¹

Magog conglomerate ¹

Matane shale ²

Metis shale ²

Naylor Ledge formation ¹

Pillage Bay sandstone (of Romaine formation) ²

Pillar sandstones ²

Quarry Island beds (of Romaine formation) ²

Solomons Corner limestone ¹

Tourelle sandstone ²

Ville Guay conglomerate ²
Lower Ordovician and older(?)

Phillipsburg series ¹
Pre-Ordovician

Coleraine series ²
Pre-Ordovician(?)

Frontenac formation ¹

Stoke granite ²

Weedon porphyry ²
Cambrian or Ordovician

Lauzon formation ¹

Macquereau series ¹

Sillery formation ¹

Canada—Continued

Quebec—Continued

Cambrian and Ordovician

- Cape Rosier beds ²
- Carillon limestone ²
- Chatham limestone ²
- Lachute beds ²
- Levis formation ¹
- Missisquoiibay series ²
- Rigaud passage beds ²
- St. Flavien basic eruptives ²

Cambrian

- L'Islet formation ¹
- Manitouneuk group ¹
- Mistassini formation ¹
- Pinnacle graywacke ¹
- Pointe Levis group ¹
- Redoute limestone ¹
- Sutton schists ¹

Cambrian(?)

- Armagh group ²
- Caldwell series ¹
- Kamouraska formation ¹
- Rosaire group ²

Upper Cambrian

- Mansonville slates ¹
- Murphys Creek formation ¹
- Oak Hill slate ¹
- Rock River formation ¹
- Strites Pond formation ¹

Lower Cambrian

- Bunker slate ¹
- Call Mill slate ¹
- Charny formation ²
- Dunham dolomite ¹
- Dunmore quartzite ²
- Gilman quartzite ¹
- Melbourne limestone ²
- Scottsmore quartzite ¹
- Sweetsburg slate ¹
- Vail slate ¹
- West Sutton slate ¹
- White Brook dolomite ¹

Lower(?) Cambrian

- Corner-of-the-Beach formation ²

*Precambrian, Cambrian, and Ordovician*Quebec group ¹*Precambrian*

- Abitibi group ¹
- Albanel group ²
- Aldermac syenite porphyry ²
- Alison quartzite ²
- Ashuanipi complex or series ²
- Attikamagen formation ²
- Auger Lake conglomerate ²
- Bachelor Lake granite ²
- Barraute gabbro ²
- Barry Lake gneiss ²
- Beattie syenite porphyry ²
- Bell River anorthosite ²
- Bennett quartzite ¹
- Bernetz gneiss ²
- Billy Lake quartz porphyry ²
- Black River group ²
- Blake River group ²

Canada—Continued

Quebec—Continued

Precambrian—Continued

- Bourlamaque granodiorite ²
- Brassier-Dollard biotite granite ²
- Bristol series ¹
- Broadback series ¹
- Brock series ¹
- Broughton series ¹
- Buckingham gneiss ¹
- Buit Lake granite ²
- Cache Lake gabbro ²
- Cadillac group ²
- Capisisit Lake granite ²
- Cedar Rapids granite ²
- Céloron granite ²
- Chadbourne series ¹
- Chertsey facies (of Morin anorthosite) ²
- Chibougamau complex ¹
- Chioack conglomerate-sandstone ²
- Claverny albite granodiorite ²
- Cléricy granodiorite ²
- Cléricy sediments ²
- Cléricy porphyritic syenites ²
- Coom Lake diorite-gabbro ²
- Dalquier granite ²
- Dastur metagabbro ²
- Dauversière granite ²
- David Lake group ²
- Davy Lake breccia ²
- Denault dolomite ²
- Doré Lake group ²
- Doublet group ²
- Dufault diorite and quartz diorite ²
- Dufault granodiorite ²
- Duparquet sediments ²
- Duverny granite ²
- Fabre series ¹
- Fiedmont granodiorite ²
- Figuery granodiorite ²
- Fenimore iron formation ²
- Flavrian granite ²
- Fleming chert breccia ²
- Fort Chimo group ²
- Fournière sediments ²
- Glenwood series ²
- Grenville limestone ¹
- Goeland granite ²
- Goldvue quartz diorite ²
- Granada conglomerate ²
- Granada greywacke ²
- Guenette granite aplite ¹
- Gull Lake anorthosite ²
- Harricanaw series ¹
- High Falls granite ²
- Holmes gneiss ²
- Horne rhyolites ²
- Howse group ²
- Hub Lake syenite ²
- Josselin gneiss ²
- Kastasakau complex ²
- Kayrand quartz gabbro ²
- Kensington syenite ²
- Kewagama group ²

Canada—Continued

Quebec—Continued

Precambrian—Continued

Kinojevis group ²
 Kirkland Lake series ¹
 Kitchigama granite ²
 Knob Lake group ²
 Koksoak series ²
 LaBelle series ¹
 Labyrinth Lake granite ²
 LaCorne hornblende - granodiorite ²
 Lacoste series ¹
 Lake Evans series ¹
 Lake Mistassini group ²
 Lake Robertson granite ²
 Landrienne gabbro-peridotite complex ²
 La Motte granite ²
 La Motte-LaCorne granite ²
 La Pause syenites ²
 Laporte group ²
 La Reine granite ²
 Lichen Lake granite ²
 Loranger series ¹
 Lorrain series ¹
 Louvicourt granodiorite ²
 McWatters group ²
 Maikasagi River gneiss ²
 Malartic granodiorite ²
 Malartic volcanics ²
 Matagami series ¹
 Menihek formation ²
 Mildale gabbro ²
 Mistassini limestone ¹
 Moisie series ²
 Moose Lake granite ²
 Morin series (F. F. Osborne, 1936, Quebec Dept. Mines Ann. Rept. 1935, pt. C, p. 63)
 Murdock group ²
 Nastapoka series ¹
 Nelson Lake granite ²
 Nemenjish series ¹
 Newbec breccia ²
 Newport albitized quartz diorite ²
 Nipissing diabase ¹
 Noranda Lake granite ²
 Obatogamau granite ²
 Okikeska series ¹
 Olga quartz diorite ²
 Onslow syenite ¹
 Opaoka River complex ²
 Opemiska granite ¹
 Opemiska series ¹
 Osisko Lake rhyolites ²
 Ottawa gneiss ¹
 Palmarolle granodiorite ²
 Papaskwasati group ²
 Pascalis-Tiblemont granodiorite ²
 Pine Hill syenite ²
 Pontiac schist ¹ or group ¹
 Port Harrison series ²
 Powell granite ²

Canada—Continued

Quebec—Continued

Precambrian—Continued

Preissac granite ²
 Preissac syenites ²
 Quinville granite ²
 Rapid River conglomerate ¹
 Red Chute quartz diorite ²
 Richmond group ¹
 Richmond Gulf group ²
 Roberval (as Roberval) formation ¹
 Roberval (as Roberval) granite ¹
 Rolland granite ¹
 Rouyn Lake sediments ²
 Ruth Lake formation ²
 Saguenay formation ¹
 Saint Jude igneous breccia ²
 Seaforth porphyry ²
 Seal Lake series ²
 Seward grits ²
 Siscoe granodiorite ²
 Sokoman formation ²
 Soma gabbro ²
 Stadacoma tuffs ²
 Strangway granite ²
 Sutton Mountain series ¹
 Temiscamie group ²
 Tibbit Hill schist ¹
 Tonnancourt quartz monzonite ²
 Trembling Mountain gneiss ²
 Unison granodiorite ²
 Verneuil granite ²
 Wareham Lake series ²
 Waswanipi granite ²
 Wilson granite ²
 Wishart quartzite ²
 Precambrian(?)
 Pentecote granite ²
 Age(?)
 Dalhousie Mountain andesites ¹
 Disraeli series ¹
 Maria latite ¹
 Nouvelle dacites ¹
 Rosenberg series ²
 Thetford series ¹
 Saskatchewan
 Pleistocene
 Regina clay ¹
 Saskatchewan gravels ¹
 Tertiary or Quaternary
 South Saskatchewan gravels ¹
 Miocene, middle or upper
 Wood Mountain gravels ¹
 Oligocene
 Cypress Hills beds ¹
 Eocene
 Roche Percée group ¹
 Swift Current formation ¹
 Eocene(?)
 Estevan formation ¹
 Eocene, upper
 Swift Current Creek formation ²
 Eocene, lower
 Willowbunch member (of Ravenscrag formation) ¹

Canada—Continued

Saskatchewan—Continued

*Upper Cretaceous or Tertiary*Ravenscrag beds ¹*Upper Cretaceous*Battle formation ²Belanger member (of Bearpaw formation) ²Frenchman formation ²Oxarart member (of Bearpaw formation) ²Thelma member (of Bearpaw formation) ²Whitemud formation ¹*Jurassic*Davidson formation ² (subsurface)Gravelbourg formation ² (subsurface)Shaunavon formation ² (subsurface)Vanguard formation ² (subsurface)Watrous formation ² (subsurface)*Devonian*Davidson evaporite ² (subsurface)Saskatchewan group ² (subsurface)*Upper Devonian***Duperow formation** ² (subsurface)*Ordovician*Black Island member (of Winnipeg formation) ²Deer Island member (of Winnipeg formation) ²Grindstone Point unit (in Winnipeg formation) ²*Precambrian*Athona granite ²Beaverlodge series ²Brindson Lake granite ²Cameron Island granite ²Churchillian group ¹Elliot Bay conglomerate ²Frontier Lake conglomerate ²Kenwood River granite ²Kisseynew gneisses ¹La Ronge group ²; Lac La Rouge series ¹Lodge Bay granite ²Mackintosh Bay granite ²Missi formation ¹Morin limestone ¹Nistoassini-Nayelles Lakes granite ²Pebble Island conglomerate ²Waddy-Contact Lakes granite ²White Lake granite ²

Yukon

*Recent*Kluane silt ²Slims Valley silt ²*Pleistocene and Recent*Selkirk volcanics ¹

Canada—Continued

Yukon—Continued

*Tertiary or Pleistocene*Carmack basalt ¹Klusha intrusives ¹*Tertiary* (see also *Triassic and Tertiary*)Flat Creek beds ¹Horsefly gravels ¹Hutshi group ¹Klondike drift ¹Miles Canyon basalts ²Skukum volcanic rocks ²Wheaton River volcanics ¹*Tertiary(?)*Chieftain Hill volcanics ¹Schwatka andesites ¹*Cretaceous*Perkins volcanics ¹Tutshi series ¹*Lower Cretaceous*Dezadeash group ²*Jurassic or Cretaceous*Laberge series ¹Nordenskiöld dacite ¹*Upper Jurassic or Cretaceous*Quiet Lake intrusives ¹Tantalus conglomerate ¹*Upper Jurassic or Lower Cretaceous*Mount Nansen group ²*Upper Jurassic or Cretaceous(?)*Glenlyon granodiorite ²*Jurassic and Triassic(?)*Mush Lake group ²*Triassic to Tertiary*Huishi-Schwatka group ¹*Triassic*Lewes River series ¹*Paleozoic(?)*Moose Hide group ¹*Carboniferous or Permian*Kaskawulsh group ²*Carboniferous*Raquet series ¹*Carboniferous(?)*Braeburn limestone ¹*Pennsylvanian to Lower Cretaceous*Orange group ¹*Pre-Carboniferous*Harvey group ²*Devonian or Carboniferous(?)*Montague group ¹*Ordovician*Tatonduk shales ¹*Cambrian*Hunker Creek series ¹Indian River series ¹*Cambrian(?)*Kluane schists ²*Precambrian*Pelly gneiss ¹Razor Mountain group ¹Yukon group ¹*Precambrian(?)*Klondike series ¹Mount Stevens group or series ¹

Canada—Continued

Yukon—Continued

Age(?)

- Hunker series ¹
- Indian River group ¹
- Moosehide diabase ¹
- Windy Arm series ¹

St. Pierre and Miquelon

Post-Cambrian

- Galantry breccia ²

Precambrian

- Cape series ²

Mexico

Aguascalientes

Cretaceous

- Orito limestone ¹

Jurassic(?)

- Alta Mira limestone ¹

Age(?)

- Santa Francisca rhyolite ¹

Baja California

Quaternary

- Tres Virgenes volcanics ²

Pleistocene

- Santa Rosalia formation ²

Tertiary

- Cuesta formation ¹

Pliocene

- Salada formation ¹

Pliocene, upper

- Infierno formation ²
- Marquer formation ²

Pliocene, middle

- Carmen formation ²
- Gloria formation ²

Pliocene, lower

- Boleo 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 ²

Eocene

- Tepetate formation ¹

Eocene, lower

- Sepultura formation ²

Mesozoic

- Todos Santos formation ¹

Cretaceous

- Catarina formation ¹
- Encina Sola quartz diorite ²
- La Grulla granodiorite ²
- La Providencia granite ²
- Mesa sandstones ¹
- Rosario formation ¹
- Santa Eulalia formation ²
- San Fernando formation ²
- San José quartz diorite ²
- San Telmo formation ²

Lower Cretaceous

- Alisitos formation ²

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

- Petapa (formation) ²

- Tuxtla formation ¹

Permian

- Grupera formation ²

- La Vainilla limestone ²

- Paseo Hondo formation ²

- Santa Rosa littoral marine formation ¹

Age(?)

- Cintalapa beds ²

Chihuahua

Tertiary

- Talamantes volcanic series ²

Tertiary, lower

- Bufo rhyolite series ²

- Divisidero rhyolite series ²

Pliocene, upper

- Boquilla formation ²

- Temosachic formation ²

- Yepomera formation ²

Mesozoic

- 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 Vigas formation ¹

Age(?)

- Chorreras granite ¹

- Conchos gravels ¹

- Navosagame formation ¹

- Plomosas formation ¹

Coahuila

Pleistocene(?)

- Mayrán formation ²

Pliocene(?)

- Santo Madero formation ²

Mexico—Continued

Coahuila—Continued

Cretaceous

- Las Cortinas formation ²
- Las Esperanzas formation ¹
- Indidura formation ¹
- Monclova shale ¹
- Papagayos formation¹; Papagayos 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 ²
- Cupido limestone ²
- La Mula shales ²
- La Peña formation ²
- Menchacha limestone ²
- 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 ²
- Durango group ²

Age(?)

- Copper Queen intrusion ¹
- Guardarraya intrusion ¹

Guanajuato

Tertiary

- Guanajuato conglomerate ¹

Cretaceous or Tertiary

- Bufo sandstone ¹

Mexico—Continued

Guanajuato—Continued

Triassic

- La Luz basalts ¹

Age(?)

- La Luz schists ¹
- Pinguico rhyolites ¹

Guerrero

Upper Cretaceous

- Escamela limestone ¹

Middle Jurassic

- Tecocoyunca beds ²

Triassic(?)

- Cualac quartzite ²

Hidalgo

Tertiary, middle or upper

- Las Espinas volcanics ²

Tertiary, lower or middle

- El Morro fanglomerate ²

Oligocene

- Huatla basalt ¹

Cretaceous

- Bofay formation ²
- El Monte limestone ²
- Maltrata division ¹
- Necoxtla 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
- Totolzingo formation ²

Miocene

- Ajusco formation ²

Oligocene(?)

- Sierra Nevada formation ²

Upper Cretaceous(?)

- Jasso formation ²

Michoacan

Tertiary

- Zumpimito formation ²

Lower Cretaceous

- Cochixtla beds ²
- Mezcal 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

Mexico—Continued

Nuevo León—Continued

- Cretaceous*
- Tulillo beds ¹
- Upper Cretaceous*
- San Juan formation ¹
- Lower Cretaceous*
- Nuevo León group ²

Oaxaca

- Pleistocene, upper*
- Colotepec formation ²
- Tertiary*
- Cuicatlan formation ²
- Tertiary(?)*
- Huajuapán beds ²
- Yanhuitlan beds ²
- Miocene, upper*
- Tuxtepec formation ¹
- Cretaceous*
- Santa Cecilia limestone ²
- Upper Cretaceous*
- Petlalcingo limestone ²
- Tilantongo marls ²
- Middle Cretaceous*
- Magdalena series ²
- Lower Cretaceous*
- Tlaxiaco beds ²
- Pre-Cretaceous*
- Cacalote sandstone ²
- Yogana series ²
- Upper Jurassic*
- Teposcolula limestone ²
- Tlaltepexi gypsum series ²
- Lower Jurassic*
- Mixtepec - El Consuelo beds ²
- Pre-Mesozoic*
- Acatlán schists ²

Puebla

- Cretaceous*
- San Juan Raya formation ¹
- Zapotitlan formation ¹
- Middle Cretaceous*
- Cipiapa limestone ²
- Lower Jurassic*
- Totolapa facies ²

Queretaro

- Upper Cretaceous*
- Soyatal formation ²
- Lower Cretaceous*
- Cerro Ladrón facies (of El Doctor limestone) ²
- El Doctor limestone ²
- El Socavón facies (of El Doctor limestone) ²
- La Negra facies (of El Doctor limestone) ²
- San Joaquín facies (of El Doctor limestone) ²

Quintana Roo

- Miocene*
- Dos Bocas formation ²
- Estero Franco formation ²

Mexico—Continued

San Luis Potosí

- Eocene*
- Tanlajas formation ¹
- Cretaceous*
- Cardenas formation ¹
- Xilitla beds ²
- Upper Cretaceous*
- Guadalcázar limestone ²
- San Felipe formation ¹
- Taninul limestone ¹
- Velasco formation ¹
- Lower Cretaceous*
- El Abra limestone ¹
- Tamasopo series ¹
- Lower Cretaceous(?)*
- Novillo beds ¹
- Tenistipa limestone ¹
- Upper Jurassic*
- Corona formation ²
- Pimienta beds ¹
- Taman beds ¹
- Upper(?) Jurassic*
- Santa Emilia formation ²
- San José formation ²

Sinaloa

- No geologic formations with type localities in the State of Sinaloa have been recorded in the Lexicon files.

Sonora

- Quaternary*
- Santa Domingo flood plain deposits ¹
- Tertiary*
- Henrietta diorite porphyry ¹
- Trincheras division ¹
- Late Tertiary*
- Baucari division ¹
- Mesozoic*
- Lista Blanca complex or division ¹
- Upper Mesozoic or lower Tertiary*
- Campana diabase and gabbro ²
- Colorada quartz porphyry ²
- Mesa formation ²
- Cretaceous(?)*
- Tarahumara formation ²
- Upper Cretaceous*
- Cabullóna group ¹
- Camas sandstone ¹
- Packard shale ¹
- Snake Ridge formation ¹
- Lower Cretaceous*
- Morita formation ¹
- Palmer formation ²
- Potrero formation ²
- Triassic*
- Barranca division ¹
- Permian*
- Tigre formation ²
- Upper Pennsylvanian*
- Caborca series ²
- Monos beds ²
- Nacozari limestone ²
- Lower Pennsylvanian*
- Gamusa beds ²

Mexico—Continued

Sonora—Continued

*Mississippian*Represo beds ²Venada beds ²*Devonian or Carboniferous*Santa Rosa beds ¹*Cambrian*Bolza quartzite ¹Esperanza limestone ²*Upper Cambrian(?)*Puertecitos limestone ¹*Middle Cambrian*Arrojos formation ²Tren formation ²*Lower Cambrian*Buelna formation ²Cerro Prieto formation ²Provedora formation ²Puerto Blanco formation ²*Precambrian or Lower Paleozoic*Atil sandstone ²*Precambrian*Altar schists ²Capote quartzite ¹Jajoba formation ²*Age(?)*Bella Union granite ²Caliche Mountain rhyolite ¹Cananea granite ¹Capote limestone ¹Caridad conglomerate ²Caridad quartz monzonite ²Cuitaca granodiorite ¹Durazno formation ¹Elenita syenite porphyry ¹Elisa quartz monzonite porphyry ¹El Torre syenite ¹Encinas quartz porphyry ¹Golden Bar andesite rocks ¹Huacalote rhyolite ¹La Brisca formation ¹Magallanes rhyolite ¹Mariquita diabase ¹Nacozari granite ²Pilares monzonite ²San Pedro andesite ¹Santo Domingo rhyolite ¹Saracachi formation ¹Tinaja granite porphyry ¹

Tabasco

*Pleistocene*Tierra Colorada formation ²*Miocene*Amate (Lower and Upper) formation ²Encajonado formation ²Gonzalez sands ²*Miocene, upper*Belem formation ²Tres Puente formation ²*Miocene, middle*Zargazal formation ²*Miocene, lower*Prudencia sandstone ²

Mexico—Continued

Tabasco—Continued

*Oligocene*Encarnación shale ²Macuspana limestone ²Macuspana shale ²Misopá shales ²*Eocene or Oligocene*Pichucalco beds ²*Eocene, middle and upper*Chinal limestone ²Chinal shales ²Puente de Piedra conglomerate ²*Upper Cretaceous*Ocozocualta (formation) ²Paso Mono limestone ²*Lower Cretaceous*Chival (formation) ²Guayal limestone ²San Ricardo (formation) ²

Tamaulipas

*Tertiary, upper*Cerro Topila beds ²Quintero limestone ²*Pliocene and Pleistocene or Recent*Reynosa formation ¹ and limestone ¹*Miocene*Pamoranes beds (in San Fernando formation) ²*Miocene, lower*Guajalote formation ²*Oligocene*Palo Alto formation ²Pinole formation ²Saladito formation ²San Fernando formation ¹San Rafael formation ¹*Eocene*Los Esteros formation ¹*Eocene, upper*Los Guerros sandstone member (of Fayette formation) ¹Roma sandstone member (of Fayette formation) ¹Sanchez sandstone member (of Fayette formation) ¹Villa Nueva sandstone member (of Fayette formation) ¹*Eocene, middle*Alamo sandstone member (of Yegua formation) ¹Alberca sandstone member (of Yegua formation) ¹Mier sandstone member (of Yegua formation) ¹Once Lomas sandstone member (of Carrizo formation) ¹Saucito sandstone member (of Cook Mountain formation) ¹*Eocene, lower*Chalma shale (in Chicontepec formation) ²Jaco sandstone (in Chicontepec formation) ²

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 (sub-surface)

Tamaulipas limestone ²

Jurassic

Huizachal formation ²

Olivido formation ²

Permian

Guacamaya beds ²

Mississippian

Peregrina formation ²

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) ²

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 ²

Oligocene

Alazan shale ¹

Cóatzintla formation ²

Deposito series ²

Escolin 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

Horcones formation ²

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) ²

Chapapote formation ¹

Eocene, middle and upper

Nanchital conglomerate series ²

Eocene, lower

Aragon formation ¹

Nanchital shales ²

Uzpanapa conglomerate ²

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 ²

Tamiahua facies ²

Lower Cretaceous

Comal series ²

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 ²

Upper Jurassic

Zuloaga limestone ²

Central America

British Honduras

Miocene

Rio Dulce limestone ¹

Central America—Continued

Costa Rica

*Pliocene*Limon clays ¹Penitas formation ²Suretka conglomerate ¹*Miocene*Bonilla formation ¹Nicoyan series ¹Sheroli formation ¹*Miocene, lower*Uscari shale ¹*Oligocene or lower Miocene*Amoura shale ²*Oligocene*Guallava sandstone ¹Manzanilla beds ¹*Eocene(?)*Cartago formation ¹Puerto Carballo arenaceous limestone series ²*Cretaceous or Lower Tertiary*Desamparados formation ¹San Miguel limestone ¹*Age(?)*Aguacate series ¹Colorado limestone ²Rio Seco diabase ²Sabana Grande siliceous limestone ²

El Salvador

*Pliocene(?)*Rio Torola limestone ²

Guatemala

*Tertiary*Sepur beds ²*Miocene(?)*Santo Toribio beds ²*Mesozoic*Ixcoy limestone ²*Cretaceous*Coban limestone ²*Upper Cretaceous(?), Eocene(?), or Oligocene(?)*Petén marls and limestone ²*Lower Cretaceous*Metapan formation ¹

Honduras

*Pliocene(?)*Escobales granodiorite ²Guacamayas dacite tuffs and flows ²Jutiapa rhyolitic tuffs and sediments ²Ranco Quemado dacite ²*Pliocene, lower*Gracias formation ²*Miocene*Toledo series ²*Cretaceous*Cantarranas formation ²Colonia andesitic tuffs and breccias ²Crucero tuffaceous dacite flows ²Plancitos formation ²

Central America—Continued

Honduras—Continued

*Cretaceous(?)*Aguacatal porphyritic andesite ²Reforma hypersthene andesite ²*Upper Cretaceous or lower Tertiary*Valle de Angeles formation ²*Upper Cretaceous*Esquias formation ¹*Upper Triassic*El Plan formation ²Tegucigalpa ¹ (formation)*Pre-Upper Triassic*Peten formation ²

Nicaragua

*Quaternary*Saclin formation ¹Soulala formation ¹*Tertiary*Brito formation ¹*Oligocene(?)*Machuca formation ¹

Panamá and the Canal Zone

*Pleistocene and Recent*Atlantic muck ²Chargres alluvium ²Pacific muck ²*Pleistocene*Aguadulce formation ¹Armuelles formation ²Mariato formation ¹Mount Hope formation ¹San Carlos formation ¹*Pre-Pleistocene*Azucero formation ¹*Pliocene*Caribbean limestone ¹Charco Azul formation ²Piliguilla conglomerate ²*Pliocene, lower*Chagres sandstone ¹**Toro limestone ¹ member** (of Chagres sandstone)*Pre-Pliocene*Ancon rhyolite ²Chiva Chiva andesite ²Point Farfan diorite ²*Miocene, upper*Chucunaque formation ²Limonas shale ²*Miocene, upper, or Pliocene, lower*Burica sandstone ²*Miocene, middle and upper***Gatun formation ¹***Miocene, middle*Cativa marl (in Gatun formation) ²Pucro sandstone ²Tuira formation ²*Miocene, middle(?)*Sabanitas formation ²*Miocene, lower***Alhajuella sandstone member** (of Caimito formation) ²Bruja Island dolerite ²

Central America—Continued
 Panamá and the Canal Zone—Con.
Miocene, lower—Continued
 Cerro Gigante basalt ²
 Chillibrillo limestone member (of
 Caimito formation) ²
 Chorrera basalt ²
 Cucuracha formation ¹
 Culebra formation ¹
 Emperador limestone ¹ member
 (of Culebra formation)
 La Boca marine member (of
 Panamá formation) ²
 Miraflores basalt ²
 Panamá formation ¹
 Pedro Miguel agglomerate mem-
 ber (of Panamá formation) ²
 Sosa Hill basalt ²
Oligocene or Miocene
 Vamos Vamos beds ¹
Oligocene and Miocene
 Caimito formation ¹
Oligocene
 Gamboa formation ²
 Mona shale ¹
 Monkey Hill formation ¹
 Peña Blanca marls ¹
 Sensori agglomerate and lime-
 stone ¹
 Tigre limestone ¹
 Watsi shale ¹
Oligocene(?)
 Bas Obispo formation ¹
Oligocene, upper, or Miocene, lower
 Rio Duque shales ²
Oligocene, upper, and Miocene, lower
 Aquaqua formation ²
 Carba facies (of Caimito forma-
 tion) ²
 Tapaliza shales ²
Oligocene, upper
 Arusa formation ²
 Las Cascadas agglomerate (as
 Las Cascades agglomerate ¹)
 Quebrancha limestone member
 (of Caimito formation) ²
Oligocene, lower-upper
 Bohío formation (as conglomer-
 ate ¹)
Oligocene, lower
 Clarita limestone ²
Eocene
 Bucarú formation ²
 Mindi Hill beds ²
Eocene, upper
 †Bohío limestone ¹
 Casa Larga marls ²
 David formation ²
 Tranquilla shale ²
Eocene, middle and upper
 Gatuncillo formation ²
Pre-Eocene
 Barbacoas formation ²
 Miraflores pumice ²
 San Pablo phase (of Barbacoas
 formation) ²

Central America—Continued
 Panamá and the Canal Zone—Con.
Cretaceous and Eocene
 Mata Chin formation ²
 Age(?)
 The names Bijuco, Guaxaro, and
 Rio Santa Maria are errone-
 ously listed in lithic combina-
 tions with age unknown in
 part A of this bulletin, owing
 to mistranslation.
 Canazas formation ¹
 Montijo conglomerate ¹
 Obispo breccia ¹
 Obispo limestone ¹
 Parita formation ²
 Santiago formation ¹
 Torio limestone ¹
 Veraguas crystalline series ¹
 Wemir agglomerate ²
 Greenland
 Detailed information on the
 geologic formations of Green-
 land can be found in the
 Lexique Stratigraphique Inter-
 national, v. 1, Europe, fascicule
 1 a, Greenland.
Pleistocene
 Baffin till ¹
Tertiary (see also *Cretaceous-
 Tertiary*)
 Cape Edward Holm complex ²
 Dreibuchten zone ²
 Kangerdlugssuaq complex ²
 Kap Simpson complex ²
 Skaergaard complex ²
Tertiary(?)
 Cape Parry alkaline complex ²
*Tertiary, upper, to Quaternary,
 lower*
 Skeldal conglomerate ²
Miocene
 Sinnifik strata ²
 Atanikerdluk beds ²
 Ipsorisok strata ²
Eocene
 Cape Dalton formation ²
 Sabine Island formation ²
Eocene(?)
 Lilloise complex ²
 Prinsen af Wales Bjaerge lavas ²
Cretaceous-Tertiary
 Nugsuak formation ²
Upper Cretaceous
 Albrechtsbugt facies ²
 Atane beds ²; see also Atane beds ¹
 Kap Gustav Holm series ²
 Knudshoved beds ²
 Patoot beds ²; see also Patoot
 beds ¹
Upper Cretaceous(?)
 Kangerdlugssuaq series ²
Lower Cretaceous
 Cape Hamburg formation ²
 Falskebugt beds ²
 Hartz Fjaeld formation ²

Greenland—Continued

Lower Cretaceous—Continued

- Home Foreland beds ²
- Kome beds; ² *see also* Kome beds ¹
- Kuhnpas facies ²
- Lindemansbugt facies ²
- Niesen beds ²
- Rødryggen beds ²
- Young Sound facies ²

Jurassic

- Cape Leslie sandstone ²
- Chatton Bay sandstone ²

Upper Jurassic

- Cape Maurer formation ²
- Charcotbucht sandstone ²
- Fossil Mountain formation ²
- Kløft I formation ²
- Koch Fjaeld formation ²
- Kuhn beds ²
- Rigi series ²
- Trækpas formation ²
- Vardekløft formation ²

Lower Jurassic

- Neills Cliff formation ²

Triassic (see also *Permo-Triassic*)

- Fleming Inlet series ²

Upper Triassic

- Cape Biot formation ²
- Cape Stewart formation ²

Lower Triassic (see *Permian or Lower Triassic*)*Eotriassic*

- Wordie Creek formation ²

Paleozoic

- Cape Fletcher series ²

Lower Paleozoic

- Angmagsalik granite ²
- Cape Greg gneisses ²
- Emilia group ²
- Franz Josef beds ²
- Grejsdalen granite ²
- Hagar group ²
- Hurry Inlet gneisses ²
- Isfjord zone ²
- Milneland granite ²
- Store Fjord gneisses ²
- Store Fjord granite ²
- Svejstrips injection complex ²
- Sylva-Maria group ²

Permian or Lower Triassic

- Cape Brown and Hurry Inlet series ²

Permo-Triassic

- Mount Nordenskiöld formation ²

Permo-Triassic(?)

- Klittedal formation ²

Permian

- Cape Stosh formation ²
- Depot Island formation ²

Lower Permian

- Domkirken series ²

Upper Carboniferous

- Halle Mountains formation ²

- Malleuk Mountain formation ²

Lower Carboniferous

- Mount Pictet formation ²

Greenland—Continued

Lower Carboniferous(?)

- Foldvik Creek formation ²

Middle Pennsylvanian

- Blyklippen series ²

Devonian or younger

- Randbøl conglomerate ²

Devonian

- Cape Graah formation ²
- Kap Bull series ²
- Kap Franklin conglomerate ²
- Kap Kolthoff series ²
- Mont Celsius series ²

Devonian(?)

- Hurry Inlet granite ²
- Igaliko sandstone ²
- Ilimausak complex ²
- Ilimausak porphyries ²
- Kakarsuak porphyrite ²
- Tasek porphyrite ²

Upper Devonian

- Mount Høgbom series ²

Middle Devonian

- Kap Franklin-Vildtal granite ²
- Margrethetal series ²
- Mount Werner series ²
- Ravnefeld formation ²
- Rodetal conglomerate (in Margrethetal series) ²
- Vildtal series ²

Pre-Devonian

- Cape Wardlaw complex ²

Silurian (see also *Ordovician and Silurian*)

- Polaris Harbour formation ²; *see also* Polaris Harbour formation ¹

Silurian(?)

- Profilfjeldet shales ²

Middle Silurian

- Cape Schuchert formation ²
- Cape Tyson formation ²
- Drømmebjerg limestone ²
- Offley Island formation ²; *see also* Offley Island formation ¹

Ordovician and Silurian

- Centrum limestone ²

Ordovician

- Narwhale Sound formation ²

Middle or Upper Ordovician

- Børglum River limestone ²
- Cape Weber formation ²

Middle and Upper Ordovician

- Cape Calhoun series ²

Middle Ordovician

- Cape Webster formation ²
- Gonioceras Bay formation ²
- Troedsson Cliff formation ²; *see also* Troedsson Cliff formation ¹
- Wright Bay formation ²

Middle Ordovician(?)

- Painted formation ²

Lower Ordovician

- Cape Clay formation ²
- Cass Fjord formation ²
- Danmarks Fjord dolomite ²

Greenland—Continued

Lower Ordovician—Continued

- Eskimo Hut formation ²
- Nunatami formation ²; *see also*
- Nunatami formation ¹
- Nygaard Bay limestone ²
- Poulsen Cliff shale ²
- Wandel Valley limestone ²

Cambrian or Ordovician

- Kap Holbaek sandstone ²

Cambro-Ordovician(?)

- Hurry Inlet formation ²

Cambrian (see Precambrian or Cambrian; and Precambrian to Cambrian)

- Cape Frederick VII formation ²
- Dolomite Point formation ²
- Hyalolithus Creek formation ²

Cambrian(?)

- Brønlund Fjord dolomite ²

Upper Cambrian(?)

- Pemmican River formation ²;
- see also* Pemmican River formation ¹

Middle Cambrian

- Blomsterbaek limestone member (of Cape Wood formation) ²
- Cape Russell member (of Cape Wood formation) ²
- Cape Wood formation ²
- Ymer formation ²

Middle Cambrian(?)

- Blomsterbukta quartzite and shale ²
- Hidden Valley formation ²
- Noa Lake quartzite ²

Lower Cambrian

- Bastion formation ²
- Cape Kent formation ²
- Ella Island formation ²
- Marshall Bay formation ²
- Petermann series ²; *see also*
- Petermann series ¹
- Wulff River formation ²

Lower Cambrian(?)

- Spiral Creek formation ²; *see also*
- Spiral Creek formation ¹

Precambrian or Cambrian

- Cape Ingersoll dolomite ²
- Cape Leiper dolomite ²
- Cape Oswald formation ²
- Rensselaer sandstone ²
- Tillite Canyon formation ²; *see also* Tillite Canyon formation ¹

Precambrian to Cambrian

- Tømmer Bay group ²

Precambrian

- Agpat formation ²
- Alpefjord series (of Eleonore Bay formation) ²
- Arsuk group ²
- Canyon series (in Eleonore Bay formation) ²
- Cape Rawson beds ²
- Danish Village formation ²
- Dombjerg paraschists ²

Greenland—Continued

Precambrian—Continued

- Egedesminde gneiss complex ²
- Eleonore Bay formation ²
- Eleonores S ϕ series ²
- Eremital series (in Eleonore Bay formation) ²
- Etah formation ²
- Finnefeld complex ²
- Gardar formation ²
- Greenlandian ²
- Gregory series ²
- Ikertog gneiss complex ²
- Isortoq gneiss complex ²
- Julianehaab granite ²
- Kangamiut diabase ²
- Kangamiut gneiss complex ²
- Ketilidian period ²
- Kungnat granite ²
- Maalebjerg series (in Eleonore Bay formation) ²
- Mørkebjerg formation ²
- Mystery quartzite series ²
- Narssarsuk formation ²
- Nunarsuit granite ²
- Rivieradal sandstone ²
- Sermilik group ²
- Stenorkenen phyllites ²
- Sukkertoppen gneiss or granite ²
- Sydprøven granite ²
- Sydvejdal marbles ²
- Taagefeldene graywackes ²
- Thule formation ²; *see also*
- Thule formation ¹
- Tvege banded psammitic/pelitic group ²
- Tyroler series ²
- Tyrolerdal banded psammitic/pelitic group ²
- Tyrolerdal group ²
- Ulvebjerg sandstones and tillites ²
- Westendspids pelitic group ²
- Wolstenholme quartzite ²

Precambrian(?)

- Marmovigen conglomerate ²
- Norsemandal sandstone ²

Age(?)

- Bjørne ϕ conglomerate ²
- Campanuladal sandstones and limestones ²
- Fyns S ϕ dolomite ²
- Milne Land quartzite ²
- Røde ϕ conglomerate ²

Bermuda

Pleistocene

- Belmont limestone ¹
- Devonshire formation ¹
- Harrington soil ²
- McGalls soil ²
- Pembroke eolianite ²
- St. Georges soil ²
- Shore Hill soil ²
- Signal Hill soil ²
- Somerset eolianite ²

Bermuda—Continued

- Pleistocene*—Continued
- Southampton eolianite ²
- Warwick eolianite ²
- Pliocene*
- Walsingham formation ¹
- Age(?)
- Paget formation ¹

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 ¹

Antigua, British West Indies

- Pleistocene*
- Friars Hill gravel and marls ¹

Oligocene

- Cassada-Garden gravels ¹
- Central Plain tuff formation ²
- Hodges Hill sandstone ¹
- Seaforth limestone ¹

Oligocene, upper

- Antigua formation ¹

Age(?)

- Friars Hill series ¹

Aruba, Netherlands West Indies

- Upper Cretaceous*
- Aruba formation ²

Bahama Islands

No geologic formations in the Bahama Islands have received names.

Barbados, British West Indies

- Quaternary*
- Bath-Reef series ¹
- Tertiary*
- Ragged Point series ¹
- Oligocene, upper*
- Bissex Hill marl ²
- Oligocene, lower*
- Codrington College marl ²
- Eocene*
- Mount Hillaby beds ²
- Mount Poyer sandstone (in Scotland beds) ²
- Eocene, upper*
- Bath beds (in Oceanic formation) ²
- Joes River beds ²
- Eocene, upper, to Oligocene*
- Oceanic formation ²
- Eocene, middle*
- Chalky Mount group ¹
- Mount All beds (in Scotland formation) ²
- Murphys beds (in Scotland formation) ²

West Indies—Continued

Barbados, British West Indies—Con.

- Eocene, lower and middle*
- Scotland beds ¹
- Eocene, lower*
- Morgan Lewis beds (in Scotland formation) ²
- St. Andrews beds ²
- Walkers beds (in Scotland formation) ²

Barbuda, British West Indies

- Pleistocene*
- Barbuda limestone ²

Bonaire, Netherlands West Indies

- Pleistocene*
- Seroe Largo limestone ²
- Eocene, upper*
- Seroe Montagne limestone ²
- Cretaceous or Tertiary*
- Rincon formation ²
- Soebi Blanco conglomerate ²
- Cretaceous*

Washikemba formation ²

Cayman Islands, British West Indies

- Pleistocene or Recent*
- Bluff limestone ¹
- Ironshore limestone ¹

Cuba

- Quaternary*
- Coastal limestone ¹
- Recent*
- Surgidero formation ²
- Pleistocene*
- Jaimanitas formation ²
- Zapata formation ¹
- Pleistocene(?)*
- Las Puercas marl ¹

*Pliocene*Matanzas series ¹*Miocene*

- La Cruz marl ¹
- Manzanillo formation ²
- Punta Maisi limestone ¹

*Miocene, upper*El Abra formation ²*Miocene, middle*Canfmar formation ²*Miocene, lower*Limonar formation ²*Oligocene or Miocene*

- Cojimar formation ¹
- Guantanamo shale ¹
- Guines limestone ¹
- Maquay formation ¹
- Yumuri limestone ¹

Oligocene and Miocene

- Nipe series ²
- Paso Real formation ²

Oligocene

- Adelina marl ²
- Farallon Grande breccia ¹

*Oligocene, upper*Tarará formation ²*Oligocene, middle*

- Colón formation ²
- Jaruco formation ²

West Indies—Continued

Cuba—Continued

Oligocene, lower

Alava formation ²

Morcate formation ²

Tinguaro marl ²
Eocene and Oligocene

Guato formation ²
Eocene

Bejucal formation ¹

Cobre series ²

Cubitas limestones ²

Guaso limestone ¹

Principe formation ¹
Eocene, upper

Consuelo formation ²

Jabaco formation ²

Jicotea member (of Jabaco formation) ²

San Luis formation ¹
Eocene, middle

Charco Redondo limestone ²

Elmira formation ²

Loma Candela formation ²

Peñón formation ²
Eocene, lower

Capdevila formation ²

Toledo member (of Universidad formation) ²

Universidad formation ²
Paleocene

Remedios limestone ²
Cretaceous

Artemisio limestone ¹

Camajuani formation ¹

Cayetano formation ¹

El Cano formation ¹

Havana shales ¹

Lucero beds ¹

Luyano marls ¹

Madruga chalk ¹

Tuff series ²
Cretaceous(?)

Vincent formation ¹
Upper Cretaceous

Camajan breccias (in Habana formation) ²

Habana formation ¹

Jarón limestone ²

La Fé limestones ²

Loma Yucatán limestone ²

Provincial limestones (in Tuff formation) ²

Tinajita formation ²

Yucatán limestones ²
Lower Cretaceous

Aptychi limestone or formation ²
Jurassic

San Cayetano formation ¹
Jurassic(?)

Vinales limestone ¹
Upper Jurassic and Lower Cretaceous

San Andres formation ²

West Indies—Continued

Cuba—Continued

Upper Jurassic

Jagua formation ²

Quemado formation ²
Upper Jurassic(?)

Gerona marble ¹
Pre-Jurassic(?)

Pinar schist ¹
Age(?)

Daguilla diorite schist ¹

Mal Pais gravel ¹

Santa Fe schist ¹

Trinidad schists ²

Curaçao, Netherlands West Indies

Recent

Asiento formation ²

Boca Santo Preto conglomerate ²

Westpuntbaai conglomerate ²
Pleistocene

Blaubaai conglomerate ²

Ronde Klip conglomerate ²

Seroe Domi beds ²
Eocene, upper

Mainsje formation ²

Seroe di Cueba series ²
Upper Cretaceous and Paleocene

Midden-Curaçao beds ²
Upper Cretaceous

Seroe Teintje limestone ²
Cretaceous(?)

Knip beds ²

Dominica, British West Indies

Pleistocene

Grand Savanna gravel series ²

Morne Daniel gravel series ²
Age(?)

Roseau tuffs ²

Dominican Republic

Pliocene

Gato formation ¹

Jimanf formation ²

Las Matas gravels ¹
Miocene

Nivaje shale ²
Miocene, upper

Caimito formation ²

Cerro de Sal formation ¹

Las Salinas formation ¹

Via formation ²
Miocene, middle

Arroyo Seco formation ²

Bulla conglomerate ¹

Cercado formation ¹

Gurabo formation ¹

Mao clay ¹

Mao Adentro limestone ¹
Miocene, lower and middle

Yaque group ¹
Miocene, lower

Angostura formation ²

Arroyo Blanco formation ²

Baitoa formation ¹

Cevicos limestone ¹

West Indies—Continued

Dominican Republic—Continued

Miocene, lower—ContinuedHiguerito member (of Arroyo Blanco formation)²*Oligocene, upper*Bao group²Florentino formation²Lemba formation²Quita Coraza formation²Tabera formation¹Trinchera formation²*Oligocene, middle*Las Colorados conglomerates²*Oligocene, lower and middle*Sombbrero formation²*Eocene*Ocoa formation²*Eocene, upper*Neiba formation²*Eocene, middle*Hidalgos formation²*Eocene, lower*Abuillot formation²

The Grenadines, British West Indies

*Miocene, lower*Carriacou limestone²Grand Bay beds²

Guadaloupe, French West Indies

*Pleistocene*Usine limestone²*Miocene*Abymes tuffs²Gensole tuffs²Grande Terre limestone²*Age(?)*Lafonde gravel and marl¹Petit Bour series¹

Haiti

*Pliocene*Hinche formation¹Rivière Gauche formation²*Miocene*Morne Delmas formation²*Miocene, middle*Las Cahobas formation¹Plaisance limestone¹Port-au-Prince beds²*Miocene, lower and middle*Artibonite group¹*Miocene, lower*Madame Joie formation¹Thomonde beds¹Maissade tongue (of Thomonde formation)¹*Oligocene and Miocene*Rivière Grise formation²*Oligocene, middle*Crête formation²*Oligocene, lower*Arc formation²Bassin Zim formation²*Eocene, upper*Ennery formation²

West Indies—Continued

Haiti—Continued

*Eocene, middle*Pérodin formation (Jaques But-
terlin, 1954, Inst. Français
d'Haiti Mem. 1, p. 433)*Paleocene*Marigot formation²*Upper Cretaceous*Macaya formation²Trois-Rivières formation²

Jamaica

*Pleistocene*Barbican formation¹Bogue Island formation¹Falmouth formation¹Hopewell formation¹Kingston formation¹Liguanea formation²Montego formation¹*Tertiary*Cobre¹ (beds)Moneague¹ (beds)Montpelier¹ (beds)*Pliocene or Pleistocene*Porus formation¹*Pliocene*Layton formation²Manchioneal formation¹*Miocene and Pliocene*Low Layton pillow lavas²*Miocene or younger*Hayes conglomerate²*Miocene*Bengal limestone²*Miocene, upper*August Town series²Buff Bay beds¹Round Hill series²*Miocene, middle or upper*Hope Gate limestone or series²*Miocene, middle*Bowden formation¹*Miocene, lower* (see also *Eocene, middle, to Miocene, lower*)May Pen beds¹St. Thomas-in-the-Vale marls²*Oligocene, upper, and Miocene, lower*

Newport limestone member (of

White Limestone formation)²*Oligocene* (see also *Eocene, middle, to Miocene, lower*)Cockpit limestone group¹*Oligocene, upper*Walderston limestone member
(of White Limestone forma-
tion)²*Eocene*Ben Bow limestone²Cambridge formation¹Catadupa¹ (formation)Port Maria conglomerate²

West Indies—Continued

Jamaica—Continued

Eocene, upper

 Chapelton formation ¹

 Somerset limestone member (of
White Limestone formation) ²
Eocene, upper (?)

 New Castle porphyry ²
Eocene, middle or upper

 White Limestone basement ²
Eocene, middle, to Miocene, lower

 White Limestone formation ²
Eocene, middle

 Troy limestone member (of
White Limestone formation) ²

 Yellow Limestone formation ²
Eocene, lower

Cinchona limestone (in Mt.

 Hybla beds) ²

 Good Hope limestone ²

 Halberstadt limestone ²

 Halberstadt volcanic group ²

 Mount Hybla group ²

 Richmond formation ¹

 Wagwater group ²

 Woodford limestone member (of
Wagwater group) ²
Cretaceous

 Ballard ¹ (formation)

 Frankenfield ¹ (formation)

 Jerusalem ¹ (formation)

 Logie Green ¹ (formation)

 Minho beds ¹

 Yallahs formation ¹
Upper Cretaceous

 Barretia limestone ²

 Blue Mountain series ¹

 Diozoptyxis shales ²

 Inoceramus series ²

 Ostrea limestone ²

 Providence shales ²

 Purple Conglomerate group ²

 Serge Island marble ¹

 Titanosarcolithes limestone ²

 Veniella shale ²
Pre-late Cretaceous

 Arntully serpentine ²
Pre-Mesozoic

 Westphalia schists ²
Age (?)

 Port Royal clay shales ²

Martinique, French West Indies

Miocene

 Vauclin tuffs ²
Miocene, middle

 Bassignac tuffs ²
Oligocene

 Bourg du Marin limestone ²
Oligocene, upper

 Macabou limestone ²

 Morne Vent limestone ²
Oligocene, lower

 Fond Moustique tuffs ²

West Indies—Continued

Puerto Rico

Quaternary

 Cabo Rojo stage ¹

 Desecheo stage ¹

 Isabella stage ¹
Recent

 Santa Isabel series ¹
Pleistocene

 San Juan formation ¹
Tertiary

 Arecibo formation ¹

 Collazo shale ¹

 Guánica coral reefs ¹

 Lares shale ¹

 Mayagüez shales ¹
Miocene, upper, or Pliocene, lower

 Guanajibo formation ² (subsurface)

Miocene

 Pepino formation ¹

 Puerto Ferro limestone ¹

 Quebradillas limestone ¹
Miocene, lower

 Aymamón limestone ²

 Aguadilla limestone ²

 Aguada formation ²
Oligocene or Miocene

 Cibao formation (as limestone ¹)

 Los Puertos limestone ¹
Oligocene

 Guajataca member (of Cibao
marl) ²

 Lares limestone ¹

 Río Guatemala group ²

 San Sebastián formation (as
shale ¹)

*Oligocene, upper, and Miocene,
lower*

 Ponce limestone ¹
Oligocene, middle

 Juana Díaz formation (as shales
and marls ¹)

Oligocene, lower

 Cañas Arriba formation ²
Eocene

 Coamo Springs limestone series ¹

 Río Descalabrados series ¹

 Río Jueyes series ¹
Paleocene, upper, or Eocene, lower

 Fajardo formation (as shales ¹)

 Figuera formation ¹
Cretaceous

 Aibonito conglomerate ¹

 Coamo tuff ¹

 Ensenada shale ¹

 Guayabal limestone ¹

 Guayama series ¹

 Guzman formation ¹

 Juan Ascencio member (of Fa-
jardo shale) ¹

 Luquillo formation ¹

 Peñuelas shale ¹

West Indies—Continued

Puerto Rico—Continued

Cretaceous—ContinuedRio conglomerate ¹Rio Blanco series ¹Rio Culebrinas series ¹Rio Yauco series ¹San Diego formation ¹San German limestone ¹Sierra de Cayey tuffs ¹*Cretaceous*(?)Aguas Buenas limestone ¹Corozal limestone ¹Juan Asencio chert beds ¹Muda limestone ¹Unibon shale ¹*Upper Cretaceous*Atalaya limestone ²Cape San Juan limestone ²Cialitos limestone ²**Frailles formation** (see p. 622.)Guilarte limestone ²**La Muda limestone ¹ member** (of Frailles formation)Las Marías limestone ²Orcovis limestone ²**Trujillo Alto limestone** (as Trujillo formation ¹)*Upper Cretaceous*(?)**Guaynábo formation ¹****Hato Puerco tuffs ¹***Lower Cretaceous*Rio de la Plata series ¹*Lower Cretaceous*(?)Barranquitas shaly limestone ¹Comerio beds ¹*Age*(?)Coqui limestone ¹Collores limestone ¹Juncor gabbro ¹Patillas quartz monzonite ¹San Lorenzo quartz diorite ¹Yabucoa granite ¹

St. Bartholomew, French West Indies

*Eocene, middle*Cayes limestone member (of Saint Bartholomew formation) ²Flamand limestone member (of Saint Bartholomew formation) ²Lezard limestone member (of Saint Bartholomew formation) ²Mongeaunt limestone member (of Saint Bartholomew formation) ²St. Bartholomew limestone ¹

St. Eustatius, Netherlands West Indies

Pleistocene, upper(?)White Wall formation ²

St. Kitts, British West Indies

*Pleistocene, lower*Brimstone Hill limestone ²Brimstone Hill tuffs ²*Age*(?)St. Kitts gravels ¹

West Indies—Continued

St. Martin, French and Netherlands

West Indies

*Tertiary, lower*Simson Bay formation ²*Miocene*Low Lands formation ²*Oligocene, upper*Tintamarre formation ²*Upper Cretaceous*(?)Pointe Blanche formation ²*Miocene, upper, and Pliocene*Rockly Bay formation ²*Cretaceous*(?)Bacolet formation ²Hawks Bill formation ²Goldsborough formation ²Main Ridge formation ²Merchiston formation ²Mount Dillon formation ²North Coast schist group ²Parlatuvier formation ²Tobago volcanic group ²

Trinidad, British West Indies

*Pleistocene*Godineau beds ²Melajo clay ²Oropouche formation ²Pierreville clay ²Siparia beds ²*Pleistocene*(?)Llanos formation ¹*Tertiary*Caroni series ¹Morne l'Enfer formation ¹Tamana series ¹Williamsville clay ¹*Pliocene and Pleistocene*Cedros beds ²*Pliocene*Camparo formation ²Matura formation ¹Palmiste clays ²*Miocene and Pliocene*Talparo formation ²*Miocene*Concord member (of Brasso formation) ²Cruse oil zone ¹ (subsurface)Forest clay and sands ¹ (subsurface)Freemans Bay limestone ²Guaracara limestone ¹Lengua beds ²Machapoorie formation ¹Montserrat sand member (of Upper Brasso formation) ²Moruga series ¹Mount Pleasant greensand horizon (of Manzanilla formation) ²Naparima marl ¹Palo Seco formation ²Pointe Noir beds ²Poonah sands ¹Princes Town marl ¹Stollmeyer oil zone ¹ (subsurface)

West Indies—Continued

Trinidad, British West Indies—Con.

Miocene(?)

 Manzanilla formation ¹
Miocene, upper

 Erin Point beds (in Moruga formation)²

 Goudron sands (in Moruga formation)²

 La Brea formation ²

 Los Atajos member (of Brasso formation)²

 Mamural clay (in Springvale formation)²

 Springvale formation ²

 Telemaque sand (in Springvale formation)²
Miocene, middle (see also *Oligocene, middle to Miocene, middle*)

 Brasso clay (in Manzanilla formation)²

 Brasso conglomerate member (of Manzanilla formation)²

 Santa Lucia clay ²
Miocene, lower or middle

 Navarro River member (of Brasso formation)²

 Tunnel Hill member (of Brasso formation)²
Miocene, lower and middle

 Biche limestone ²
Miocene, lower

 Brigand Hill limestone ²

 Herrera sandstone ²

 Rio Claro boulder bed ²
Oligocene and Miocene

 St. Croix formation ¹
Oligocene

 Alley Creek beds ²

 Bontour Point ¹ (formation)

 Cacatro member (of Cipero formation)²

 Cipero marl formation ²

 Flat Rock tongue (of San Fernando formation)²

 Godineau River marls ²

 Kapur limestone ²

 Karamat formation ²

 Mejias limestone ²

 Morne Diablo beds ²

 Paradise member (of Cipero formation)²

 Quinam limestone)²

 Retrench marls ²

 Tabaquite series ²
Oligocene(?)

 Ben Lommond formation ¹
Oligocene, upper

 Trinidad Point calcareous clay ²
Oligocene, middle, to Miocene, middle

 Brasso formation ²
Oligocene, middle to upper

 Esmeralda member (of Brasso formation)²

West Indies—Continued

Trinidad, British West Indies—Con.

Eocene

 Bon Accord conglomerate ²

 Fitt Trace marl ²

 Nariva series ¹

 Soldado Rock formation ¹
Eocene(?)

 Benitie group ²

 Galeota group ²

 Lagoon Navête group ²

 Lagoon Palmiste group ²
Eocene, upper

 Boca de Serpiente formation ²

 Hospital Hill formation ²

 Morne Roche beds ²

 Mount Moriah formation ¹

 Plaisance conglomerate ²

 San Fernando formation¹

 Soldado formation ²

 Ulen Quarry beds ²

 Vista Bella member (of Mount Moriah group)²
Eocene, middle

 Pelican Rock marls ²
Eocene, lower or middle

 Friendship Quarry marl (in Navet formation)²

 Mount Harris beds (in Pointe-à-Pierre formation)²

 Penitence Hill marl (in Navet formation)²

 Pierre Point beds (in Pointe-à-Pierre formation)²
Eocene, lower and middle

 Nariva River marl ²

 Navet formation ²

 Peñal Quarry horizon (in Palo Seco formation)²
Eocene, lower

 Dunmore Hill marl member (of Navet formation)²

 Ramdat marl (in Navet formation)²

 Serpent formation ²
Paleocene

 Chaudiere formation ²

 Cunapo River argiline ²

 Ganteaume conglomerate ²

 Maroc formation ¹

 St. Joseph boulder bed ²

 Soldado formation ²

 Tarouba shale ¹
Paleocene, lower

 Lizard Springs formation ²
Cretaceous or Tertiary

 Parian group ¹
Cretaceous

 La Carriere shale ¹

 Point à Pierre grits ¹
Upper Cretaceous

 Bontour formation ²

 Chert Hill formation ²

 Cunapo-Southern horizon (in Turure formation)²

West Indies—Continued

Trinidad, British West Indies—Con.

Upper Cretaceous—ContinuedGautier formation ²Guayaguayare beds ² (subsurface)Hobsons clay ²Lantern marl (in Chaudiere shale) ²Naparima Hill formation ²Railway Cut marl (in Chaudiere shale) ²San Fernando argiline ²Stack Rock limestone ²Toco Bay beds ²Turure formation ²*Lower Cretaceous*Bon Accord formation ²Cuche formation ²Cuche River beds ²Cumana formation ²Galera formation ²Galera Grit member (of Galera formation) ²Grande Riviere formation ²Grande Riviere Road limestone ²Maridale formation ²Plum Road formation ²San Souci volcanic formation ²Toco formation ²Zagaya limestone member (of Toco formation) ²*Lower Cretaceous(?)*Caribbean group ¹*Pre-Cretaceous(?)*Laventille limestone ¹*Jurassic*Cuare limestone ²Maracas beds ²Maraval beds ²Picton limestone member (of Laventille formation) ²Rio Seco formation ²*Upper Jurassic*Hollis Reservoir formation ²Quaré limestone (in Hollis Reservoir formation) ²*Jurassic or older*Dragon formation (type locality in Venezuela) ²

Virgin Islands

*Oligocene and Miocene**Kingshill marl* ²*Oligocene**Jealousy formation* ²*Upper Cretaceous**Mount Eagle volcanics* (as series ¹)

Pacific Islands

Detailed information on the geologic formations of all of the smaller islands in the Mid-Pacific area can be found in the Lexique Stratigraphique International, v. 1, Oceanic fascicule 2, Oceanic Proprement Dite.

Pacific Islands—Continued

Caroline Islands (Angaur)

*Pleistocene and Recent*Angaur (Older and Younger) limestone ²

Caroline Islands (Babelthaup)

*Pleistocene*Palau limestone ²*Pliocene*Airai lignite bearing beds ²*Oligocene*Arumonogui (Almongui) agglomerate ²*Eocene*Aimiriiki (Aimiliiki) agglomerate ²Babelthaup agglomerate ²Kameset (Gamusetsu) agglomerate ²Ngardok (Galdog) beds ²

Caroline Islands (Eastern)

*Miocene*East Caroline beds ²

Caroline Islands (Fais)

*Pleistocene*Caroline limestone ²Fais limestone ²

Caroline Islands (Garim, island off Yap)

*Pleistocene*Garim limestone ²

Caroline Islands (Kusaie)

*Pliocene*Iisa beds ²*Miocene*Malam (Maremu) beds ²

Caroline Islands (Map)

*Miocene*Map formation ²

Caroline Islands (Peleliu)

*Recent*Ngarekeukl (Galkyoku) limestone ²*Pleistocene*Peleliu limestone ²

Caroline Islands (Ponape)

*Miocene*Metalanim (Matalanim) beds ²

Caroline Islands (Truk)

*Miocene*Getuyoto beds ²

Caroline Islands (Yap)

*Oligocene*Tomil agglomerate ²*Pre-Tertiary(?)*Yap formation ²

Hawaii (Island of Hawaii)

Quaternary (see also *Tertiary, upper, to Quaternary*)

Glenwood tuff ²Kapukapu tuff ²Olaa agglomerate ²Waiau formation ²Waimea formation ²

Pacific Islands—Continued

Hawaii (Island of Hawaii)—Con.

Recent

 Huehue flow ²

 Keanakakoi formation ²
Recent and Pleistocene, upper(?)

 Kamehame basalt ¹

 Kau volcanic series ²

 Kona tuff formation ²

 Puna volcanic series ²
Pleistocene or Recent

 Uwekahuna ash ²
Pleistocene and Recent

 Hualalai volcanic series ²

 Honolulu volcanic series ¹
Pleistocene and Recent(?)

 Laupahoehoe volcanic series ²
Pleistocene

 Hawi volcanic series ²

 Kahuku volcanic series ²

 Makanaka drift and stage ²

 Pahala ash (as basalt ¹)

 Pohakuloa drift and stage ²

 Waihu fanglomerate ²
Pleistocene(?)

 Hilina volcanic series ²

 Waawaa volcanics ²
Tertiary, upper, to Quaternary

 Hamakua volcanic series ²
Pliocene(?)

 Ninole volcanic series (as basalt¹)

 Pololu volcanic series ²

Hawaii (Island of Kahoolawe)

Pliocene(?)

 Kanapou volcanic series ²

Hawaii (Island of Kauai)

Pleistocene and Recent

 Koloa volcanic series ²
Pleistocene

 Palikea formation ²
Pliocene(?)

 Haupu formation ²

 Makaweli formation ²

 Mokuone member (of Makaweli formation) ²

 Napali formation ²

 Olokele formation ²

 Waimea Canyon volcanic series ²
Age(?)

 Kauai lavas ²

 Waimea conglomerate ²

Hawaii (Island of Lanai)

Pliocene and Pleistocene(?)

 Lanai volcanic series (as basalt¹)

Age(?)

 Manele basalt ¹

Hawaii (Island of Maui)

Pleistocene or Recent(?)

 Lahaina volcanic series ²

 Laina volcanics ²
Pleistocene and Recent

 Hana volcanic series ²
Pleistocene

 Kaupo mud flow ²

Pacific Islands—Continued

Hawaii (Island of Maui)—Continued

Pleistocene(?)

 Big Falls picritic basalt ²

 Hanawi basaltic andesite ²

 Kapaula basaltic andesite ²

 Keanae basalt ²

 Kilea volcanics ²

 Kipahula formation ²

 Kuhiwa basaltic andesite ²

 Makaino basaltic andesite ²

 Makapipi basalt ²

 Mossman picritic basalt ²

 Ohia basalt ²

 Paakea basalt ²

 Pauwalu basalt ²

 Piinaau basalt ²

 Waiaaka basaltic andesite ²

 Wailuanui basalt ²

 Waiokamilo basalt ²
Pleistocene, lower, or Pliocene, upper(?)

 Honolua volcanic series ²
Pliocene(?)

 Wailuku volcanic series ²
Tertiary, upper(?)

 Honomanu volcanic series ²

 Kula volcanic series ²

Hawaii (Island of Molokai)

Pleistocene(?)

 Kalaupapa basalt ²
Pliocene

 West Molokai volcanic series ²
Pliocene(?)

 East Molokai volcanic series ²

Hawaii (Island of Niihau)

Pleistocene

 Kiekie volcanic series ²
Pliocene(?)

 Paniau volcanic series ²

Hawaii (Island of Oahu)

Quaternary

 Aliamanu basalt ² (subsurface)

 Kaau mud flow ²

 Kii Point limestone ²

 Pyramid Rock basalt ²
Recent

 Black Point ash ²

 Diamond Head talus breccia ¹

 Kalama volcanics ¹
Pleistocene(?)

 Kolekole volcanics ²
Pleistocene, upper, or Recent

 Kaupo basalt ¹

 Koko volcanics ¹

 Manana tuff ¹

 Sugar Loaf basalt ¹

 Tantalus basalt ¹
Pleistocene, upper, and Recent

 Kaohikaipu volcanics ¹
Pleistocene, upper

 Ainoni volcanics ¹

 Aliamanu tuff ¹

Pacific Islands—Continued

Hawaii (Island of Oahu)—Continued

Pleistocene, upper—ContinuedBlack Point basalt ¹Castle volcanics ¹Diamond Head tuff ¹Fort Shafter gravel ¹Haiku volcanics ¹Hawaiiiloa volcanics ¹Kaau volcanics ¹Kaimuki volcanics ¹Kalihi volcanics ¹Kamanaiki basalt ¹Kaneohe volcanics ¹Kupikipikio basalt ¹ or black ash ¹Makalapa tuff ¹Makawao breccia ¹Maunawili volcanics ¹Mauumae volcanics ¹Mokapu basalt ¹Mokolea basalt (as Mokulea basalt ¹)Moku Manu volcanics ¹Nuuanu volcanics ¹Pali volcanics ¹Punchbowl volcanics ¹Rocky Hill volcanics ¹Salt Lake tuff ¹Training School volcanics ¹Ulupau tuff ¹*Pliocene*Pearl Harbor series ¹Pearl River series ¹*Pliocene(?)*Kailu volcanic series ¹Koolau volcanic series ¹Waianae volcanic series ¹*Age(?)*Black Point limestone ²

Mariana Islands (Aguijan)

*Pliocene*Aguijan limestone ²

Mariana Islands (Farallon de Medinilla)

*Oligocene (Aquitania)*Medinilla (Lower and Upper) limestone ²

Mariana Islands (Guam)

*Recent*Merizo limestone ²*Pleistocene*Barrigada limestone ²*Pliocene*Sumay limestone ²Talofofo peat-bearing beds ²*Oligocene (Aquitania)*Asan limestone ²*Eocene*Balanos andesite ²Fena beds ²Nagas beds ²Santa Rosa beds ²Umatac andesite ²

Pacific Islands—Continued

Mariana Islands (Pagan)

*Recent*Pagan limestone ²

Mariana Islands (Rota)

*Recent*Mirikattan limestone ²*Pleistocene*Rota limestone ²*Pliocene(?)*Poniya limestone ²*Miocene, lower*Hirippo limestone ²*Oligocene (Aquitania)*Taihamu (Taihanom) limestone ²*Eocene*Manila agglomerate ²Mariiru beds ²

Mariana Islands (Saipan)

*Pleistocene or Recent*Tanapag limestone ²*Pleistocene*Chacha limestone ²*Pliocene and Pleistocene*Naftan limestone ²*Miocene, lower*

Donni sandstone member (of

Tagpochau limestone) ²Laulau limestone ²

Machegit conglomerate member

(of Tagpochau limestone) ²Tagpochau limestone ²*Eocene*As Perdido (Asuberudedo) beds ²*Eocene(?)*Sankakuyama formation ²*Eocene, upper*Densinyama formation ²Hagman formation ²Matansa limestone ²

Mariana Islands (Tinian)

*Recent*Dankuro limestone ²*Pleistocene*Mariana limestone ²Sonson limestone ²*Pliocene or Pleistocene*Carolinas limestone ²*Oligocene (Aquitania)*Kasutesyo limestone ²Lasso limestone ²Tinian beds ²*Eocene*Marino agglomerate ²Marino beds ²

Samoa Islands

*Recent*Aunuu tuff ²*Recent(?)*Leone volcanics ²*Pliocene(?)*Alofau volcanics ²Masefau volcanics ²Olomoana volcanics ²

Pacific Islands—Continued
 Samoa Islands—Continued
Pliocene(?)—Continued
Taputapu volcanics²
Pliocene and Pleistocene(?)
Pago volcanic series²
Pliocene or Pleistocene, lower
 Afono trachyte²
 Matafao breccia²
 Matafao trachyte²
 Papatele trachyte²

Pacific Islands—Continued
 Samoa Islands—Continued
Pliocene or Pleistocene, lower—Con.
 Pioa breccia²
 Pioa rhyolite²
 Vatia trachyte²
Pliocene and lower Pleistocene(?)
 Fagasa gabbro²
 Lefulufulua trachyte²
 Leila trachyte²
 Tau trachyte²

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:

Frailles formation (C. A. Kaye, 1959, U.S. Geol. Survey Prof. Paper 317-A, p. 16), Upper Cretaceous of Puerto Rico (p. 616)

Houy formation (P. E. Cloud, V. E. Barnes, and W. H. Hass, 1957, Geol. Soc. America Bull., v. 68, no. 7, p. 810-816), Devonian and Lower Mississippian of Texas (p. 554)

Owens Valley formation (C. W. Merriam and W. E. Hall, 1957, U.S. Geol. Survey Bull. 1061-A, p. 7-12), Permian of California (p. 450)

Recent additions to and revisions of Survey usage made too late to be included in the text:

Genesee formation (as group¹), Upper Devonian of New York (p. 512), containing the following members:

Genesee shale¹ member (p. 512)

Genundewa limestone member (as lentil of Genesee shale¹) (p. 512)

Ithaca member (as shale member of Portage formation¹) (p. 512)

Penn Yan shale member (as Tongue of West River shale²) (p. 512)

Renwick shale member¹ (p. 512)

Sherburne flagstone member (as member of Portage formation¹) (p. 512)

West River shale¹ member (p. 512)

Keyser limestone (as member of Helderberg limestone¹), Upper Silurian and Lower Devonian (?) of West Virginia (p. 571)

McElroy formation (as member of Fayette sandstone¹), upper Eocene of Texas (p. 546), containing the following members:

Dilworth sandstone member (as sand¹) (p. 545)

Manning clay member (as beds¹) (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 beds¹), upper Eocene of Texas (p. 546), containing the following members:

Calliham sandstone member (as sand¹) (p. 545)

Dubose member (as sands and clays¹) (p. 546)

Fashing clay member (as clay¹) (p. 546)

Stones Switch sandstone member (as sand¹) (p. 546)

Corrections:

†Sharon coal group,¹ 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)

Sugarloaf series, Cenozoic of Arizona (H. E. Enlows, 1951, Tulsa Geol. Soc. Digest, v. 19, p. 105-107)

The names listed below are cited under erroneous localities in the text:

Bromley shale (in Cynthiana formation),¹ Middle Ordovician of Kentucky (p. 522)

Floyd shale,¹ Upper Mississippian of Georgia (p. 430)

Drywood formation or coal group,¹ Pennsylvanian (Des Moines) of Missouri (p. 526)

Geologic Names of North America

By DRUID WILSON *and others*

G E O L O G I C A L S U R V E Y B U L L E T I N 1 0 5 6



UNITED STATES DEPARTMENT OF THE INTERIOR

FRED A. SEATON, *Secretary*

GEOLOGICAL SURVEY

Thomas B. Nolan, *Director*

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Bibliography: p. 410-412.

CONTENTS.—A. Geologic names of North America introduced in 1936-1955, by D. Wilson, W. J. Sando, and R. W. Kopf.—B. Index to the geologic names of North America, by D. Wilson, G. C. Keroher, and B. E. Hansen.

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(B) Index to the geologic names of North America, by Druid Wilson, Grace C. Keroher, and Blanche E. Hansen.....	407

the 1990s, the number of people in the world who are undernourished has increased from 600 million to 800 million (FAO 1996). The number of people who are malnourished has increased from 1.2 billion to 1.5 billion (FAO 1996).

There is a growing awareness of the need to improve the nutritional status of the world's population. The World Health Organization (WHO) has set a goal of reducing the number of undernourished people in the world by 50% by the year 2010 (WHO 1996).

The purpose of this paper is to review the current state of knowledge about the nutritional status of the world's population and to discuss the implications for public health.

Methods

The data for this review were obtained from a search of the literature using the following keywords: malnutrition, undernutrition, and public health.

Results

The results of the search are presented in Table 1. The table shows the number of articles found for each keyword and the number of articles that were included in the review.

The results of the search show that there is a large amount of research on malnutrition and undernutrition. The number of articles found for each keyword is shown in Table 1.

The results of the search also show that there is a large amount of research on public health. The number of articles found for each keyword is shown in Table 1.

The results of the search show that there is a large amount of research on malnutrition and undernutrition. The number of articles found for each keyword is shown in Table 1.

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The search was limited to the English language and to the period 1990-1996. The search was conducted using the following databases: Medline, Psycinfo, and Socioindex.

The search results were screened for relevance. The full text of the relevant articles was obtained and reviewed.

The data were then analyzed and summarized. The results are presented in the following sections.

Results

The results of the search are presented in the following sections. The first section discusses the prevalence of malnutrition in the world's population.

The second section discusses the causes of malnutrition. The third section discusses the consequences of malnutrition.

The fourth section discusses the implications for public health. The fifth section discusses the need for further research.

The sixth section discusses the need for action. The seventh section discusses the need for further research.

The eighth section discusses the need for action. The ninth section discusses the need for further research.

The tenth section discusses the need for action. The eleventh section discusses the need for further research.

The twelfth section discusses the need for action. The thirteenth section discusses the need for further research.

The fourteenth section discusses the need for action. The fifteenth section discusses the need for further research.