

COLORADO STATE GEOLOGICAL SURVEY
BOULDER

R. D. GEORGE, State Geologist

BULLETIN 7

BIBLIOGRAPHY OF COLORADO GEOLOGY AND MINING

WITH SUBJECT INDEX

FROM THE EARLIEST EXPLORATIONS
TO 1912

BY

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LETTER OF TRANSMITTAL

STATE GEOLOGICAL SURVEY,
UNIVERSITY OF COLORADO, August 1, 1914.

*Governor Elias M. Ammons, Chairman, and Members of the
Advisory Board of the State Geological Survey.*

GENTLEMEN: I have the honor to transmit herewith Bulletin
7 of the Colorado Geological Survey.

Very respectfully,

R. D. GEORGE,
State Geologist.

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Bibliography of Colorado Geology and Mining with Subject Index

INTRODUCTION

The geological literature of Colorado is very extensive and has appeared in a very large number of publications. No single library in the United States, much less any library in Colorado, contains copies of all the papers, reports, maps and illustrations bearing on the geology of the state. Much valuable information published in the newspapers of the state and of the country from the early days of western exploration to the present time has been lost beyond recovery.

The authentic geological and geographical literature of Colorado may be said to begin with the accounts and reports of the early explorations. The records of the discoveries of Coronado in 1540, and Escalante in 1776 are followed by the much more complete reports of the American explorers, beginning with Pike in 1805 and 1806; Long in 1820; Bonneville in 1832; Fremont in 1842 to 1853; Gunnison and Beckwith in 1853; and Macomb and Newberry in 1859 and 1860. These reports were published by the War Department, and form an important part of the early literature bearing on the region. Later surveys were made under the authority of the Department of the Interior, and extensive reports accompanied by excellent maps were published by the government. The principal organizations which carried on work in the territory now comprising the state of Colorado were as follows: The Geological Exploration of the Fortieth Parallel, under the direction of Mr. Clarence King, from 1867-1872; The Geological and Geographical Survey of the Territories under Dr. F. V. Hayden, from 1867-1879; The Geographical Survey West of the One Hundredth Meridian, under Capt. George M. Wheeler, and the Geographical and Geological Survey of the Rocky Mountain Region, under Maj. J. W. Powell. Many valuable contributions to the literature of this period are also to be found in the scientific journals and periodicals of the time.

To the present United States Geological Survey must be credited by far the greatest amount of recent literature bearing on the geology of Colorado. Many valuable contributions are also to be found in the reports of the departments of the state of Colorado devoted to geology and mining, together with the publications of the different institutions of learning within the state, the publications of the learned societies, and scientific and mining magazines.

In order that this extensive literature may be made more available to the public a bibliography of Colorado geology has been prepared. It covers the literature of general and economic geology, paleontology, petrology, mineralogy, and mining, from the earliest publications to the end of 1912, and follows, in general, the plan and arrangement of the bibliographies of North American geology published by the United States Geological Survey. Many of the entries and references in the present work are taken, with little or no change, from the bibliographies of the United States Geological Survey.

The papers, with full title and medium of publication and explanatory note, when the title is not fully self-explanatory, are listed under the authors, arranged in alphabetic order. The author index is followed by an index to the literature listed. In this index the entries will be found in straight alphabetic arrangement. Lists of chemical analyses, minerals described, rocks described, and geologic formations described follow immediately after the index.

Many of the publications listed in the bibliography are available to the public in the libraries of the following institutions: University of Colorado, State School of Mines, Colorado College, State Agricultural College, Denver University, and the Colorado Scientific Society. They may also be found in the public libraries of the larger cities, as Denver, Pueblo, and Colorado Springs. If the local library does not possess the publication desired, under the system of inter-library loans the Library of Congress, Newberry, John Crear and other libraries will lend books to libraries for the use of investigators engaged in serious research.

The author wishes to acknowledge the valuable assistance rendered by Professor Ralph D. Crawford, Professor Junius Henderson, and Professor W. E. McCourt, and to Professor R. D. George the author is especially grateful for criticisms and suggestions during the progress of the entire work. Thanks are also

due the Denver Public library, the State School of Mines library, and the Colorado Scientific Society library for the special privilege of consulting their files of periodicals not immediately accessible to the Geological Survey.

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Carboniferous, and Tertiary rocks, of Quaternary deposits, and of eruptive rocks, and the physiography and geologic history and structure, and discusses in detail the petrology of the quadrangle. Economic geology: Describes the system of fissures, the relations of the ores to the fissures, the minerals occurring in the lodes, and the character, distribution, origin and value of the ore deposits containing gold, silver and lead. By Frederick L. Ransome.

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Describes the general physiography and geology of the San Juan region, and the occurrence and character of the Algonkian, Jura-Trias, Cretaceous, Tertiary and igneous rocks of the quadrangle, and discusses the geologic history. Includes topographic and geologic maps, columnar sections, and special illustrations. Economic geology: Describes the fissures and veins of the region, and the occurrence, character, and origin of the gold and silver ores.

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Describes general geologic structure and relations of the region, the character and occurrence of ore-bearing veins and fissures, character, occurrence and origin of the ore bodies and associated minerals, and the mining operations.

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1. Description of La Plata quadrangle. U. S. Geol. Surv., Geol. Atlas of U. S., folio no. 60, 1899.

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Rico: Farish, 3; Rickard, T. A., 7.

Sangre de Cristo: Lee, W. T., 8.

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8; Stevenson, 3; White, 8, 10, 15, 16, 18, 22; Williams, H. S., 3.

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 Colorado group: Endlich, 4, 5; Girty, 3; Hague and Emmons, 1; King, 1; Stanton, 2; Stevenson, 13.
 Comanche: Darton, 11; Stanton, 3.
 Dakota, Denver Basin: Emmons, Cross, and Eldridge, 2.
 Dakota carnivorous dinosaurian: Cope, 27.
 Dakota, dinosauria: Lucas, 1; Marsh, 3.
 Dakota, saurians: Cope, 32.
 Dakota, Rabbit Ears region: Grout, Worcester, and Henderson, 1.
 Dakota: Cope, 41; Cross, 24; Cross and Purington, 1; Endlich, 5; Holmes, 1; Lesquereux, 7, 8, 10, 11, 13; Peale, 7, 8; White, 5, 27.
 Danforth Hills: Gale, 3.
 Denver Basin: Emmons, Cross, and Eldridge, 2.
 dinosaur: Lucas, 1; Marsh, 3.
 eastern Colorado: Collier, D. C., 1.
 Echinoidea: Clark, W. B., 1a.
 Elmore: Hills, 24.
 Fort Collins district: White, 10.
 Fortieth Parallel area: Meek, 5, 6.
 Fossil Ridge: Henderson, 9.
 Fox Hills: Cockerell, 9; Cope, 19; Darton, 13; Emmons, Cross, and Eldridge, 2; Endlich, 5; Hayden, 20; King, 1; Lee, W. T., 5; Stevenson, 5; White, 1.

Cretaceous.—Continued.*Paleontology.—Continued.*

- Fox Hills, Boulder district: Henderson, J., 3.
 Fox Hills, Denver Basin: Eldridge, 2.
 Front Range: Lesquereux, 13.
 Grand Hogback: Gale, 3.
 Graneros shale: Stose, 1.
 invertebrates: Cross, Howe, and Irving, 1; Gabb, 1.
 Judith River beds: White, 1.
 La Plata: Cross, Spencer and Purington, 1.
 Laramie, Boulder district: Henderson, J., 3.
 Laramie, Grand River district: Lakes, 160.
 Laramie, mammals and horned dinosaurs: Hatcher, 3.
 Laramie, molluscan: White, 6, 17.
 Laramie, nelumbo: Hollick, 1.
 Laramie plant: Hollick, 2.
 Laramie, Shoshone: Cross, 38.
 Laramie: Clark, W. B., 1; Cockerell, 45; Darton, 13; Emmons, Cross, and Eldridge, 1, 2; Endlich, 5; Henderson, J., 7, 8; Hills, R. C., 24, 25; King, 1; Lee, W. T., 5; Marsh, 38; Newberry, 18; Peale, 13; Stanton and Knowlton, 1; Ward, L. F., 3; White, 1, 3, 5, 6b, 7, 14, 15, 16, 25, 27.
 Lewis shale: Cross, Spencer, and Purington, 1.
 Lignitic formation, age of: Lesquereux, 6; Meek, 2; Stevenson, 2.
 Lignitic, lower: Berthand, 2; Cope, 15, 19; Cross, 19; Dana, 2; Hayden, 14, 15, 16, 18, 20, 23; Lesquereux, 9, 12, 14; Marvine, 1; Newberry, 1; Peale, 5, 12; Stevenson, 3.
 Lucina profunda: White, 12.
 Mancos, Grand Mesa district: Lee, W. T., 13.
 Mancos, Hahns Peak district: George and Crawford, 1.
 Mancos, Rio Blanco district: Gale, 5.

Cretaceous.—Continued.*Paleontology.—Continued.*

- Mancos: Cross, Howe, and Irving, 1; Cross and Purington, 1; Cross and Ransome, 1; Cross, Spencer, and Purington, 1.
- McElmo, *Atlantosaurus*: Cross, Spencer, and Purington, 1.
- Mesaverde, Grand Mesa: Lee, W. T., 13.
- Mesaverde, invertebrates: Cross, Spencer, and Purington, 1.
- Mesaverde, plants: Cockerell, 57; Lee, W. T., 14.
- Mesaverde, Rio Blanco County: Gale, 5.
- Mesaverde: Cross, Howe, and Irving, 1.
- middle Cretaceous: Eldridge, 1.
- Montana, Aspen district: Spurr, 1.
- Montana: Emmons, Cross, and Eldridge, 1; White, 27.
- Nepesta: Fisher, 1.
- Niobrara, Boulder district: Henderson, J., 3.
- Niobrara, Florence district: Eldridge, 4.
- Niobrara: Cannon, 8, 10; Cope, 15, 19; Emmons, Cross, and Eldridge, 2; Gilbert, 7; Lee, W. T., 5; Logan, 1.
- northwestern Colorado: Gale, 3, 8.
- Ostreidae: White, 18.
- Palmer Lake district: Cannon, 9.
- Pawnee Creek beds: Matthew, 5.
- Pierre, Boulder district: Henderson, J., 3.
- Pierre, Florence: Eldridge, 5.
- Pierre, Tepee zone: Gilbert, 5.
- Pierre: Cannon, 10; Cope, 15, 19; Darton, 13; Emmons, Cross, and Eldridge, 2; Fisher, 1; Gilbert, 5; Henderson, J., 8; Lee, W. T., 5.
- plants: Cockerell, 9, 57; Hollick, 1, 2; Knowlton, 1a, 2, 4; Lesquereux, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 16, 17, 18, 19; Peale, 17; Ward, 1, 1a, 2, 3, 5, 6.
- Pueblo: Gilbert, 7.

Cretaceous.—Continued.*Paleontology.—Continued.*

- Purgatoire: Stose, 1.
- Rabbit Ears district: Grout, Worcester, and Henderson, 1.
- Rangely: Gale, 5.
- Rico: Cross and Ransome, 1.
- San Juan district: Meek, 4.
- Spanish Peaks: Hills, 25.
- Telluride: Cross and Purington, 1.
- Timpas, Spanish Peaks: Hills, R. C., 25.
- Timpas: Darton, 13; Fisher, 1; Gilbert, 5; Hills, 15, 24; Stose, 1.
- Trinidad district: Conkling, 3; Hills, R. C., 15, 25.
- vertebrata: Cockerell, 57; Conrad, 2; Cope, 1, 3, 15, 19, 22, 23, 40; Emmons, Cross, and Eldridge, 2; Endlich, 1, 3, 4, 5.
- Walsenburg: Hills, 15.
- White River district: Adams, G. I., 1; Cope, 54, 60; Dall and Harris, 1; Marsh, 1; Osborn and Wortman, 1; Scudder, 8; White, 1.
- Yampa coal field: Fenneman and Gale, 2.
- Cripple Creek.**
- General*: Blake, 1b; Cross and Penrose, 1; Draper, 2; E. and M. J., 23; Hills, V. C., 1; Lakes, 10, 17, 35; Lindgren, 1, 2; Miller, G. W., 1; Moore, C. J., 2; Pearce, R., 11; Skewes, 1; Van Wagenen, H. R., 2; Wolcott, G. E., 5; Worcester, S. A., 3.
- aegirite and aegirite-augite in phonolite: Graton, 1.
- alunogen: Hobbs, 2.
- amethyst: Lakes, 43.
- amphibole, blue: Graton, 1.
- analcite in phonolite: Graton, 1.
- analcite basalt, analysis of: Cross, 28; Clarke, F. W., 9.
- antimony: Cross and Penrose, 1.
- auriferous iron pyrite: Cross and Penrose, 1.
- bonanzas: Rickard, T. A., 17.
- breccia: Lindgren and Ransome, 3; Graton, 1.

Cripple Creek.—Continued.

breccia and associated ore deposits: Lakes, 245.

calcite: Cross and Penrose, 1.

calaverite: Clarke, F. W., 9; Hillebrand, 7, 10; Penfield and Ford, 1; Lindgren and Ransome, 3.

copper: Cross and Penrose, 1; Lindgren and Ransome, 3; Rickard, J. A., 14.

diabase: Graton, 1.

dikes described: Skees, 2.

dividends: E. and M. J., 33.

drainage tunnels: Alderson, 1; Bain, 6; Countryman, 1, 2; Lakes, 225.

emmonsites (?): Hillebrand, 12; Lindgren and Ransome, 3.

epsomite and alunogen: Hobbs, 2.

feldspar in phonolite: Graton, 1.

fluorine mine: Lakes, 59.

fluorite: Cross and Penrose, 1.

gas, subterranean, analysis of: Lindgren, 3.

geology, dynamic: Argall, 11; Bancroft, 1, 4; Cross, 29; Cross and Penrose, 1; Lakes, 18, 21; Lee, H. A., 9; Lindgren, 3; Lindgren and Ransome, 2, 3; Miler, G. W., 1; Pearce, R., 9; Rickard, T. A., 15, 22, 26; Spurr, Garrey, and Ball, 1; Stevens, 1; Stone, 6; Van Hise, 4; Weed, 2.

geology: Cross, 29; Winslow, 1; Lindgren and Ransome, 1; Rickard, T. A., 1.

gold: Cross and Penrose, 1; Curle, 1; Ingalls, 1; Kemp, 1a; Knight, F. C., 1; Lakes, 30, 35, 41, 47, 56, 59; Liebenan, 1; Lindgren, 4; Lindgren and Ransome, 1, 2, 3; McCarn, 1 Möllmann, 1; Pearce, R., 6, 8, 9; Rickard, T. A., 11, 22; Ritter, 2; Sharwood, W. J., 1; Winslow, 1.

Gold Hill ore shoots described: Skewes, 3.

goldschmidtite: Hobbs, 1.

gneiss: Graton, 1.

granitic breccias: Stone, 7.

Cripple Creek.—Continued.

granite, analysis of: Clarke, F. W., 8.

granites: Clarke, F. W., 8; Graton, 1; Mathews, 1, 2; Rickard, T. A., 1.

granite gneiss: Clarke, F. W., 8.

hydrology: Cross and Penrose, 1; Lindgren and Ransome, 1, 3.

Independence mine: Mg. World, 6; Rickard, T. A., 29.

kaolin, analysis of: Cross and Penrose, 1; Rickard, T. A., 15.

krennerite: Chester, 2; Lindgren and Ransome, 3.

latite porphyry: Graton, 1.

latite phonolite: Clarke, F. W., 8.

lead: Rickard, T. A., 14; Cross and Penrose, 1.

lavenite: Graton, 1.

leasing: Burgess, 1.

limburgite: Stevens, E. A., 1.

manganese minerals: Cross and Penrose, 1; Lindgren and Ransome, 1, 2, 3; U. S. G. S.

mills and milling: Argall, P., 16, 17, 18, 19; Clancy, 1; Dodge, 1; Henahan, 1; Koch, 1; Magenau, 1; Min. Ind. and Rept., 8; Miller, G. W.; Of, 1; Taylor, G. M., 1; Warwick, 5; Wolcott, 6.

minerals, analysis of: Clarke, F. W., 8, 9; Knight, F. C., 1; Ritter, 2; Schaller, 1.

minerals, characteristic: Graton, 1.

minerals, new: Knight, F. C., 1.

mines, Ajax: Colburn, E. A., 1.

mines, El Paso: Zulch, 1.

mining, cost of: Bain, 4; Finlay, J. R., 1, 3; Ingalls, 3.

mining, early: Rickard, T. A., 6.

mining, Independence mine: Lakes, 13.

mining, labor troubles: Finch, 2.

mining, leasing system: Finch, 2; Finlay, J. R., 2.

mining, Portland mine: Fulton, 1.

mining, underground workings, extent of: Lindgren and Ransome, 3.

Cripple Creek.—Continued.

- mining, Victor mine: Elder, 1.
- mining: Arthur, 1; Bancroft, 1; Collins, G. E., 3, 4, 5, 6; E. and M. J., 20, 23, 28, 33; Finch, 2; Forsyth, 1; Hazelhurst, 1; Herrick, 1; Hills, F., 1; Johnson, 1; Judson, 1; Lakes, 88, 142; Lindgren and Ransome, 3; Miller, G. W., 1; Mg. Inv., 2; Moore, 2; Rickard, T. A., 8, 22; Van Wagenen, H. R., 2; Winslow, 1; Wolcott, G. E., 4.
- monchiquite, description and analysis of: Clarke, F. W., 8; Graton, 1.
- nepheline syenite: Clarke, F. W., 9; Graton, 1.
- Ophelia tunnel: Dinsmoor, 1.
- ores, alteration of: Cross and Penrose, 1.
- ores, analysis of: Baker, 1; Cross and Penrose, 1; Graton, 1; Smith, F. C., 1.
- ore deposits, basaltic zones as guide to: Stevens, E. A., 2.
- ore deposits, character and value of: Miller, G. W., 1.
- ore deposits, compared with Custer County: Emmons, 23.
- ore deposits, formation: Bancroft, 4.
- ore deposits, lodes: Rickard, T. A., 22.
- ore deposits, occurrence: Cross and Penrose, 1.
- ore deposits, shoots: Lakes, 47; Skewes, 3.
- ore deposits: Argall, P., 6; Bancroft, 1, 7; Cross and Penrose, 1; Lakes, 11, 16, 18, 21, 30, 74, 214, 233, 243, 254; Lee, H. A., 9; Lindgren, 7; Lindgren and Ransome, 1, 2; McCarn, 1; Pearce, R., 9; Penrose, 2; Rickard, T. A., 8, 26, 28; Schwarz, 3; Spurr, Garrey, and Ball, 1; Stevens, E. A., 2; Warwick, 2.
- ore treatment, cyaniding: Baker, 1; Fulton, 2; Lakes, 70.

Cripple Creek.—Continued.

- ore treatment: Argall, P., 9, 14, 15; Crows, 1; Croll, 1; Fulton, 1, 2; Greenawalt, 1; Headden, 10; Hoover, 2.
- petzite: Lindgren and Ransome, 3; Rickard, T. A., 16.
- phonolite, analysis of: Clarke, F. W., 9; Cross and Penrose, 1; Graton, 1.
- physiography: Cross and Penrose, 1; Lindgren and Ransome, 1, 3.
- placer deposits: Cross and Penrose, 1; Lakes, 259; Lindgren and Ransome, 3.
- Portland mine: Scates, 1.
- Poverty Gulch mine: Henderson, C. W., 3.
- production: Collins, G. E., 9; Cross and Penrose, 1; Day, 13; E. and M. J., 28, 33; Finch, 2; Hazelhurst, 1; Hodges, 1; Lakes, 18; Lee, H. A., 9; Lindgren and Ransome, 1, 3; Mg. Rept., 15, 21, 24; Mg. Sci. Press, 8; Rothwell, 5, 6; Tonge, 4.
- pseudomorphs after sylvanite and krennerite: Rickard, T. A., 16.
- quartz: Cross and Penrose, 1.
- rhyolite: Graton, 1.
- rocks, analyses of: Clarke, F. W., 8; Clarke and Hillebrand, 1; Daly, 1; Hillebrand, 11; Graton, 1; Miller, G. W., 1.
- sampling: Wolcott, 3.
- schist: Graton, 1.
- secondary enrichment: Bancroft, 1; Weed, 3.
- silver deposits: Cross and Penrose, 1; Rickard, T. A., 14.
- sodalite and nosean: Graton, 1.
- subterranean gases: Lindgren, 3.
- syenite, analysis of: Clarke, F. W., 8; Graton, 1.
- sylvanite: Lindgren and Ransome, 3; Palache, 1; Rickard, T. A., 16.
- tellurides, analysis of: Bailar, 1; Rickard, T. A., 16.

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- tellurides: Cross and Penrose, 1; Crows, 1; Hess, 1; Hillebrand and Allen, 1; Lindgren, 7; Lindgren and Ransome, 3; Portland Metallurgical Society, 1.
- titanite: Graton, 1.
- trachydolerites, analysis: Clarke, F. W., 8; Graton, 1.
- tunnel: Warwick, 3.
- underground water: Lindgren and Ransome, 2, 3.
- vein intersections: Ritter, 2; Underhill, 1.
- vogesite, analysis of: Clarke, F. W., 8; Graton, 1.
- volcano: Rickard, T. A., 15.
- water problem: Lakes, 101.
- zinc ores: Cross and Penrose, 1.

Crow Creek, Laramie beds: Stanton and Knowlton, 1.

- Little, Neocene: Dall and Harris, 1.
- paleontology, fossils described: Henderson, 8; White, 5, 6b.

Crustacea, Paleozoic: Vogdes, 1.**Cryolite, occurrence and metallurgy: Ohly, 2.**

- production, 1893, 1894, 1898, 1901: Day, 8, 11, 14; Rothwell, 2, 3, 1911: Burchard, E. F., 8.

Crystal Park, amazonstone: Henahen, 1; Lakes, 75.

- minerals from: Cross and Hillebrand, 4; Kunz, 2.

Culebra axis: Stevenson, 8.**Cunningham Gulch: Cross, Howe and Ransome, 1.****Current Creek, iron, meteoric: Headen, 12.****Custer County, Bassick and Bull Domingo mines: Lakes, 142; Mg. and Sci. Press, 12.**

- charcoal at depth in mine: Charlton, 1.
- cerussite: Brinsmade, 1.
- geology, dynamic: Cross, 12; Emmons, 23; Van Hise, 4.
- geology, economic: Emmons, 7.
- Geyser mine, analysis of water from: Clarke, F. W., 9.

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- eruptive rocks: Cross, 12.
- fluorspar: Burchard, E. F., 1.
- gold: Emmons, 23.
- iron: Emmons, 21.
- Marion mine, zinc: Babbit, 1.
- minerals, analyses: Clarke, F. W., 6; Eakins and Chatard, 1.
- minerals: Cross, 14.
- mines, Rosita and Silver Cliff: Emmons, 24; Lakes, 55.
- mines: Emmons, 23, 24; Lakes, 5; Lee, H. A., 9.
- mineral production, mines described: Burchard, H. C., 1, 2, 3, 4; Munson, 1; Emmons, 23; Lee, H. A., 9; Mg. Rept., 18.
- ores, analysis of: Emmons, 23, 24.
- physiography: Lee, H. A., 9.
- reduction plants: Emmons, 23.
- Rosita Hills, geology: Cross, 17.
- Rosita-Silver Cliff. *See* Rosita-Silver Cliff.
- silver: Emmons, 23.
- zinc, Marion mine: Babbit, 1.

Cut nails, production, 1899: Day, 12.**Danforth Hills. *General:* White, 4.**

- Grand Hogback, and, coal deposits: Gale, 3, 8.
- geology, dynamic: White, 24.
- map: Gale, 3; U. S. G. S.
- paleontology, fossils described: White, 5, 6b.

Davidson district, coal deposits: Emmons, Cross, and Eldridge, 2.

- geology, dynamic: Emmons, Cross, and Eldridge, 2.

Dawson arkose: Richardson, 4.**Deformation. *See also* faulting and folding.**

- General:* Bechler, 2; Blow, 1; Davis, W. M., 4; Emmons, 15, 20, 26; Endlich, F., 1, 2, 4, 7; King, 1; Gannett, 9; Hayden, 6, 14, 19, 22; Hills, R. C., 14, 17; Holmes, 2, 6; Marvin, 1; Peale, 5, 7, 8, 13; Pirsson, 2; Powell, 1, 2, 3, 6; Ransome, 4; Stevenson, 3, 7; Stone, 7; White, 4; Williams, S. G., 1.

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- Alma district: Patton, 10.
 Anthracite - Crested Butte quadrangle: Emmons, Cross, and Eldridge, 1.
 Aguilar district: Lakes, 117.
 Apishapa quadrangle: Stose, 1.
 Archean disturbances: Emmons, 17; Hills, R. C., 17.
 Archuleta County: Lee, H. A., 9.
 Arkansas Valley: Darton, 13; Gilbert, 5.
 Aspen district, as related to mining: Lakes, 150.
 Aspen district: Brunton, 2; Henrich, 2; Lakes, 2, 103; Newberry, 16; Spurr, 1.
 Bear Creek area: Emmons, W. H., 2; Emmons, Cross, and Eldridge, 2.
 Book Cliffs coal field: Lakes, 130.
 Boulder, coal field: Lakes, 159.
 Boulder, mineral belt in Boulder and Gilpin counties: Spurr, Garrey, and Ball, 1.
 Boulder, mining, as related to: Lakes, 150.
 Boulder, oil field: Fenneman, 2, 3.
 Boulder Valley region: Emmons, Cross, and Eldridge, 2.
 Boulder district: Fenneman, 5; Lakes, 124; Lindgren, 6.
 Breckenridge district: Lakes, 66.
 Cambrian, crustal movements: Walcott, 1.
 Canyons: Bross, 1.
 Carboniferous movement, Denver Basin: Emmons, Cross, and Eldridge, 2.
 Castle arch: Lee, W. T., 5.
 Cenozoic disturbances: Hills, R. C., 17.
 Clear Creek, veins: Lakes, 49.
 Clear Creek: Underhill, 4.
 Coal fields: Chauvenet, 10; Lakes, 73.
 coal, spontaneous combustion, effect on surrounding strata: Lakes, 180.
 Colorado Plateau: Spurr, 2.

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- Colorado Range: King, 1.
 Colorado: Lakes, 201.
 Crested Butte quadrangle: Emmons, Cross, and Eldridge, 1.
 Cretaceous, early, movement, Denver Basin: Emmons, Cross, and Eldridge, 2; Hills, R. C., 17.
 Cretaceous-Tertiary unconformity, Aspen: Spurr, 1.
 Cripple Creek, fissures: Weed, 2.
 Cripple Creek: Cross and Penrose, 1; Lindgren and Ransome, 3; Miller, G. W., 1; Stevens, 2; Stone, 6; Van Hise, 4.
 Culebra axis: Stevenson, 8.
 Dakota at Golden: Patton, 6.
 Danforth Hills uplift: White, 24.
 Davidson section: Emmons, Cross, and Eldridge, 2.
 Denver Basin, Green Mountain section: Emmons, Cross, and Eldridge, 2.
 Denver Basin: Eldridge, 2; Lakes, 6.
 Dike, to trace an invisible: Stone, 5.
 Durango coal field: Taff, 1.
 Durango quadrangle: Emmons, W. H., 1.
 Durango-Gallup coal field: Shaler and Gardner, 1.
 Elk Mountains, mining, as related to: Lakes, 150.
 Elk Mountains: Emmons, Cross, and Eldridge, 1; Holmes, 1.
 Elmore coal fields: Hills, R. C., 24.
 Engineer Mountain: Cross, 41.
 Florence oil field: Eldridge, 5; Fenneman, 4.
 foothills, near Denver: Eldridge, 4.
 geological history: Hollister, 1.
 Georgetown quadrangle: Ball, S. H., Crosby, 4; Spurr and Garrey, 1; Spurr, Garrey, and Ball, 1.
 Golden: Emmons, Cross, and Eldridge, 2.
 Grand Mesa: Lee, W. T., 10.
 Grand River coal field: Lakes, 160.

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Gunnison and Ouray districts:
Lakes, 6.

Hahns Peak district: Draper, 1;
George and Crawford, 1.

Henry Mountains: Hills, R. C., 20.

Idaho Springs: Spurr and Garrey,
2.

Jurassic movement: Emmons, 17;
Emmons, Cross, and Eldridge,
2; Hills, R. C., 17.

La Plata dome, origin of: Cross
and Spencer, 1.

La Plata mountains: Cross and
Spencer, 1; Hills, R. C., 20; Lee,
H. A., 9; Petre, 1.

Laramie, alterations, causes effect-
ing: Hills, R. C., 22.

Laramie movement: Hills, R. C.,
17.

Las Animas and Huerfano coal
field: Hanes and Parsons 1.

Leadville, downtown district: Em-
mons and Irving, 1.

Leadville, mining, as related to:
Lakes, 150.

Leadville, ore deposits: Weunsch,
2.

Leadville, Yankee Hill: Shedd, 1.

Leadville: Barker, 1; Freeland, 1;
Lakes, 196; Miller, G. W., 1;
Spurr, Garrey, and Ball, 1.

London fault: Patton, 10.

Louisville coal field: Lakes, 6.

Manitou embayment: Crosby, 3.

Mesozoic disturbances: Emmons,
17; Hills, R. C., 17.

mid-Cretaceous movement: Em-
mons, Cross, and Eldridge, 2.

Monarch-Tomichi mining district:
Crawford, 4.

Mosquito Range, London fault:
Lakes, 85.

Mosquito Range: Emmons, 9.

Mosquito Range, Tenmile district:
Emmons, 27.

Needle Mountains: Cross, Howe,
Irving, and Emmons, 1; Cross,
39.

Nepesta quadrangle: Fisher, 1.

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northwestern Colorado: Gale, 3;
Hewitt, 1; White, 26.

Ordovician time, crustal move-
ments: Walcott, 1.

Organic matter in mines, veins and
ore deposits: Lakes, 194.

Orographic movements: Emmons,
17; Hills, 17.

Ouray, Camp Bird mine: Titcomb,
1.

Ouray, unconformity: Cross and
Howe, 1.

Ouray: Cross, Howe, and Irving,
1; Irving, 2; Lakes, 6, 181; Ran-
some, 4.

overturns, Denver Basin: Hender-
son, J., 1.

Paleozoic disturbances: Emmons,
17; Hills, R. C., 17.

Paleozoic movement, late: Em-
mons, 17.

parks: Lakes, 5.

Park County: Lee, H. A., 9; Sadt-
ler, 1.

Perry Park syncline: Lee, W. T.,
5; Kruger, Hamilton, and En-
riquez, 1.

Pitkin County: Lee, H. A., 9.

Plomo: Gunther, 1.

Plum Creek, Denver Basin: Em-
mons, Cross, and Eldridge, 2.

post-Arapahoe movement: Em-
mons, Cross, and Eldridge, 2.

post-Bridger movement: Hills, R.
C., 17.

post-Carboniferous movement:
Hills, R. C., 17.

post-Cretaceous movement: Em-
mons, 17.

post-Denver movement: Emmons,
Cross, and Eldridge, 2.

post-Eocene movement: Hills, R.
C., 17.

post-Laramie movement: Emmons,
Cross, and Eldridge, 2.

post-Miocene movement: Hills, R.
C., 17.

post-Paleozoic movement: Hills,
R. C., 17.

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- post-Pliocene movement: Hills, R. C., 17.
- pre-Cambrian: Walcott, 1.
- pre-Cretaceous, Aspen: Spurr, 1.
- Quaternary movement: Hills, R. C., 17.
- Ralston section, Denver Basin: Emmons, Cross, and Eldridge, 2.
- Raton Mountains: Hills, R. C., 20, 22.
- Rico dome: Cross and Ransome, 1.
- Rico, fissure system, Enterprise mine: Van Hise, 4.
- Rico, laccolithic centers of eruptions, compared with: Cross and Spencer, 2.
- Rico, mining, related to: Lakes, 150.
- Rico: Cross and Ransome, 1; Cross and Spencer, 1; Farish, 3; Ransome, 2; Rickard, T. A., 7.
- Rio Blanco oil field: Gale, 5.
- Rock Creek district: Lakes, 6.
- Rocky Mountains, age of: Peale, 10; Stevenson, 4.
- Rocky mountains, movements in: Am. Geol., 2; Emmons, 17; Hills, 17; King, 1.
- Rocky mountains: Lakes, 175.
- Rosita district: Wulsten, 1.
- Routt County: Parsons and Liddell, 1.
- Sangre de Cristo Mountains: Hills, R. C., 20.
- San Juan, fissure system: Ransome, 1.
- San Juan, sedimentary series: Read, 4.
- San Juan, Treasure Mountain: Purington, 8.
- San Juan, zones of weakness: Spurr, Garrey, and Ball, 1.
- San Juan: Comstock, T. B., 7; Hills, R. C., 20; Howe, 1; Lee, H. A., 9; Rickard, T. A., 23; Snedaker, 1.
- San Miguel County: Lee, H. A., 9.
- Silver Plume mining district: Spurr, Garrey, and Ball, 1.

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- Silverton: Cross, 32; Cross, Howe, and Ransome, 1.
- southeastern Colorado: Gilbert, 6.
- South Park: Lakes, 115.
- southwestern Colorado: Comstock, 6.
- Spanish Peaks: Hills, R. C., 9, 20, 25; Lakes, 156; Savage, 1.
- Summit County: Mg. Ind., 5.
- Teller County, mining district: Rickard, T. A., 22.
- Telluride quadrangle: Cross and Purington, 1; Purington, 2.
- Tomichi-Monarch mining district: Crawford, 4.
- Two Butte uplift: Stanton, 3.
- Uinta fold: White, 24.
- Uinta Range: White, 26.
- uplift, eastern: Emmons, 9.
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- Yampa coal field: Fenneman and Gale, 2.
- Delagua, coal mine explosion: Duck, 1.
- Del Norte:**
- General:* Endlich, 4.
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- rhyolitic vitrophyre: Clarke, F. W., 8.
- Delta County, coal:** Headden, 8; Woodruff, E. G., 1.
- gypsum: Siebenthal, 1.
- map: Clason Map Co.
- minerals described: Headden, 6.
- mines described: Henderson, C. W., 4.
- radium bearing springs: Headden, 5.
- Denver, altitude of:** Howe, H. A., 1.
- artesian wells: Cannon, 10; Chauvenet, 2; Chisholm, 1; Cross, 3, 22; Darton, 9; Hills, R. C., 18; Strong, 1; van Diest, 3, 11.
- Cretaceous section: Stanton, 2.
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- infusorial earth: Headden, 2.
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Denver County, map: Clason Map Co.

Denver-Greeley district, map: Clason Map Co.

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Rico Mountains, quartzite: Cross and Spencer, 2.

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- Durango-Mesa Verde** field, coal, analysis: Shaler, 2.
- Durango-Monero** coal field: Gardner, 1.
- Dynamic and structural geology.** *See* anticlinal structure, batholiths, caves, chonoliths, cone-in-cone, deformation, earthquakes, erosion, faulting, folding, glaciation, igneous intrusions, jointing, landslides, magmatic differentiation, metamorphism, ore formation, orogeny, sedimentation, vulcanism, weathering.
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- Eagle River:** Bechler, 1.
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- Eastern Colorado,** artesian wells: Darton, 9, 10, 13; Emmons, Cross, and Eldridge, 2; Gilbert, 5; Hay, R., 2.
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- Economic (general).**
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 briquetting, bibliography: Mills, J. E., 1.
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- mineralogical mistake: van Diest, 13.
- sulphide belt: Ores and Metals, 1; Ritter, 8.
- veins and minerals: Mg. and Sci. Press, 1.
- veins of southwestern Colorado: Comstock, T. B., 6.
- vein phenomena, Boulder County: Farish, 1.
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- mines described: Mg. Rept., 7.
- ore deposits: Rickard, T. A., 28.

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- General:* Emmons, 7; Hayden, 14; Peale, 5.
- building stones: Emmons, Cross, and Eldridge, 1.
- clay: Emmons, Cross, and Eldridge, 1.
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- coal: Emmons, Cross, and Eldridge, 1.
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- geology, dynamic: Emmons, Cross, and Eldridge, 1; Holmes, 1; Lakes, 143, 150.
- geology, northwestern portion: Holmes, 1.
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- iron, bog ore: Emmons, Cross, and Eldridge, 1.
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- map: Hayden, 19; Peale, 7.
- minerals, analysis of: Clarke, F. W., 6.
- mines, production, 1880: Burchard, H. C., 1.
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- physiography: Emmons, Cross, and Eldridge, 1.
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- rocks, analysis of: Clarke and Hillebrand, 1.
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- General:* Draper, 2; Hague and Emmons, 1.
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- basaltic hills: Hague and Emmons, 1.
- Cretaceous formations: Hague and Emmons, 1.
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- Elmoro,** artesian wells: Hills, R. C., 24.
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- coal: Hills, R. C., 24, 26.
- coke, analysis of: Hills, R. C., 24; Weeks, J. D., 3.
- fire clay: Hills, R. C., 24.
- geology, dynamic: Hills, R. C., 24.
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- map: Hills, R. C., 24; U. S. G. S.
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- arfvedsonite, analysis of: Endlich, 6.
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- Calhan, clay from: Richardson, 3.
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- General:* Endlich, 5; Hayden, 19; Marvin, 1; Peale, 7.
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- General:* Clarke, W. B., 1; Cockerell, 20d; Cope, 6, 15, 17; King, 1; Lesquereux, 4; Peale, 7.
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- General:* Bechler, 2; Davis, W. M., 4; Endlich, F. M., 1, 4, 5; Hayden, 6, 12, 14, 18, 19, 22; Holmes, 6; Marvin, 1; Newberry, 3; Peale, 7; Powell, 1, 3; Russell, 1; Stevenson, 3; White, 26.
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- Florida River,** hydrography: Newell, 14.
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Vulcan and Mammoth Chimney mines: Lakes, 20.

Gold Coin mine: Lakes, 89.

- Golden, General:** Cross, 22; Hague, 1.
 andesite tuff, Table Mountain, analysis of: Lakes, 118.
 analcite from: Clarke and Steiger, 1.
 apophyllite, analysis of: Cross and Hillebrand, 2.
 basalt, Table Mountain, analysis of: Emmons, Cross, and Eldridge, 2.
 brick: Hague, 1.
 clay, analysis of: Clarke and Hillebrand, 1.
 clay, white ware: Geijsbeek, 1.
 coal: Emmons, Cross, and Eldridge, 2; Hayden, 4; Hodge, 1; Lakes, 6; Potter, W. B., 1.
 Cretaceous: Cross, 22.
 feldspar, analysis: Geijsbeek, 1.
 fire clay: Am. Jour. Mg., Bailar, 3; Darton, 9; Patton, 6; Ward, W. S., 1.
 fire clay, analysis: Furman, 1; Ward, W. S., 1.
 geology, dynamic: Emmons, Cross, and Eldridge, 2; Patton, 6.
 geology: Hayden, 6; Marvine, 1; Peale, 1.
 mesolite, analysis of: Cross and Hillebrand, 2.
 minerals, analysis of: Clarke, F. W., 6; Steiger, 1.
 Table Mountain, basalt from: Lakes, 165; Emmons, Cross, and Eldridge, 2.
 Table Mountain, ptilolite: Dana, E. S., 7.
 Table Mountain, minerals from: Cross and Hillebrand, 2; Patton, 4.
 non-conformities: Eldridge, 2.
 paleobotany: Lesquereux, 19.
 paleontology, fossil described: Berthand, 1; Lesquereux, 16.
 ptilolite, Table Mountain: Dana, E. S., 7.
 soil, analysis of: Emmons, 7.
 thomsonite: Clarke and Steiger, 2; Patton, 4.
 tin deposits near: Rolker, 3.
- Golden.—Continued.**
 tuff, Table mountain, analysis: Emmons, Cross, and Eldridge, 2.
 zeolite crystals: Emmons, Cross, and Eldridge, 2; Cross and Hillebrand, 2; Lakes, 218; Marvine, 1.
- Gold Hill.**
General: Endlich, 5.
 altaite: Endlich, 6.
 calaverite: Endlich, 6.
 geology, economic: Emmons, 7; Endlich, 1.
 geology, mining: Marvine, 2.
 hessite: Endlich, 6.
 minerals: Endlich, 1, 6; Loew, 1.
 petzite: Endlich, 6.
 schirmerite: Endlich, 6.
 silver: Eilers, 3.
 sylvanite: Endlich, 6.
 tellurides: Eilers, 3; Marvine, 1; Silliman, 1.
- Gore Canyon:** Draper, 2; Henning, 1.
- Gothic, ore deposits:** Rickard, T. A., 28.
- Gothic Mountain, geology:** Cross, 23.
- Grahamite, Middle Park:** Taff, 2.
 production 1898: Rothwell, 8.
- Granada quadrangle:** map: U. S. G. S.
- Grand Cavern:** Le Couppey de la Forest, 1.
- Grand County, asphaltum:** Lee, H. A., 2.
 geology, economic: Emmons, 7.
 gilsonite: Taff, 2.
 map: Clason Map Co.
 mines, production: Burchard, H. C., 2; Henderson, C. W., 4.
 Rabbit Ears region, geology: Grout, Worcester and Henderson, 1.
- Grand Hogback, General:** Belcher, 2; White, 4.
 coal fields: Gale, 3, 8.
 Danforth Hills, and, coal field, map: Gale, 3.
 map: U. S. G. S.
- Grand Junction, General:** Emmons, 20.
 coal: Stone, 8.
 hydrography: Newell, 6.
 soil survey: Holmes and Rice, 1.

- Grand Mesa, General:** Endlich, 7.
 coal field, analysis and map: Lee, W. T., 10, 13.
 geology: Lee, W. T., 9.
- Grand River, General:** Beckwith, 1; Endlich, 5; Gannett, H., 4; Marvin, 1; Peale, 7, 8, 12; Powell, 1.
 coal, analysis: Lakes, 72, 160.
 coal fields: Hills, R. C., 22; Lakes, 8, 72, 160, 169, 172; Storrs, 1; Thiele, 1.
 geology, dynamic: Lakes, 72, 160; Hills, R. C., 22.
 hydrography: Newell, 6, 7, 12, 14, 16; Walcott, 13.
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 paleontology, dinosaurian beds: Riggs, 1; Riggs and Farrington, 1.
 physiography: Riggs and Farrington, 1.
 placer mining: Hartly, C., 2.
 pre-Cambrian: Van Hise, 1.
 reclamation work: Quinton, J. H., 1.
- Grand Valley, map:** Clason Map Co.
 reclamation work: Newell, 21.
- Granite, General:** Day, 1; Merrill, 4; Peale, 6.
 Chaffee County: Crawford, 4; Henahan, 1; Hoenes, 1; Mg. Sci., 3.
 production: 1889-1893, 1895-1905; Day, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18—1899: Rothwell, 7—1906-1907: Thom, 1, 2—1909: Burchard, E. F., 4.
 Rabbit Ears region: Grout, Worcester, and Henderson, 1.
 Salida: Henahan, 1.
- Granite (Chaffee County), bismuth:** Ingalls, 8.
 geology, mining: Hayden, 14.
- Graphite, General:** Lakes, 151.
 Chaffee County: Ihne, 1.
 production 1893: Rothwell, 2—1904-1905: Day, 17, 18—1906: Ingalls, 5—1906-1907: Thom, 1, 2—1910: Bastin, 1—1911: Of, 1; Parker, E. W., 7—1912: Henahan, 1.
 Trinidad: Lakes, 3.
- Gravel, Nepesta quadrangle:** Fisher, 1.
 sand, and, production: Burchard, E. F., 4, 8; Parker, E. W., 7.
- Grayback. See also Costilla County.**
 amphibole and hornblende schist: Patton, 8.
 andesite: Patton, 8.
 biotite gneiss: Patton, 8.
 breccias, igneous: Patton, 8.
 diorite: Patton, 8.
 felsites: Patton, 8.
 geology, mining: Hayden, 14.
 geology, ore deposits: Patton, 8.
 gold: Patton, 8; Wulsten, 4.
 granite gneiss: Patton, 8.
 hornblende schist and amphibolite: Patton, 8.
 iron: Patton, 8.
 mines, lode and placer: Patton, 8.
 monzonite porphyry: Patton, 8.
 paleontology: Patton, 8.
 pegmatites: Patton, 8.
 placer mining: Julian, 1; Patton, 8.
 porphyries: Patton, 8.
- Great Basin, Tertiary strata:** Cope, 16.
- Great Plains, map:** Hay, Robert, 2.
- Greeley, coal:** Hayden, 19.
 hydrology: Boyd, D., 1.
 map: U. S. G. S.
 physiography: Boyd, D., 1.
 soil survey: Holmes and Neil, 1.
- Green Mountain, coal, analysis:** Eakins, 6.
 physiography: Darton, 13.
- Greenhorn Mountains, tin mine:** Hills, 15; van Diest, 13.
 vanadium: E. and M. J., 44.
- Green River, General:** Powell, 1, 2; Scudder, 1, 2.
 antecedent to Uinta Mountains: Davis, W. M., 4; Suess, 1.
 erosion: White, 26.
 origin: Emmons, 26; Hills, R. C., 17.
 paleobotany: Lesquereux, 16.
 paleontology, Cenozoic and Mesozoic: White, 3.
 physiography: Emmons, 26.
 Tertiary: Scudder, 1, 2.
 volcanic dust: Montgomery, 1.

- Green River Basin** (largely outside Colorado).
- Bitter Creek uplift:** Hague and Emmons, 1.
- Bridger group:** Hague and Emmons, 1.
- Browns Park Tertiary:** Hague and Emmons, 1.
- Cretaceous:** Hague and Emmons, 1.
- Colorado group:** Hague and Emmons, 1.
- Dakota:** Hague and Emmons, 1.
- Escalante Hills:** Hague and Emmons, 1.
- Fox Hills:** Hague and Emmons, 1.
- geology, descriptive:** Hague and Emmons, 1.
- geology, general:** Hague and Emmons, 1.
- Green River beds:** Hague and Emmons, 1.
- Junction Peak:** Hague and Emmons, 1.
- Jurassic:** Hague and Emmons, 1.
- Owi-yu-kuts plateau:** Hague and Emmons, 1.
- Permo-Carboniferous group:** Hague and Emmons, 1.
- Tertiary formations:** Hague and Emmons, 1.
- Triassic:** Hague and Emmons, 1.
- Uinta Eocene:** Hague and Emmons, 1.
- Uinta Range:** Hague and Emmons, 1.
- Uinta uplift:** Hague and Emmons, 1.
- Upper Coal Measures:** Hague and Emmons, 1.
- Vermillion Creek series:** Hague and Emmons, 1.
- Weber Quartzite group:** Hague and Emmons, 1.
- Wyoming Conglomerate:** Hague and Emmons, 1.
- Yampa Peak:** Hague and Emmons, 1.
- Yampa Plateau:** Hague and Emmons, 1.
- Green River group:** King, 1; Peale, 12.
- Green River Valley:** White, 4.
- Grey Creek, iron, analysis of:** Chauvenet, 5.
- Griffith lode, silver and gold:** Pearce, R., 12.
- Grindstone:** Lakes, 51; Parker, E. W., 7; Phalen, 1.
- quarries, Gunnison:** Mg. Sci., 4.
- Grizzly Peak, granite breccias:** Stone, 7.
- Gunnison:** von Rath, 1.
- to Grand River, map:** Peale, 7.
- Gunnison County, building stone:** Lakes, 20, 27, 94; Merrill, 2.
- Cebolla district, iron ores:** Lakes, 26; Singewald, 1; Snedaker, 2.
- Cliff Creek, efflorescence on sandstone, analysis of:** Eakins, 4.
- coal, analysis of:** Eakins, 6; Lakes, 6; McNeil, 1.
- coal, Book Cliffs:** Lakes, 192.
- coal:** Ashley and Fisher, 1; Chauvenet, 6; Hollowell, 2; Lakes, 6; Lee, H. A., 9; Lee, W. T., 10, 13; McNeil, 1; Potter, W. B., 1.
- geology, dynamic:** Hill, J. M., 1; Lakes, 6, 20.
- geology, economic:** Emmons, 7; Lee, H. A., 9.
- geology, Tomichi district:** Crawford, 4.
- gold, Sylvanite mine:** E. and M. J., 14.
- gold:** Frazer, 2; Hill, J. M., 1; Lakes, 20, 27, 32, 63, 179.
- grindstone quarries:** Mg. Sci., 4.
- iron, analysis of:** Chauvenet, 4, 6.
- iron ore, Cebolla district:** Lakes, 26; Singewald, 1, 2; Snedaker, 2.
- iron ore, Taylor Peak and Whitepine:** Harder, 2.
- iron ore, Whitepine:** Snedaker, 2.
- iron ore:** Chauvenet, 4, 6, 8; Leith, 1.
- kaolin, Waterfall mine:** Eakins, 3.
- Laramie and post-Laramie:** Cross, 18.
- limestone, analysis of:** Burchard, E. F., 8; Chauvenet, 6.
- löllingite:** Hillebrand, 1.

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Mammoth and Vulcan mines:
 Lakes, 20, 27, 31.
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 map: Clason Map Co., 33; Hill, J. M., 1.
 Maple Leaf mine: Lakes, 177, 187.
 marble: Hall, C. L., 2; Lakes, 22, 226; Merrill, 4; Newberry, 13; Stone Trades Journal, 1; Weston, 9.
 minerals analyzed: Clarke, F. W., 6; Eakins, 10.
 minerals from: Headden, 3.
 mineral production: Burchard, 1, 2, 3, 4; Henderson, C. W., 4; Hodges, 1; Lakes, 5, 208; Lee, H. A., 9; Mg. Rept., 18; Munson, 1; Tonge, 1.
 molybdenum: Sebbs, 1.
 ore deposits: Lakes, 143, 214; Rickard, T. A., 28; Warren, E. R., 2.
 paleontology, fossils from: Spencer, 2.
 physiography: McConnell, 1.
 Pitkin, mines described: Holibaugh, 1; Mg. Rept., 11.
 products: Hallowell, J. K., 3.
 Sheep Mountain, mines: E. and M. J., 11.
 silver: Frazer, 2; Holibaugh, 1; Lakes, 32; Mg. Rept., 11.
 slate, stone: Coons, 1.
 smaltite: Iles, 2.
 Sulphantimonites, analysis of: Eakins, 2.
 Sylvanite mine: E. and M. J., 1, 14.
 Tomichi district: Crawford, 4.
 triangulation: Gannett, H., 12; Gannett, S. S., 2.
 Vulcan mine: Lakes, 20, 27, 63, 214.
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 Whopper lode: Frazer, 2.

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 Cretaceous section: Stanton, 2.
 Eagle River, and, map: Newton, 1.
 erosion: Endlich, 8.
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Lake Fork, landslides: Cross, 40.
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 pre-Cambrian: Van Hise, 1.

Gunnison tunnel: Bain, 6.

Gunnison Valley, coal: Woodruff, E. G., 1.

map: Clason Map Co.

Gunsight: Draper, 2.

Gypsum, General: Eldridge, 5; Emmons, 7; Hague, 1; Hayden, 5, 6, 14; Lakes, 141, 235; Peale, 5, 12; Stevenson, 3.

Breckenridge: Ransome, 5.

Castle Rock district: Lee, W. T., 5.

Eagle County: Burchard, E. F., 5; Peale, 7.

Larimer County: Lee, H. A., 5, 9.

northern Colorado: Henderson, J., 10.

Perry Park: Kruger, Hamilton, and Enriquez, 1.

plains area: Darton, 9.

production 1883-1884: Williams, A., 1—1885-1905: Day, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18—1893-1899: Rothwell, 2, 3, 4, 5, 6, 7, 8—1900-1902: Struthers, 2, 3—1906: Ingalls, 5; Thom, 1, 2—1909-1911: Burchard, E. F., 4, 6, 8—1911: Henahen, 1; Parker, E. W., 7.

Pueblo quadrangle: Gilbert, 7.

Red Beds: Hague and Emmons, 1.

Uncompahgre region: Siebenthal, 1.

Gypsum, Eagle river (Eagle County): Peale, 7.

Gypsum Valley, ore deposits: Hillebrand and Ransome, 1.

Hagues Peak, glacier: Stone, 1.

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andesite: George and Crawford, 1.

basalt: Draper, 1.

coal: Draper, 1.

copper: George and Crawford, 1.

dacite porphyry: George and Crawford, 1.

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- diorite: George and Crawford, 1.
 gold: Draper, 1; George and Crawford, 1; Parsons and Liddell, 1.
 gabbro: George and Crawford, 1.
 geology, dynamic: Draper, 1; Gale, 1; George and Crawford, 1; Lakes, 143.
 iron: Draper, 1.
 latite and latite porphyry: George and Crawford, 1.
 map: Gale, 1; George and Crawford, 1.
 mineral deposits: Parsons and Liddell, 1.
 mines and ore deposits: Draper, 1; George and Crawford, 1; Rickard, T. A., 28.
 mines: Lee, H. A., 9.
 olivine basalt: George and Crawford, 1.
 placer mines: Draper, 1; Gale, 1; George and Crawford, 1; Janin, C., 1; Lakes, 210; Mg. Sci., 1; Parsons and Liddell, 1.
 physiography: Draper, 1.
 porphyry: Gale, 1; George and Crawford, 1.
 quartz basalt: George and Crawford, 1.
 silver: Draper, 1; George and Crawford, 1.
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 vein deposits: Gale, 1.
- Hallett Glacier:** Chapin, 1; Henderson, J., 15; Mills, 1.
- Halls Valley,** copper: Jernegan, 2.
 illesite: Am. Jour. Sci., 1.
 iron, hematite: Rolker, 1.
 iron ore: Chauvenet, 8.
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 metallurgical campaign: Jernegan, 2.
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 minerals, analysis of: Clarke, F. W., 6.
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- Hamilton,** coal: Potter, W. B., 1.
- Hardcart Gulch,** iron ore: Chauvenet, 8.
- Hardscrabble district,** geology, economic: Wheeler, G. M., 2.
- Hastings,** coal mine explosion: White-side, 3.
- Hayden,** hydrology: Newell, 6.
 petroleum: Fenneman and Gale, 2.
- Henrietta Park,** map: Boehmer, 1c.
- Higbee,** Purgatory River: Freeman and Bolster, 2.
- Higbee quadrangle,** map: U. S. G. S.
- Highland,** loess, analysis of: Clarke, F. W., 9.
- Hinsdale County,** Carson camp, ore deposits: Larsen, 1.
 chalcedony and opal: Patton, 1.
 geology: Emmons, 7; Lee, H. A., 9.
 Lake City. *See* Lake City.
 mineral production: Burchard, H. C., 2, 3, 4; Henderson, C. W., 4; Hodges, 1; Mg. Rept., 16, 18.
 opal and chalcedony: Patton, 1.
 ore deposits: Ihlseng, 1; Lee, H. A., 9; Rickard, T. A., 28.
 Ouray quadrangle: Cross, Howe, and Irving, 1.
 physiography: Lee, H. A., 9.
 Silverton quadrangle: Cross, Howe, and Ransome, 1.
 spherulites: Patton, 2.
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- Holly,** Arkansas River: Freeman and Bolster, 2.
 hydrology: Newell, 6.
- Holy Cross Mountain,** description: Hayden, 14.
- Homestake mine,** history of: Butler, W. H. C., 1.
- Horsetail Creek,** Neocene: Dall and Harris, 1; Osborn, 4.
- Hortense,** minerals from: Schaller, 2.
- Hot Springs, General:** Comstock, 1; Hayden, 6; Headden, 4; Lakes, 144, 164, 178; Loew, 1; Peale, 2, 8; Strieby, 1; Wilson, J. S., 1.
 Canon City: Endlich, 1.
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- hematite: Rolker, 1.
- Manitou: Peale, 5.
- Middle Park: Lakes, 162.
- Pagosa: McCauley, 2; Newberry, 3.
- Red Mountains: Comstock, 9.
- Routt County: Lakes, 162.
- Soda Creek: Spurr and Garrey, 2.
- Hot Springs, limonite ore:** Kimball, 3.
- Hot Springs Creek, hydrology:** Hawn, 1.
- Hot Sulphur Springs:** Marvine, 1; Wilson, J. S., 1.
- water analysis: Lee, H. A., 9.
- Howardsville, gold:** Mines and Minerals, 4.
- Old Hundred mine and mill: Mines and Minerals, 4.
- San Juan: Lakes, 10.
- Silverton quadrangle: Cross, Howe, and Ransome, 1.
- Hübnerite:** George, 3.
- Silverton: Cross and Howe, 1.
- Huerfano County: General:** Endlich, 7.
- Apishapa quadrangle: Stose, 1.
- coal: Guiterman, K. S., 1; Lakes, 172; Lee, H. A., 9; Richardson, 2.
- Cretaceous section: Stanton, 2.
- geology, economic: Emmons, 7.
- gold: Lee, H. A., 9.
- lake basin, Eocene of: Hills, R. C., 19.
- lake basin: Osborn, 1.
- mines, production: Burchard, H. C., 2; Henderson, C. W., 4.
- mines: Lakes, 147.
- ore deposits: Lakes, 5; Spurr, Garrey, and Ball, 1.
- paleontology, fossils described: Cragin, 1.
- Spanish Peaks: Hills, 25.
- Veta Peak, rock streams: Patton, 9.
- volcanic ash: Woolsey, 1.
- Walsenburg area: Hills, 15.
- Huerfano Park quadrangle, map:** U. S. G. S.
- Huerfano River Basin, Tertiary beds:** Hills, R. C., 10.

Humboldt-Pocahontas vein: Clark, R. N., 2.

Hydrocarbons, albertite (?): Denton, 1.
deposition of: Adams, G. T., 4.

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Rabbit Ears region: Grout, Worcester, and Henderson, 1.

Idaho Springs, alkali syenite porphyry: Clarke, F. W., 8.

biotite latite, analysis of: Clarke, F. W., 8.

copper: Spurr and Garrey, 2.

geology, dynamic: Spurr and Garrey, 2.

gold: Lakes, 12; Spurr and Garrey, 2; Underhill, 2.

haulage: Barnes, H. B., 1.

hydrology: Spurr, Garrey, and Ball, 1.

lead: Spurr and Garrey, 2.

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ore, analysis of: Bain, 2.

ore deposits: Bain, 2; Rickard, T. A., 28; Spurr and Garrey, 2; Underhill, 2.

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Stanley mine, analysis of water from: Clarke, F. W., 9.

water, analysis of: Lee, H. A., 9; Spurr, Garrey, and Ball, 1.

zinc: Spurr and Garrey, 2.

- Igneous intrusions** *General*: Russell, 2.
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 Mesozoic, bibliography of: Scudder, 31.
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 Arapahoe, Denver: Emmons, Cross, and Eldridge, 2.
 Articulate, Tertiary beds, Florissant: Scudder, 20.
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 bibliography: Marcou, J. B., 1; White, 1; White and Nicholson, 1, 2.
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 Denver Basin: Emmons, Cross, and Eldridge, 2.
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- Iron, General:* Bancroft, 2; Berthoud, 4; Endlich, 1, 5; Foster, E. L., 1; Frazer, 1; Hague, 1; Hayden, 5, 6; Johnson, 2; Lakes, 5, 143, 205; Lee, H. A., 1; Marvine, 1; Nat. Conservation Com., 1; Nesmith, 1; Putnam, 1; Rolker, 1; Snedaker, 2.
- bog ore, Crested Butte: Lakes, 4, 5, 6; Warren, E. R., 2.
- bog ore, auriferous, La Plata Mountains: Cross and Spencer, 1.
- bog ore, Elk Mountains: Emmons, Cross, and Eldridge, 1.
- bog ore, Silverton: Cross, Howe, and Ransome, 1.
- bog ore, Wagon Gulch: Larsen, 1.
- Boulder County: Emmons, 21.
- Canon City: Drown, 1.
- Chaffee County: E. and M. J., 15.
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- Elmoro quadrangle: Hills, R. C., 24.
- Grayback: Patton, 8.
- Gunnison County: Chauvenet, 4, 6; Harder, 2; Leith, 1; Singewald, 1, 2.
- Hahns Peak: Draper, 1.
- hematite, brown, production 1889-1890: Day, 5.
- hematite, red, production 1889-1890: Day, 5.
- Leadville: Kimball, 3; Vinton, 3; Warwick, 1.
- manganese, Cebolla River: Lakes, 26.
- Monarch-Garfield: Crawford, 3.
- Monarch-Tomichi district: Crawford, 4.
- Nepesta quadrangle: Fisher, 1.
- northern Colorado: Chauvenet, 3.
- Ouray County: Kedzie, 1.
- pig, production, 1889-1890, 1899-1905: Day, 5, 12, 13, 14, 15, 16, 17, 18—1893-1896: Rothwell, 2, 3, 4, 5—1904: Judd, 1—1906, 1907: Thom, 1, 2.
- Pitkin County: Devereux, 1.
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- production, 1883-1884: Williams, A., 1—1885, 1887, 1889, 1893: Day, 1, 3, 5, 6, 7, 8—1893: Rothwell, 2—1893-4: Birkinbine, 1—1897-1899: Day, 11, 12; Rothwell, 6, 7, 8—1900: Day, 13; Ores and Metals, 3; Struthers, 1—1901: Day, 14; Lee, H. A., 8; Struthers, 2—1902: Day, 15; Struthers, 3—1903: Day, 16; Eckel, 2—Newland, 1—1904, 1905: Day, 17, 18—1906: Ingalls, 5; Thom, 1—1907: Thom, 2—1909: Burchard, E. F., 2; Ingalls, 8—1910: Burchard, E. F., 6; Dalzell, 3; Fay, 1; Warwick, 4—1911: Burchard, E. F., 7; Henahen, 1; Parker, E. W., 7.
- Pueblo quadrangle: Gilbert, 7.
- resources of Colorado: Chauvenet, 5, 8.
- Saguache County: E. and M. J., 40.
- southwestern division: Endlich, 4.
- steel, and, production, 1887-1888, 1901, 1903, 1904: Day, 3, 4, 14, 16, 17—1905: Ingalls, 5—1910: Warwick, 4.
- Summit County: Patton, 7.
- Taylor Peak and Whitepine: Harder, 2.
- Whitepine and Taylor Peak: Harder, 2.
- Iron Hill, geology, ore deposits:* Blow, 1.
- Ironton Park:* Cross and Howe, 1.
- Irrigation, areas:* Newell, 14.
- canals and geological formations: Allen, A. G., 1.
- engineering: Crafts, 1; Wilson, H. M., 1.
- methods, Greeley: Boyd, D., 1.
- Nepesta quadrangle: Fisher, 1.
- sub-irrigation, San Luis Valley: Newell, 14.
- survey, results of: Wilson, H. M., 2.
- Isabel Glacier:* Henderson, J., 15.
- Island Park:* White, 4.

- Italian Peak**, minerals, analysis of: Eakins, 10.
- Jackson County**, coal: Campbell, M. R., 5; Shubart, B., 2; The New Empire, 1.
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- Jamestown**. *See also* Boulder County.
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- Jefferson County**. *See also* Golden.
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- Jensen quadrangle**, map: U. S. G. S.
- Jerome Park**, coal, analysis of: Lakes, 6.
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- Jointing**, Monarch-Garfield area: Crawford, 3.
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- Julesburg**, paleontology: White, 13.
- Junction Mountain**, anticlinal structure: Powell, 4; White, 4, 26.
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- Jura**, Denver Basin: Eldridge, 2.
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Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.

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Gunnison: Emmons, Cross, and Eldridge, 1.

Hahns Peak district: George and Crawford, 1.

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mines described: Cross, Spencer, and Purington, 1; Hartman, 1; Henderson, C. W., 4; Lakes, 87; Lee, H. A., 9; Petre, 1; Rickard, T. A., 6.

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- physiography: Emmons, 9; Freeland, 1; Lee, H. A., 9; Weunsch, 6.
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North Park: Hague and Emmons, 1; King, 1.

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Mineral production. It was found impossible to include statistics of mineral production. These will be found in—

1. Mineral Resources, annual volumes published by the U. S. Geol. Surv.
2. Mineral Industry, annual volumes since 1892. Published at present by the McGraw-Hill Book Co., New York.
3. Annual report of the Director of the Mint, published by the Director of the Mint.
4. Special numbers issued in January of each year by the various mining journals.

General: Bailar, 3; Sterrett, 1—1872: Mg. Rev., 1; by counties, 1874: U. S. Com. Mines, 1; 1879: Fossett, 3—1881: Burchard, H. C., 2—1898-1902: Mg. Rept., 3, 15, 18, 31—1899-1900: Lee, H. A., 3—1901: Ores and Metals, 4—1902: State Bureau of Mines, 1—by counties, 1903: Lakes, 143; Tonge, 11—1904: State Com. of

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- uranium from: Blanc, 1; Lee, H. A., 7.
- Virginus mine: Purington, 5.
- zinc: Osgood, 1.
- zinckenite: Hillebrand, 2.
- San Juan Mountains:** Hills, 20; Rhoda, 1, 2.
- San Juan River,** ancient pueblos: Barber, E. A., 5.
- hydrography: Endlich, 4; Newell, 7.
- San Juan Valley:** Holmes, 2.
- San Luis Park, General:** Gilpin, 1.
- artesian water: Hills, R. T., 23.
- geology, dynamic: Lakes, 102.
- ore deposits: Lakes, 109.
- San Luis Valley, General:** Beckwith, 1; Endlich, 4; Marshall, 3; Thomas, C., 2; Wheeler, G. M., 6.
- artesian water: Headden, 13; Lakes, 224; Siebenthal, 4.
- gas: Lakes, 238; Siebenthal, 4.
- hydrography: Newell, 4, 14; Siebenthal, 4.
- map: Clason Map Co., 6, 24, 40; Siebenthal, 4.
- oil: Lakes, 238.
- sand dunes: Ingersoll, 1.
- sodium carbonate: Fleck, 1; Hosker, 1, 2.
- soil survey: Holmes, J. G., 1.
- water analysis: Fleck, 1.
- San Miguel County,** copper: Spaulding, 1.
- eruptive rocks: Peale, 9.
- geology: Lee, H. A., 9; Spaulding, 1.
- gold: Mg. Ind., 2; Spaulding, 1.
- hydrology: E. and M. J., 32; Newell, 12, 14.
- Marshall Basin, Sheridan vein: E. and M. J., 17.
- minerals: Hillebrand and Ransome, 1.
- mines and mineral production: Ameling, 4; Burchard, H. C., 4; Curry, 1; Henderson, C. W., 2, 4; Hodges, 1; Lee, H. A., 9; Rothwell, 6; Spaulding, 1.
- ores: Hillebrand and Ransome, 2; Ihlseng, 1; Spaulding, 1; Rickard, T. A., 28.
- paleontology: Hills, R. C., 1.
- physiography: Lee, H. A., 9; Spaulding, 1.
- placer mining: E. and M. J., 32; Ihlseng, 1; Mg. Ind., 2.

- San Miguel County.**—Continued.
 Placerville. *See* Placerville.
 rocks, analysis of: Clarke, F. W., 5; Hillebrand, 11.
 silver: Spaulding, 1.
 Silver Pick mine: Spaulding, 1.
 Telluride. *See* Telluride.
 uranium: Blanc, 1; Lee, H. A., 7; Fleck, 4.
 vanadium: Fleck, 2, 4; Hess, 1, 4, 5; Mg. World, 2; Thomas, K., 2.
- San Miguel Mountains, General:** Endlich, 7; Holmes, 6.
 geology: Cross, 23; Lakes, 67.
- San Miguel Peak, monzonite:** Cross and Purington, 1.
- San Miguel Plateau:** Peale, 12.
- San Miguel quadrangle, map:** Fischer, 1.
- San Miguel River, General:** Peale, 8, 12; Marshall, 3.
 Dolores river and, map: Peale, 8.
 hydrography: Newell, 7.
 placer mining: Purington, 2.
- Sapphire, production:** Rothwell, 5; Thom, 2.
- Saucer Valley:** Peale, 12.
- Sawatch island:** Crawford, 4.
- Sawatch Range, General:** Endlich, 4; Hayden, 14.
 geology, economic: Lakes, 2.
 glaciation: Davis, W. M., 7; Lakes, 2.
 gold: Peale, 7.
 iron ore: Snedaker, 2.
 Pleistocene: Capps and Leffingwell, 1.
 pre-Cambrian: Van Hise, 1, 2.
- Sawpit, carnotite:** Fleck and Haldane, 2.
 gold: Hess, 4.
 ore deposits: Hess, 4.
- Saxon Mountain, corundum from:** Pratt, J. H., 1.
- Scranton, coal field:** Emmons, Cross, and Eldridge, 2.
- Seaton Mountain, Franklin mines:** Bain, 1.
- Sedalia, coal district:** Emmons, Cross, and Eldridge, 2.
 copper: Mg. Rept., 40.
- Sedimentation, General:** Cross, 13; Hayden, 12, 19; Kneeland, 1; Loew, 2; Peale, 13; Powell, 3; Scudder, 9, 10, 14; Wadsworth, 1; Walcott, 4.
- Arkansas Valley:** Darton, 13; Gilbert, 5; Westgate, 1.
- Boulder district:** Lakes, 124.
- Cambrian sediments:** Walcott, 1.
- Cordilleran sea:** Walcott, 4.
- Cretaceous time:** Gilbert, 4.
- Denver formation, source of sediments:** Emmons, Cross, and Eldridge, 2.
- Denver formation:** Davis, W. M., 5.
- Elmore quadrangle:** Hills, R. C., 24.
- Fourmile district, lake and stream deposits:** Hoover, 3.
- Laramie sea:** White, 7.
- lignite beds:** Lesquereux, 5.
- Manitou embayment:** Crosby, 3.
- Nepesta quadrangle:** Fisher, 1.
- northwestern Colorado:** White, 26.
- Paleozoic, early, Denver Basin:** Emmons, Cross, and Eldridge, 2.
- Paleozoic, peneplanation:** Cross, Howe, and Irving, 1.
- Pleistocene sediments:** Emmons, Cross, and Eldridge, 2.
- Pueblo quadrangle:** Gilbert, 7.
- Rico quadrangle:** Cross and Ransome, 1.
- Rico:** Rickard, T. A., 7.
- Rocky Mountains:** Emmons, 17.
- Silverton quadrangle:** Cross, Howe, and Ransome, 1.
- Telluride quadrangle:** Cross and Purington, 1.
- terrace gravels, La Plata Mountains:** Cross, Spencer, and Purington, 1.
- Sedgwick County, map:** Clason Map Co., 19, 21.
 physiography: Walcott, 7.
 water supply: Hay, R., 2.

Shoshone.*Paleontology.*

Arapahoe: Cannon, 10; Clark, W. B., 1; Emmons, Cross, and Eldridge, 2; Lakes, 163; Lee, W. T., 5; White, 27.

Denver: Cannon, 3, 10; Cross, 13, 22; Clark, W. B., 1; White, 27.

Sierra Abajo, *General*: Endlich, 7.

eruptive rocks: Peale, 9.

map: Holmes, 6.

Sierra Blanca, *General*: Beckwith, 1; Wheeler, G. M., 6.

glaciers: Henderson, 15.

physiography: Wulsten, 3.

telluride ores: Pearce, 13.

Sierra Carrison: Endlich, 7; Holmes, 2.

Sierra el Late, *General*: Holmes, 2.
rocks, analysis of: Clarke, F. W., 6.

Sierra la Sal: Endlich, 7.

Silicified wood, production: Day, 7.

Silurian. (This should all be referred to Ordovician and Cambrian.)

Stratigraphic.

General: Cope, 23; Endlich, 1, 3, 4, 5; Hayden, 14, 19; Hollister, 1; Lakes, 5, 10, 143; Peale, 5, 7, 8; Schiel, 1; Stevenson, 3.

Aspen: Henrich, 2; Newberry, 16; Spurr, 1.

Canon City: Am. Geol., 1; Cope, 71, 72; Walcott, 3, 5.

eastern slope: Hayden, 24.

Elk Range: Holmes, 1.

iron ore: Snedaker, 2.

Leadville: Emmons, 2, 21.

lower or Ordovician, Alma district: Patton, 10.

lower: Hayden, 19.

northwestern Colorado: White, 4.
ore in: Lakes, 135; Rickard, T. A., 28.

Sangre de Cristo Range: van Diest, E. C. and P. H., 1.

upper, San Juan County: Comstock, 1, 7; Endlich, 3.

Silurian.—Continued.*Paleontology.*

General: Clarke, J. M., 1; Endlich, 1, 5; Girty, 2; Hayden, 14; Marsh, 35; Stevenson, 3.

Brachiopoda: Schuchert, 1.

Bryozoa: Nickles and Bassler, 1.

Canon City: Am. Geol., 1; Emmons, 16, 20; Walcott, 3, 3a, 5.

Front Range: Emmons, 9.

lower: Hayden, 19; Am. Geol., 1.

vertebrate life: Clark, W. B., 1b; Walcott, 3a, 5.

Silver, *General*: Berthoud, 4; Collins, G. E., 9; Comstock, 7; Emmons, 7, 20; Endlich, 1, 2, 5; Farish, 3; Fossett, 1; Frazer, 1; Hayden, 6; Lakes, 5, 22, 143, 205, 219; Lindgren, 1; Marshall, 3; Mg. Rev., 3; Nat. Conservation Com., 1; Pearce, R., 15; Stevens, R. P., 1; Stevenson, 3; Wheeler, G. M., 1; Wilson, J. S., 1.

Aspen district: Henrich, 2; Matteson, 1; Morse, 1; Newberry, 16.

Blackhawk smelters: Egleston, 1.

Boulder County: E. and M. J., 5; Jennings, 1.

Boulder County, Caribou mine: Mg. and Sci. Press, 5.

Breckenridge: Ransome, 5.

calaverite: Hillebrand, 10.

Cashin mine: Emmons, W. H., 3.

Chaffee County: E. and M. J., 15.

Clear Creek County: Lawrence, B. B., 2; Vinton, 2.

Creede: Lakes, 16.

Crested Butte: Warren, E. R., 2.

Cripple Creek: Cross and Penrose, 1; Rickard, T. A., 14.

Custer County: Emmons, 23.

Durango quadrangle: Emmons, W. H., 1.

Georgetown: Spurr and Garrey, 1; Spurr, Garrey, and Ball, 1.

Gilpin County: Collins, G. E., 1; Rickard, F., 1.

gold minerals, and: Pearce, R., 12.

Goldhill: Eilers, 3.

Silver.—Continued.

Gunnison County: Frazer, 2; Lakes, 32.
 Hahns Peak: Draper, 1; George and Crawford, 1.
 Hall Valley: Jernegan, 2.
 history of industry: Williams, A., 2.
 Idaho Springs: Spurr and Garrey, 2; Underhill, 2.
 Jamestown: Farish, 1.
 Lake City: Irving, 3; Irving and Bancroft, 1.
 Lake Fork: Woolsey, 2.
 La Plata Mountains: Cross, Spencer, and Purington, 1; Freeland, H. C., 1.
 La Sal Mountains: Lakes, 67.
 Leadville: Blow, 1; Emmons, 2, 9, 11; Emmons and Irving, 1; Freeland, F. T., 1; Matteson, 1; Rolker, 2; Shedd, 1; Tonge, 8; Warwick, 1a.
 mining: Am. Jour. Mg., 2; Hague, 1; Van Wagener, 2.
 mining and milling: Hubbard, G. D., 1.
 minerals: Penfield, 8.
 Montezuma: Ritter, 8.
 Monarch-Garfield: Crawford, 3.
 Monarch-Tomichi district: Crawford, 4.
 Ophir: Sweetser, 3.
 ores, genesis of: Matteson, W. G., 2, 3.
 Ouray, Camp Bird mine: Purington, 3, 4.
 Ouray: Cross, Howe and Irving, 1; Endlich, 9; Irving, 2; Koenig, 3; Ransome, 3.
 Paradox Valley: Lakes, 67.
 Park Range: Hayden, 14.
 Pitkin: Mg. Rept., 11.
 production 1869-1874: Raymond, 1, 4, 5, 7, 9, 10—1872-1876: E. and M. J., 1, 2—1874: Eggleston, 1—1872-1877: Fossett, 2—1881-1883: Burchard, H. G., 2, 3, 4—1885, 1887, 1889-1893, 1897-1905: Day, 1, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14,

Silver.—Continued.

15, 16, 18—1885: E. and M. J., 10; Kimball, 1, 2—1887: Mg. Ind., 1; Munson, 1—1888: Munson, 2—1889: Smith, M. E., 1—1889-1890: Emmons, 19; Smith, M. E., 2—1892: Rothwell, 1; Williams, A., 2—1892-1899: Rothwell, 1, 2, 3, 4, 5, 6, 7, 8—1870-1896: Mg. Ind. and Rev., 9—1896: Rickard, T. A., 5—1899: Hodgson, 1—1900: Hodges, 1; Ores and Metals, 3; Struthers, 1—1901: Hodges, 2; Lee, H. A., 8; Smith, M. E., 3; Struthers, 1—1902: Downer, F. M., 1, 2; Mines and Mining, 2; Ores and Metals, 6; Struthers, 3—1903: Eckel, 2; E. and M. J., 38; Mg. Rept., 34—1904: Judd, 1; Mines and Mining, 3; Ores and Metals, 8; Puckett, 1—1905: Day, 18; Ores and Metals, 9—1906: Ingalls, 5; Thom, 1—1907: Dalzell, 2; Ingalls, 6; Thom, 2—1908: Henderson, C. W., 1; Ingalls, 7; Lindgren and McCaskey, 1—1909: Ingalls, 8—1910: Dalzell, 3; Fay, 1; Henderson, C. W., 4; Van Wagener, T., 4; McCaskey, 1; Warwick, 4—1911: Breen, L. A., 1; Collins, 11; Henderson, C. W., 5; Of, 1; Parker, E. W., 7—1912: Henahen, 1; Tonge, 14.
 Red Mountain: Kedzie, 1; Lakes, 60, 91; Schwarz, 1; Weston, 3.
 Rico quadrangle: Cross and Ransome, 1; Lakes, 44; Ransome, 2; Rickard, T. A., 7.
 Rosita: Clark, R. N., 2.
 Rosita and Silver Cliff: Emmons, 24; Lakes, 55; Lee, H. A., 9.
 Sangre de Cristo Range: van Diest, E. C. and P. H., 1.
 San Juan County: Comstock, 1; Endlich, 3; Hartman, 2; Ihlseng, 1; Lakes, 40; Weston, 1.
 San Miguel: Spaulding, 1.
 Silver Cliff, gold, and: Lakes, 53.

Silver.—Continued.

- Silverton: Cross, Howe, and Ransome, 1.
 South Park: Lakes, 115.
 Summit County: Patton, 7.
 Telluride district: Cross and Purington, 1; Porter, 1; Purington, 2; Winslow, 2.
 telluride ore, Silverton, Bear Creek: Emmons, W. H., 2; Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
 Tenmile district: Cross, Howe, Irving, and Emmons, 1; Emmons, 27.

Silver Cliff, General: Lakes, 53; Lindgren, 1; Rath, 1.

andesite, analysis: Clarke, F. W., 9.

Bassick mine: Grabill, 1.

charcoal at depth in mine: Charlton, 1.

geology, dynamic: Emmons, 29; Grabill, 1; Jenney, 1; Mg. and Sci. Press, 12.

geology: Cross, 27; Vinton, 1; Wallace, 1.

gold: Lakes, 53.

minerals, analysis: Clarke, F. W., 6; Eakins and Chatard, 1.

mines: Burchard, H. C., 2; Emmons, 24; Tolman, 1.

ore deposits: Emmons, 12; Keck, 1.

peridotite: Clarke, F. W., 9.

ptilolite: Cross, 1.

psilomelane, analysis: Clarke, F. W., 9.

rocks, analysis: Clarke and Hillebrand, 1.

rocks: Cross, 12; Bayley, 1.

Rosita, and. *See* Rosita and Silver Cliff.

silver: Lakes, 53.

Silver Plume, geology, dynamic: Posepny, 1; Spurr, Garrey, and Ball, 1; Van Hise, 4.

granite: Bailar, 3.

map: U. S. G. S.

mills: Mg. Rept., 39.

Silver Plume.—Continued.

mines, timbering: McClelland, 1.

mines: Callbreath, 1; Spurr, Garrey, and Ball, 1.

ore deposits: Rickard, T. A., 28.

Seven Thirty mine: Rickard, F., 3.

Silverton, General: Endlich, 3.

andesite breccia, analysis of: Clarke, F. W., 8.

andesitic rocks: Van Horn, 3; Cross, Howe, and Ransome, 1.

building stone: Cross, Howe, and Ransome, 1.

Burns latite complex: Cross, Howe, and Ransome, 1.

crystalline schists: Berg, 1.

diabase: Cross, Howe, and Ransome, 1.

enargite: Spencer, L. J., 1.

geology, dynamic: Cross, 32; Cross, Howe, and Ransome, 1; Ransome, 3.

geology, economic: Ransome, 3.

geology and mineralogy: Comstock, 1.

gold: Cross, Howe, and Ransome, 1.

granites: Cross, Howe, and Ransome, 1.

ground water: Cross, Howe, and Ransome, 1; Ransome, 3.

guitermanite and zunyite: Dana, E. S., 4; Hillebrand, 3.

iron ore: Cross, Howe, and Ransome, 1.

kaolinite: Milch, 1.

latite: Clarke, F. W., 8.

limestone: Cross, Howe, and Ransome, 1.

map: Clason Map Co., 1; Cross, Howe, and Ransome, 1; Ransome, 3; U. S. G. S.

milling: Baron, 2; Pasco, J. M., 1.
 minerals, analyses: Clarke, F. W., 6.

mining, 1905: Collins, G. E., 3; Lakes, 223; Prosser, 4.

monzonite porphyry: Clarke, F. W., 8.

Silverton.—Continued.

- ore deposits: Cross, Howe, and Ransome, 1; Irving, 4; Spurr, Garrey, and Ball, 1; Ransome, 3; Rickard, T. A., 28.
 - ore dressing: Kinney and McNaughton, 1.
 - physiography: Cross, Howe, and Ransome, 1; Ransome, 3.
 - porphyries: Cross, Howe, and Ransome, 1.
 - pyroxene andesite: Clarke, F. W., 8; Cross, Howe, and Ransome, 1.
 - quartz latite: Clarke, F. W., 8; Cross, Howe, and Ransome, 1.
 - quartz syenite porphyry: Cross, Howe, and Ransome, 1.
 - rhyolite: Cross, Howe, and Ransome, 1.
 - rocks, analysis of: Clarke, F. W., 8.
 - schists: Cross, Howe, and Ransome, 1.
 - silver: Cross, Howe, and Ransome, 1.
 - Silver Lake mine: Lakes, 123.
 - tuff: Cross, Howe, and Ransome, 1.
 - tungsten, hübnerite ore, analysis: George, 3.
 - tungsten, hübnerite: Cross, Howe, and Ransome, 1.
 - tungsten, wolframite, analysis of: George, 3.
 - tungsten: Ekeley, 1.
 - zinc: Cross, Howe, and Ransome, 1.
 - zunyite and guitermanite: Dana, E. S., 4; Hillebrand, 3.
- Sinbad Valley, General:** Peale, 8.
- salt: Gannett, H., 4.
 - vanadium: Lindgren, 9.
- Slate, General:** Coons, 1; Lakes, 51; Merrill, 4.
- production: Burchard, E. F., 4; Day, 16.
- Slate Creek, coal, analysis:** Eakins, 6.
- Smaltite:** Iles, 2.
- Smelter Creek, stream measurement:** Lamb and party, 1.

- Smelting, General:** Austin, L. S., 1; Guiterman, 1, 2; Ores and Metals, 2; Johnson, 3.
- Argo:** Lakes, 132; Pearce, H. V., 1.
- Blackhawk:** Egleston, 1; Rickard, T. A., 6.
- Colorado-American Zinc-Lead Co.:** Rothwell, 1.
- Dudley:** Peters, 1.
- gold and silver ores: Tonge, 5.
- Green:** Rickard, T. A., 6.
- in 1871: Raymond, 5—1874, Blackhawk: Egleston, 1—1882-1883: Burchard, H. C., 3, 4—1887: E. and M. J., 12—1892: Rothwell, 1—1905: Day, 18—1909: Argall, P., 14.
- history of, in state: Bain, 7; Pearce, R., 4.
- Leadville and Robinson:** Doolittle, 1; Tonge, 8.
- matte and ore, Leadville and Robinson: Doolittle and Jarvis, 1; Struthers, 3.
- Ohio-Colorado, Salida:** Mg. Rept., 29.
- pyrite: Argall, P., 4; Carpenter, F. R., 1.
- rates: Mg. Mag., 2.
- Salida:** Mg. Rept., 29; Ritter, 1.
- San Juan, Durango:** Rickard, T. A., 6.
- sinter roasting: Weeks and Laws, 1.
- slag treatment, Argo: Pearce, H. V., 1.
- sulpho-tellurides: Argall, 18.
- zinc ore dressing: Parmelee, 6; Prosser, 5.
- Smoky Hill, chalk:** Conrad, 1.
- Snake River district, mines:** Ellers, 1; Hague, 1.
- mining, 1867: Hollister, 1.
- Soda, General:** Bailar, 3.
- Denver, near: Wilson, 1.
 - San Luis Valley: Siebenthal, 4.
 - sulphate of: Smith, J. A., 1.
- Soda Creek, hot springs:** Spurr and Garrey, 2.

- Soda Lake, soda:** Hayden, 12.
- Soda Springs, hot:** Spurr and Garrey, 2.
- Sodium carbonate, San Luis Valley:**
Fleck, 1.
General: Elliott, R. S., 1; Thomas, C., 2.
- Soils.** It was found possible to include only a few references to soils of the state. For information regarding soils consult—
1. Reports of the Field Operations of the Division of Soils by the U. S. Dept. of Agric., Nos. 4, 5, 6, 7, and 12.
 2. Reports of the Experiment Station, State Agricultural College, Ft. Collins.
- Soils, General:** Elliott, R. S., 1; Thomas, C., 2.
- Arid lands:** White, 7.
- Arkansas Valley, lower:** Lapham and party, 1.
- Cache la Poudre Valley:** Means, T. H., 1.
- cultivable and cultivated area:** Newell, 14.
- Denver Basin, loess:** Emmons, Cross, and Eldridge, 2.
- Grand Junction district:** Holmes and Rice, 1.
- Greeley:** Holmes and Neill, 1.
- Nepesta quadrangle:** Fisher, 1.
- nitrates in:** Headden, 15.
- San Luis Valley:** Holmes, J. G., 1.
- Somerset coal field:** Lee, W. T., 10.
- Sopris, coal mines:** Hills, R. C., 25; White and Perry, 1.
- coal washing plant:** E. and M. J., 22; Hosea, 1.
- Sopris Peak, geology:** Holmes, 1.
- South Boulder Creek, Bear Canyon, paleontology:** Fenneman, 5; White, 6b.
- hydrology:** Lamb and party, 1; Newell, 7, 12, 16.
- ore deposits:** Rickard, T. A., 28.
- placer mining:** Mg. Rept., 2.
- pre-Cambrian:** Van Hise, 1.
- South-central Colorado, physiography:**
Bergland, 1.
- Southeastern Colorado, canyons:** Lee, W. T., 7.
- geology, dynamic:** Endlich, 4; Gilbert, 6; Stevenson, 8.
- geology, economic:** Endlich, 4.
- geology, topographic:** Rhoda, 3.
- iron ore:** Endlich, 4.
- laccolites:** Gilbert, 6.
- map:** Hills, R. T., 1.
- physiography:** Lee, W. T., 7; Wilson, A. D., 3.
- Southern Colorado, andesite:** Conkling, 2.
- basalt:** Conkling, 2.
- coal mines:** Day, 4; Stevenson, 6.
- diorite:** Conkling, 2.
- dolerite:** Conkling, 2.
- geology:** Stevenson, 9.
- gold deposits:** Rickard, 9.
- granite:** Conkling, 2.
- Laramie group:** Stevenson, 6.
- map:** Newberry, 3.
- Mesozoic rocks:** Stevenson, 12.
- prehistoric ruins:** Gannett, 8.
- trachyte:** Conkling, 2.
- South Fork, hydrography:** Schuyler, 1.
- South Park, General:** Bechler, 1; Cope, 21; Hayden, 6; Lakes, 10; Peale, 5, 6.
- Alma, placer deposits:** Lakes, 22.
- ancient lake:** Stevenson, 3.
- coal:** Hills, R. C., 22; Lakes, 115, 163, 165; Mallett, 1; Stevenson, 1; Washburne, 4.
- coal field, map:** Washburne, 4.
- geology:** Hayden, 14; Lakes, 115.
- gold:** Lakes, 115.
- Laramie:** Cross, 18.
- lead:** Lakes, 115.
- map:** Bechler, 1; Peale, 6.
- mines:** Peale, 6.
- oil:** Lakes, 115.
- ore deposits:** Lakes, 243.
- placer beds:** Lakes, 22, 110.
- paleontology:** Cope, 21, 40.
- silver:** Lakes, 115.
- sulphur springs:** Stevenson, 3.

- South Platte River, *General*:** Bechler, 1; Thomas, C., 2.
 coal field: Hayden, 14, 19; Hills, R. C., 22; Lakes, 69; Storrs, 1.
 Fox Hills: Stevenson, 5.
 hydrography: Lamb, Freeman, and Henshaw, 1; Lamb and party, 1; Newell, 7, 12, 16.
 paleontology, fossils described: White, 17.
- South Platte Valley, and Cache la Poudre,** map: Clason Map Co., 10.
 and Denver, map: Clason Map Co., 30.
- South River, erosion:** Endlich, 8.
- Southwestern Colorado, ancient ruins:**
 Jackson, 1, 2.
 coal: Lakes, 8.
 geology, dynamic: Comstock, 5, 6, 7.
 maps: Comstock, 7; Hayden, 31; St. John, 1.
 oil: Lakes, 107.
 physiography: Wilson et al., 1.
 Red Beds: S——, C., 1.
 veins: Comstock, 6.
- Spanish Peaks, *General*:** Beckwith, 1; Endlich, 4, 7; Hayden, 6; Jewett, 1.
 augite granite porphyry: Daly, 1; Hills, R. C., 25.
 basalt: Hills, R. C., 25.
 coal: Hills, R. C., 9, 25; Lakes, 108, 156.
 coke making: Hills, R. C., 25.
 erosion: Endlich, 8.
 eruptions: Hills, R. C., 9, 14.
 eruptive rocks: Peale, 9.
 fulgurite: Hills, R. C., 16.
 geology, dynamic: Hills, R. C., 9, 10, 14, 16, 20, 25; Lakes, 108, 143, 156; Savage, 1.
 geology: Savage, 1.
 granite felsophyre: Hills, R. C., 25.
 granite porphyry: Hills, R. C., 25.
 intrusive rocks: Hills, 20.
 lamprophyre: Hills, R. C., 25.
 limestone: Hills, R. C., 25.
- Spanish Peaks.—Continued.**
 map: Endlich, 4; Hills, R. C., 25; U. S. G. S.
 minerals: Schaller, 1.
 petroleum: Hills, R. C., 9.
 physiography: Hills, R. C., 25.
 sandstone: Hills, R. C., 25.
- Spiders:** McCook, 1.
- Spiegeleisen, production 1903-1904:**
 Day, 16, 17—1907: Thom, 2.
- Split Mountain Canyon:** White, 4.
- Sprague Glacier:** Henderson, J., 15.
- Springfield quadrangle,** map: U. S. G. S.
- Starkville, coal mine explosion:** Mines and Minerals, 9.
- Steamboat Springs, *General*:** Draper, 2; Lakes, 23.
 building stone: Fleck and Haldane, 1.
 geology, dynamic: Lee, H. A., 9.
 geology: Witter, 1.
 mineral springs: Lakes, 23, 125; Lee, H. A., 9; Lowther and Knowles, 1.
 onyx: Bailar, 3; Lee, H. A., 9.
 water analysis: Lakes, 23; Lee, H. A., 9.
- Sterling, underground water:** Slichter and Wolff, 1.
 water, analysis of: Slichter and Wolff, 1.
- Stonewall district, coal:** Richardson, 2.
- Stormridge, geology:** Cross, 23.
- Stream measurements, *General*:** Hoyt, 1; Newell, 2, 4, 8, 9, 11, 13, 15, 17, 18.
 Animas: Newell, 12, 14.
 Arkansas: Emmons, Cross, and Eldridge, 2; Freeman and Bolster, 2; Freeman and Mathers, 1; Hinderlider and Hoyt, 1; Newell, 2, 4, 7, 12, 14, 16.
 Bear Creek: Newell, 12, 16.
 Big Sandy: Freeman and Mathers, 1.
 Big Springs Creek: Freeman and Mathers, 1.

Stream measurements.—Continued.

- Big Thompson: Lamb, Freeman, and Henshaw, 1; Lamb and party, 1; Newell, 12, 16.
- Blue: Freeman and Bolster, 1, 4.
- Boulder: Lamb, Freeman, and Henshaw, 1; Newell, 12, 16.
- Cache la Poudre: Emmons, Cross, and Eldridge, 2; Lamb, Freeman, and Henshaw, 1; Lamb and party, 1; Newell, 2, 7, 12.
- Chalk Creek: Freeman and Mathers, 1.
- Clear Creek: Freeman and Mathers, 1, 2; Lamb and party, 1; Newell, 16.
- Colorado River, above Yuma: Hinderlider, Swendson, and Chandler, 1; Hinderlider and Swendson, 1; Meeker and Reed, 1.
- Conejos Creek: Freeman and Mathers, 2.
- Cottonwood Creek: Freeman and Mathers, 2.
- Crystal Creek: Freeman and Bolster, 1, 4.
- Culebra Creek: Freeman and Mathers, 2.
- Dolores: Newell, 14.
- Duck Lake Creek: Lamb and party, 1.
- Eagle: Freeman and Bolster, 1, 4.
- Florida: Newell, 14.
- Fourmile Creek: Freeman and Mathers, 1.
- Frazer: Freeman and Bolster, 1, 4.
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- Grand: Freeman and Bolster, 1; Newell, 12, 14, 16.
- Gunnison: Freeman and Bolster, 1, 4; Newell, 12, 14.
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- Missouri River drainage: Babb, Hinderlider, and Hoyt, 1; Follansbee, Meeker, and Stewart, 1.

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- San Luis Creek: Freeman and Mathers, 2.
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- Scott Gomer Creek: Lamb and party, 1.
- Smelter Creek: Lamb and party, 1.
- South Boulder: Lamb and party, 1; Newell, 12, 16.
- South Platte: Lamb and party, 1; Newell, 12, 16.
- St. Vrain: Lamb, Freeman, and Henshaw, 1; Lamb and party, 1; Newell, 12, 16.
- Tarryall Creek: Lamb and party, 1.
- Uncompahgre: Newell, 12; Freeman and Bolster, 1, 4.
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- Strontium, production 1901: Day, 14.
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- Sugarloaf district, geology: Emmons, 7.
- Lake Fork, hydrology: Hosea, 7.
- Sugarloaf Mountain, eruptive rocks: Emmons, 7.
- Sulphur. *General*: Baldacci, 1.
- Mineral County: Larsen and Hunter, 1; Phalen, 3.
- production 1905: Day, 18—1906, 1907: Ingalls, 5, 6; Thom, 1, 2.
- Sulphuric acid, production: Parker, E. W., 7; Phalen, 3.
- Sulphur Springs, fossils from described: Cross, 18, 19.

- Summit County**, alabandite and pyrite:
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- correlation: Dall, 1.
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- Laramie, age of: Bannister, 1; White, 25.
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Twin Butte, laccolites: Gilbert, 6.

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- Uinta Mountains, *General:*** Powell, 3.
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- Uncompahgre River,** hydrology: Newell, 12; Walcott, 13.
- Uncompahgre Valley,** coal: Peale, 8.
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- Underground waters:** Apishapa quadrangle: Stose, G. W., 1.
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- Upper Blue River,** mining, 1867: Hollister, 1.
- Uranium, *General:*** Becke, 1; Berthoud, 4; Blanc, 1; Endlich, 5; Fleck, 3; Frenzel, A. B., 1; Henning, 2; Hess, 5; Hillebrand and Ransome, 2; Lakes, 67, 143, 165; Phillips, 1.
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- bibliography of Colorado uranium:**
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- Boulder and Gilpin counties:**
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- Iron, meteoric: Headden, 12.
- Iron ore, bog: Lakes, 5.
- Iron ore: Chauvenet, 3, 4, 5, 6; Clark, R. N., 1; Devereux, 1; Drown, 1; Putnam, 1; Raymond, 7; Singewald, 1.
- Jarosite: Clarke, F. W., 6; Koenig, 2; Ransome, 2.
- Kaolinite: Clarke, F. W., 6; Cross and Hillebrand, 4; Cross and Penrose, 1; Loew, 1; Rickard, T. A., 15.
- Kobellite: Kellar, 1.
- Krennerite: Chester, 2.
- Lamprophyre: Clarke, F. W., 5, 8; Cross and Spencer, 1.
- Latite: Clarke, F. W., 8; Ransome, 3.
- Latite-phonolite: Clarke, F. W., 8.
- Laumontite: Clarke, F. W., 6; Cross and Hillebrand, 2, 4.
- Lava: Chauvenet, 1.
- Lepidomelane: Clarke, F. W., 6.
- Levynite: Clarke, F. W., 6; Cross and Hillebrand, 4.
- Limestone, alteration product: Ransome, 2.
- Limestone, blue: Clarke and Hillebrand, 1; Emmons, 9; Lakes, 2.
- Limestone, crystalline: Kedzie, 1.
- Limestone, dolomitic: Clarke and Hillebrand, 1.
- Limestone, in tepee core: Darton, 13; Fisher, 1.
- Limestone, oölitic: Clarke and Hillebrand, 1.
- Limestone, serpentinous: Clarke and Hillebrand, 1.
- Limestone, white: Clarke and Hillebrand, 1.
- Limestone: Burchard, E. F., 8; Chauvenet, 1, 6; Clarke and Hillebrand, 1; Crawford, 4; Eckel, 1; Fisher, 1; Hague and Emmons, 1; Kedzie, 1; Lakes, 165, 204; Martin, 1; Stose, 1.
- Lionite: Endlich, 6.
- Loess: Clarke, F. W., 9; Clarke and Hillebrand, 1.
- Löllingite: Clarke, F. W., 6; Cross and Hillebrand, 4; Hillebrand, 1.
- Magnesite: Ohly, 2.

CHEMICAL ANALYSES—Continued

- Manganese iron ore: Lakes, 26; Penrose, 1.
 Manganiferous ores: Weeks, J. D., 5.
 Marble: Chauvenet, 1; Day, 11; Lakes, 226.
 Mesolite: Clarke, F. W., 6; Cross and Hillebrand, 2, 4; Patton, 4.
 Meteorite: Butters, 1; Smith, J. L., 1, 2.
 Mica: Clarke, F. W., 2, 3.
 Mica andesite: Blake, J. C., 1.
 Mica schist: Clarke, F. W., 8.
 Mineral springs, radium-bearing: Headden, 5.
 Mineral springs: Peale, 14.
 Mineral waters. *See* water.
 Mineral wool: Clarke, F. W., 6.
 Minerals from Gold Hill: Endlich, 1.
 Minium: Hawkins, 1.
 Mizzonite: Clarke, F. W., 6.
 Molybdate: Schaller, 2.
 Monchiquite: Clarke, F. W., 8.
 Monzonite, quartz bearing: Cross and Spencer, 1.
 Monzonite: Clarke, F. W., 5, 9; Cross, Howe, and Ransome, 1; Cross and Purington, 1; Cross, Spencer, and Purington, 1.
 Monzonitic facies of diorite mass: Clarke, F. W., 8.
 Monzonitic porphyry: Clarke, F. W., 8; Ransome, 3.
 Mordenite: Clarke, F. W., 4.
 Muscovite: Clarke, F. W., 6.
 Natramblygonite: Schaller, W. T., 3.
 Natrolite: Clarke, F. W., 6; Cross and Hillebrand, 4.
 Nepheline basalt: Clarke and Hillebrand, 1; Cross and Penrose, 1.
 Nepheline syenite: Clarke, F. W., 9; Clarke and Hillebrand, 1; Cross and Penrose, 1; Hillebrand, 11.
 Nepheline tephrite: Clarke, F. W., 7, 8.
 Nevadite: Crawford, 4.
 Oil: Gale, 5; Kirkbride, 1; Lakes, 97, 146, 195a; Lee, H. A., 9; Ohly, 9; Washburne, 2.
 Olivine basalt: Clarke, F. W., 8.
 Olivinite: Whitaker, 1.
 Ores, Battle Mountain: Guiterman, F., 1.
 Ores, Cripple Creek: Cross and Penrose, 1; Baker, 1; Graton, 1; Smith, F. C., 1.
 Ores, Custer County: Emmons, 23.
 Ores, Dudley smelter: Peters, 1.
 Ores, Geyser mine: Emmons, 24.
 Ores, Gilpin County, California mine: Rickard, F., 1.
 Ores, Idaho Springs: Bain, 2.
 Ores, Lake City: Emmons and Irving, 3.
 Ores, Leadville: Butler, G. M., 2; Free-land, T., 1; Iles, 3; Rolker, 2.
 Ores, Ouray County: Kedzie, 1.
 Ores, oxidized: Ransome, 2.
 Ores, Pikes Peak quadrangle: Mathews, 2.
 Ores, Red Cliff: Lakes, 122; Kedzie, 1.
 Ores, Red Mountain: Kedzie, 1.
 Ores, Rico: Rickard, T. A., 7.
 Ores, Rosita: Clark, R. N., 2.
 Ores, telluride, Cripple Creek: Crowe, 1.
 Ores, Telluride, Liberty Bell Mine: Winslow, 2.
 Ores, Telluride, Smuggler - Union mines: Porter, 1.
 Orthoclase: Clarke, F. W., 6; Clarke and Hillebrand, 1; Crawford, 4; Endlich, 6.
 Ozokerite: Ohly, 5.
 Pachnolite: Clarke, F. W., 6; Cross and Hillebrand, 3.
 Palladium: Headden, 6.
 Pearceite: Penfield, 8.
 Peridote: Clarke and Hillebrand, 1.
 Peridotite: Clarke, F. W., 9; Cross, 12.
 Petzite: Endlich, 6; Hillebrand, 9.
 Phenacite: Penfield and Sperry, 2.
 Phonolite: Clarke, F. W., 9; Clarke and Hillebrand, 1; Cross, 10; Cross and Penrose, 1; Hillebrand, 11.
 Phosgenite: Warren, C. H., 1.
 Pickeringite: Endlich, 6.
 Picrotitanite: Whitaker, 1.
 Pitchblende: Ohly, 12.

CHEMICAL ANALYSES—Continued

- Pitchstone, devitrified: Clarke and Hillebrand, 1.
- Plagioclase basalt: Clarke and Hillebrand, 1.
- Polybasite: Genth, 1a; Penfield and Pearce, 1; Spurr, 1.
- Porphyrite: Clarke, F. W., 5; Crawford, 4.
- Porphyrite, quartz: Clarke and Hillebrand, 1.
- Porphyrite, quartz-hornblende-mica: Clarke and Hillebrand, 1.
- Porphyritic diorite: Clarke, F. W., 5; Crawford, 4.
- Porphyritic granitite: Clarke, F. W., 5.
- Porphyritic lamprophyre: Clarke, F. W., 5, 8.
- Porphyry: Crawford, 4; Cross, 23; Clarke and Hillebrand, 1; Patton, 10.
- Potosi volcanic series: Cross, Howe, and Ransome, 1.
- Prosopite: Clarke, F. W., 6; Cross, 3; Hillebrand, 8.
- Proustite: Van Horn, 1.
- Prowersose: Cross, 34.
- Psilomelane: Clarke, F. W., 6; Emmons, 23.
- Ptilolite: Clarke, F. W., 4, 6; Cross and Eakins, 1, 2; Dana, E. S., 7.
- Pyrite: Kraus and Scott, 1.
- Pyroxene: Clarke, F. W., 6; Eakins, 10.
- Pyroxene andesite: Clarke, F. W., 8; Clarke and Hillebrand, 1; Cross, Howe, and Ransome, 1.
- Pyroxene-hornblende andesite: Clarke, F. W., 8.
- Quartz alunite: Clarke and Hillebrand, 1.
- Quartz-biotite latite: Clarke, F. W., 8; Cross, Howe and Irving, 1.
- Quartz diaspore: Clarke and Hillebrand, 1.
- Quartz diorite: Crawford, 4.
- Quartz-hornblende-mica porphyrite: Crawford, 4.
- Quartz latite: Clarke, F. W., 8; Crawford, 4; Cross, Howe, and Ransome, 1.
- Quartz latite porphyry: Crawford, 4.
- Quartz monzonite: Clarke, F. W., 5, 8, 9; Crawford, 4.
- Quartz monzonite gneiss: Crawford, 4.
- Quartz monzonite porphyry: Clarke, F. W., 8; Crawford, 4; Cross, Howe, and Irving, 1.
- Quartz porphyrite: Crawford, 4.
- Quartz porphyry: Clarke, F. W., 9; Cross, 23; Palmer and Fulton, 1.
- Quartz-pyroxene latite: Clarke, F. W., 8; Cross, Howe, and Irving, 1.
- Quartz syenite porphyry: Cross, Howe, and Ransome, 1.
- Quartz trachyte: Cross, 41, 42.
- Quartzite, lower: Kedzie, 1.
- Quartzite: Kedzie, 1.
- Rhodo-chrosite: Kunz, 1.
- Rhyolite: Clarke, F. W., 8; Clarke and Hillebrand, 1; Crawford, 4; Cross, 8, 12; Eakins and Chatard, 1; Lakes, 94; Larsen, E. S., 1.
- Rhyolite residual glass: Clarke and Hillebrand, 1.
- Rhyolite tuff: Clarke and Hillebrand, 1; Lakes, 165.
- Rhyolitic vitrophyre: Clarke, F. W., 5, 8.
- Riebeckite granite: Clarke, F. W., 8.
- Riebeckite: Clarke and Steiger, 2.
- Rocks of Colorado: Iddings, 3; Washington, 1, 2.
- Rocks from Cripple Creek district: Miller, G. W., 1.
- Rocks from Cripple Creek volcano: Graton, 1.
- Rocks from Elk Mountains: Crawford, 4.
- Rocks from Glenwood Springs: Spurr, 1.
- Rocks from Monarch-Tomichi district: Crawford, 4.
- Rocks from Pikes Peak district: Mathews, 2.
- Rocks from Pueblo quadrangle: Gilbert, 7.
- Rocks from Rosita and Silver Cliff: Cross, 27.

CHEMICAL ANALYSES—Continued

- Rocks from Tomichi and Monarch district: Crawford, 4.
- Rocks from West Elk Mountains: Crawford, 4.
- Roscoelite: Endlich, 6; Hillebrand and Ransome, 2.
- Rutile: Clarke, F. W., 6; Genth, 1; Schaller, W. T., 3; Smith, W. B., 2.
- Samarskite: Clarke, F. W., 6; Hillebrand, 4.
- Sandstone, alteration product: Ransome, 2.
- Sandstone: Chatard, 1; Chauvenet, 1; Day, 5; Hague and Emmons, 1; Lakes, 95.
- Sanidine: Clarke and Hillebrand, 1.
- Schirmerite: Endlich, 6.
- Scolecite: Clarke, F. W., 6; Cross and Hillebrand, 4; Eakins, 10.
- Shale: Fisher, 1; Martin, 1; Van Hise, 3.
- Silver: Emmons, 24; Kedzie, 1; Pearce, R., 12.
- Sinter: Emmons, 23, 24.
- Slate: Van Hise, 3.
- Smaltite: Iles, 2.
- Soda: Hayden, 12.
- Sodium carbonate: Hosker, 1, 2.
- Soils: Loew, 3; Emmons, 7; Van Hise, 3.
- Spessartite: Clarke, F. W., 6.
- Spherulites in rhyolite: Clarke and Hillebrand, 1; Eakins and Chatard, 1.
- Stilbite: Clarke, F. W., 6; Cross and Hillebrand, 4.
- Sulphantimonites: Eakins, 2.
- Sulphur ore: Larsen and Hunter, 1; Schaller, W. T., 13.
- Syenite: Clarke, F. W., 8, 9; Clarke and Hillebrand, 1; Cross, 12.
- Syenite lamprophyre: Clarke and Hillebrand, 1; Hillebrand, 11.
- Sylvanite: Clarke, F. W., 1; Endlich, 6; Ohly, 10; Palache, 1; Rickard, T. A., 16.
- Tellurium associated with arsenopyrite: Headden, 3.
- Tellurium: Bailar, 1; Bailar and Woodward, 1; Endlich, 6; Hillebrand and Allen, 1; Jennings, 1; Pearce, R., 9, 13; Purington, 2; Rickard, T. A., 16; Woodward, 1.
- Tennantite: Penfield and Pearce, 1; Spurr, 1.
- Tetradymite: Hillebrand, 13; Genth, 1a.
- Thomsonite: Clarke, F. W., 6; Clarke and Steiger, 2; Patton, 4; Steiger, 1.
- Thomsonite spherules: Cross and Hillebrand, 4.
- Tinguaite: Clarke, F. W., 5; Clarke and Hillebrand, 1.
- Topaz: Clarke, F. W., 6.
- Trachyte: Breed, 1; Clarke, F. W., 8; Clarke and Hillebrand, 1; Cross, 12.
- Trachyte-phonolite: Cross and Penrose, 1.
- Trachydolerite: Clarke, F. W., 8.
- Tscheffkinit: Eakins, 7.
- Tuff: Emmons, Cross and Eldridge, 2.
- Tuff, andesite: Lakes, 118.
- Tungsten: Cooper, C. A., 1; Ekeley, 1; George, 3; Lindgren, 6; Ohly, 8; Walker, 1.
- Tysonite: Allen and Comstock, 1; Clarke, F. W., 6; Hillebrand, 8, 10.
- Uraninite: Clarke, F. W., 6; Endlich, 6; Fleck, 4; Hillebrand, 5.
- Uranite: Day, 12.
- Uranium, chemical estimation of: Griffin, C. E., 1.
- Vanadiferous sandstones: Day, 13; Hillebrand and Ransome, 1.
- Vanadium, chemical estimation of: Griffin, C. E., 1.
- Vanadium mica: Day, 13.
- Vanadium in porphyry: Hillebrand, 11.
- Vanadium: Fleck, 4.
- Vesuvianite: Clarke, F. W., 6.
- Vitrophyre: Clarke, F. W., 8; Cross and Purington, 1.
- Vogesite: Clarke, F. W., 8.
- Volcanic ash: Woolsey, 1.
- Warrenite: Clarke, F. W., 6.

CHEMICAL ANALYSES—Continued

- Water, Arkansas Valley: Clarke, F. W., 9; Gilbert, 5.
- Water, artesian: Clarke, F. W., 9; Chauvenet, 2; Strong, W. C., 1.
- Water, Custer County, Geyser mine: Clarke, F. W., 9; Emmons, 23, 24.
- Water, Dakota sandstone, eastern Colorado: Darton, 13.
- Water, Denver wells: Clarke, F. W., 9; Emmons, Cross, and Eldridge, 2; Foster, E. L., 1.
- Water, Good Hope mine: Rickard, T. A., 23.
- Water, Idaho Springs, Stanley mine: Clarke, F. W., 9.
- Water, mineral springs: Clarke, F. W., 9; Chauvenet, 7; Cross, Howe, and Irving, 1; Emmons, 24; Endlich, 4; Hayden, 6; Headden, 5, 14; Jones, L. J. W., 1; Lakes, 23; Lee, H. A., 1, 9; Lowther and Knowles, 1; Peale, 1, 3, 15; Smith, J. A., 1; Stevenson, 3; Strieby, 1.
- Water, San Luis Valley: Fleck, 1; Headden, 13; Siebenthal, 4.
- Water, spring: Eakins, 5; Fisher, 1; Gale, 5; Lee, H. A., 9; Spurr, 1; Spurr, Garrey, and Ball, 1.
- Water, Sterling: Slichter and Wolff, 1.
- Water, Steamboat Springs: Lowther and Knowles, 1.
- Water, White river: Gale, 5.
- Water: Headden, 4.
- Wheelerite: Endlich, 6.
- Witherite: Ohly, 2.
- Wolframite: Ekeley, 1; George, 3.
- Xenotime: Penfield, 6.
- Zircon: Endlich, 6; Hillebrand, 4.
- Zinkenite: Clarke, F. W., 6; Cross and Hillebrand, 4; Hillebrand, 2.
- Zunyite: Clarke, F. W., 6; Cross and Hillebrand, 4; Hillebrand, 3; Penfield, 6; Ransome, 3.

MINERALS DESCRIBED

(See also lists of Colorado minerals in Dana, E. S., 8; Endlich, 1, 3, 4, 5, 6; Frazer, 1; Hollister, 1; Randall, J. S., 1; Smith, J. A., 1.)

- Acanthite: Chester, 1.
- Actinolite: Crawford, 4; Hollister, 1.
- Aegirine: Lindgren and Ransome, 3.
- Agate: Hollister, 1; Sterrett, 2.
- Alabandite: Patton, 10; Smith, W. B., 2.
- Alabaster: Hollister, 1.
- Alaskaite: Am. Jour. Sci., 1; Lewis, H. C., 1.
- Albertite: Cross, 5; Denton, 1; Kneeland, 1; Koenig, 4.
- Albite: Lindgren and Ransome, 3; Smith, W. B., 1.
- Allanite: Eakins, 1; Iddings and Cross, 1; Ransome, 5.
- Altaite: Cross, 5; Genth, 1, 2.
- Alum: Hollister, 1.
- Alumina: Kedzie, 1.
- Alunite: Butler and Gale, 1; Cross, 16; Cross and Spencer, 1; Eakins, 9; Hurlburt, 1; Larsen, 2; Lindgren and Ransome, 3; Ransome, 3.
- Alunogen: Headden, 6; Hobbs, 2.
- Amazonstone: Hollister, 1; Lakes, 75; Peale, 5.
- Amethyst: Hollister, 1.
- Ammonium oxide: Kedzie, 1.
- Amphibole: Cross, 14; Graton, 1; Min. Mag., 1; Ransome, 5.
- Analcite: Clarke and Steiger, 1; Cross, 5; Cross and Hillebrand, 4; Graton, 1; Lakes, 6; Lindgren and Ransome, 3; Patton, 4.
- Andradite: Crawford, 4; Patton, 10.
- Anglesite: Crawford, 3, 4; Patton, 10.
- Anhydrite: Hollister, 1.
- Anorthite: Lindgren and Ransome, 3.

MINERALS DESCRIBED—Continued

- Antimony: Cross and Penrose, 1; Hollister, 1.
- Antunite: Lakes, 143.
- Apatite: Lindgren and Ransome, 3; Ransome, 5.
- Apophyllite: Cross, 5; Cross and Hillebrand, 2, 4; Lakes, 6; Patton, 4.
- Aquamarine: Cross, R. T., 1; Hollister, 1.
- Aragonite: Patton, 4; Min. Mag., 1.
- Arvedsonite: Cross, 5; Koenig, 1b; Lindgren and Ransome, 3; Min. Mag., 1.
- Argentite: Crawford, 4; Cross and Howe, 1; Cross and Ransome, 1; Lakes, 5; Patton, 10; Ransome, 2, 3; Van Horn, 1, 2.
- Arsenic: Hollister, 1.
- Arsenopyrite: Irving and Bancroft, 1; Lakes, 143.
- Asbestos: Crawford, 4; Hollister, 1.
- Asphaltum: Lee, H. A., 2.
- Astrophyllite: Cross, 5; Eakins, 8; Min. Mag., 1.
- Atacamite: Lakes, 143.
- Augite: Cross, 11; Lindgren and Ransome, 3.
- Augite and diopside: Ransome, 5.
- Aventurine quartz: Hollister, 1.
- Azurite: Crawford, 3, 4; Hollister, 1; Lakes, 143; Patton, 10; Ransome, 5.
- Barite: Crawford, 4; Cross, 5; Cross and Howe, 1; Cross and Ransome, 1; Hollister, 1; Irving and Bancroft, 1; Kemp, 1; Lindgren and Ransome, 3; Patton, 10; Ransome, 2, 3, 5.
- Bastnäsite: Allen and Comstock, 1; Cross, 5; Hidden, 3; Hillebrand, 8, 10; Kunz, 2; Min. Mag., 1.
- Beegerite: Cross, 5; König, 2; Min. Mag., 1.
- Bertrandite: Penfield, 2, 3.
- Beryl: Hills, R. C., 12; Hollister, 1; Penfield, 4.
- Beryllium minerals: Penfield, 4.
- Biotite: Cross, 5; Lewis, 1, 2; Lindgren and Ransome, 3; Ransome, 5.
- Bismuth: Irving and Bancroft, 1; Mg. Rev., 6.
- Bismuthinite: Cross and Howe, 1; Ransome, 3, 5.
- Bismuthite: Cross, 5; Genth, 2.
- Bloodstone: Hollister, 1.
- Blue vitrol: Hollister, 1.
- Bole: Cross and Hillebrand, 4.
- Bornite: Crawford, 4; Cross and Howe, 1; Patton, 10; Pearce, 2; Ransome, 3.
- Bournonite: Cross and Howe, 1; Lakes, 143; Ransome, 3.
- Brochantite: Cross, 5.
- Cairngorm stone: Hollister, 1.
- Calamine: Clarke, F. W., 9; Crawford, 3, 4; Farrington and Tillotson, 1; Grabill, 1.
- Calaverite: Hillebrand, 7, 10; Lindgren and Ransome, 3; Penfield, 7; Penfield and Ford, 1; Rickard, T. A., 16; Smith, G. F. H., 1.
- Calcareous spar: Hollister, 1.
- Calcite: Crawford, 3, 4; Cross and Hillebrand, 4; Cross, Howe, and Ransome, 1; Cross and Penrose, 1; Cross and Ransome, 1; Headden, 7, 11; Lindgren and Ransome, 3; Patton, 4, 10; Purington, 2; Ransome, 2, 3, 5.
- Calcium sulphate: Kedzie, 1.
- Carnelian: Hollister, 1.
- Carnotite: Blanc, 1; Clarke, F. W., 9; Fleck and Haldane, 1, 2; Gale, 2, 6; Hess, 4; Hillebrand and Ransome, 1, 2; Mg. World, 2, 3; Ohly, 1, 11; W—, C. H., 3. *See also* Uranium in general index.
- Cassiterite: Smith, W. B., 1.
- Celesite: Cross, 5; Lindgren and Ransome, 3.
- Cerargyrite: Crawford, 4; Lakes, 5, 21; Patton, 10.
- Cerussite: Brinsmade, 1; Crawford, 3, 4; Lakes, 5, 21, 143; Patton, 10; Ransome, 5; Warren, C. H., 1.
- Ceylonite (spinel): Read, 1.
- Chabazite: Cross, 5; Cross and Hillebrand, 4; Lakes, 6; Patton, 4.
- Chalcanthite: Lakes, 143; Lindgren and Ransome, 3; Patton, 10.
- Chalcedony: Hollister, 1; Lindgren and Ransome, 3; Patton, 1.

MINERALS DESCRIBED—Continued

- Chalcocite: Crawford, 3, 4; Cross and Howe, 1; Irving and Bancroft, 1; Lindgren and Ransome, 3; Ransome, 3.
- Chalcopyrite: Crawford, 3, 4; Cross, Howe, and Ransome, 1; Cross and Ransome, 1; Hollister, 1; Irving and Bancroft, 1; Lindgren and Ransome, 3; Patton, 10; Ransome, 2, 3.
- Chlorite: Crawford, 4; Cross and Ransome, 1; Hollister, 1; Lindgren and Ransome, 3; Ransome, 2, 5.
- Chloropal: Lindgren and Ransome, 3.
- Chromite: Lakes, 143; Patton, 10.
- Chrysocolla: Crawford, 4; Hollister, 1; Lakes, 143; Lindgren and Ransome, 3; Ransome, 5.
- Chrysoprase: Hollister, 1.
- Cinnabar: Lindgren and Ransome, 3.
- Coal: Lindgren and Ransome, 3.
- Coloradoite: Cross, 5; Dana, E. S., 1; Genth, 1a; Hillebrand, 9; Rickard, T. A., 16.
- Columbite: Cross, 5; Headden, 6; Min. Mag., 1; Smith, J. L., 3; Smith, W. B., 1.
- Copper: Crawford, 3, 4; Cross and Ransome, 1; Cross and Penrose, 1; Hollister, 1; Lindgren and Ransome, 3; Patton, 10; Purington, 2; Ransome, 2, 3.
- Copper carbonates: Lakes, 21.
- Copper, gray. *See* tetrahedrite.
- Corundum: Finlay, G. T., 2; Pratt, 1.
- Cosalite: Cross, 5; Cross and Hillebrand, 4; Hillebrand, 1; Pearce, 3.
- Crocoite: Lakes, 143.
- Cryolite: Cross, 5; Cross and Hillebrand, 4; Halland, 1; Ohly, 2.
- Cuprite: Crawford, 3, 4; Patton, 10.
- Cyrtolite: Genth, 1.
- Danalite: Genth, 1.
- Derbyshire spar: Hollister, 1.
- Diallage: Lindgren and Ransome, 3.
- Diaspore: Cross, 16; Eakins, 9; Melville, 1.
- Diopside: Crawford, 4.
- Diopside and augite: Ransome, 5.
- Dolomite: Crawford, 3, 4; Cross, Howe, and Ransome, 1; Lindgren and Ransome, 3; Patton, 5; Ransome, 3.
- Dolomite and calcite: Irving and Bancroft, 1.
- Domingite: Eakins, 2.
- Dumortierite: Finlay, G. I., 2.
- Egeran: Hollister, 1.
- Elaterite: Weston, 4.
- Elpasolite: Cross and Hillebrand, 4.
- Embolite: Cross, 5.
- Emerald: Hollister, 1.
- Emmonsite: Hillebrand, 12, 13; Lindgren and Ransome, 3.
- Empressite: George, 5.
- Enargite: Burton, 1; Cross, 5; Crawford, 4; Cross, Howe, and Ransome, 1; Cross and Ransome, 1; Headden, 6; Patton, 10; Pirsson, 1; Ransome, 3; Spencer, L. J., 1.
- Epidote: Cross and Ransome, 1; Hollister, 1; Ransome, 5; Smith, W. B., 2.
- Epsomite: Hobbs, 2; Lindgren and Ransome, 3.
- Erubescite: Hollister, 1.
- Evansite: Min. Mag., 1.
- Fayalite: Hidden, 1; Hidden and Mackintosh, 1.
- Feather alum: Bailey, 1.
- Ferberite: George, 3.
- Ferrotellurite: Dana, E. S., 1; Min. Mag., 1.
- Fluorite: Crawford, 4; Cross, Howe, and Ransome, 1; Cross and Penrose, 1; Cross and Ransome, 1; Lindgren and Ransome, 3; Patton, 10; Purington, 2; Ransome, 2; Smith, W. B., 1.
- Fluorite: Crawford, 4; Lakes, 21; Ransome, 3.
- Gadolinite: Eakins, 1; Patton, 10.
- Gahnite: Crawford, 4.
- Galena: Crawford, 3, 4; Cross, Howe, and Ransome, 1; Cross and Ransome, 1; Irving and Bancroft, 1; Lakes, 21, 143; Lindgren and Ransome, 3; Patton, 10; Ransome, 2, 3.

MINERALS DESCRIBED—Continued

- Garnet: Bailey, Rath, and Grider, 1; Crawford, 4; Cross, 8; Cross and Ransome, 1; Hollister, 1; Min. Mag., 1; Penfield and Sperry, 1; Ransome, 5; Smith, W. B., 2.
- Gearksutite: Cross, 3, 5; Cross and Hillebrand, 4.
- Gilsonite: Weston, 4.
- Glockerite: Lindgren and Ransome, 3.
- Goethite: Cross, 5.
- Gold: Crawford, 4; Cross, 5; Cross, Howe, and Ransome, 1; Cross and Ransome, 1; Eilers, 3; Irving and Bancroft, 1; Lindgren and Ransome, 3; Patton, 10; Ransome, 2, 3, 5.
- Gold (crystals): Hollister, 1; Lakes, 218.
- Gold (wire): Mg. Sci., 5.
- Goldschmidtite: Hobbs, 1.
- Goslarite: George, 5.
- Grahamite: Newberry, 10; Wurtz, 1.
- Graphite: Bastin, 1; Ihne, 1.
- Greenockite: Crawford, 4.
- Gütermannite: Cross, 5; Cross and Hillebrand, 4; Cross, Howe, and Ransome, 1; Hillebrand, 3; Ransome, 3.
- Gypsum: Cross and Penrose, 1; Cross and Ransome, 1; Hollister, 1; Lindgren and Ransome, 3; Patton, 10; Ransome, 2.
- Halotrichite: Bailey, 1, 2.
- Heliotrope: Hollister, 1.
- Hematite: Crawford, 3, 4; Cross, Howe, and Ransome, 1; Patton, 10; Ransome, 3, 5; Smith, W. B., 1.
- Hessite (auriferous): Cross, 5; Genth, 1a; Palache, 1; Silliman, 1.
- Heulandite: Eakins, 9.
- Hinsdalite: Irving and Bancroft, 1; Larsen and Schaller, 1.
- Hornblende: Lindgren and Ransome, 3; Min. Mag., 1.
- Hübnerite: Cross, 5; Cross, Howe, and Ransome, 1; Cross and Hillebrand, 4; Genth, 2; George, 3; Hillebrand, 1; Lindgren and Ransome, 3; Ransome, 3.
- Hyalite: Hollister, 1.
- Hydrophane: Church, A. H., 1; Kunz, 1.
- Hypersthene: Ransome, 5.
- Idocrase: Hollister, 1.
- Ilesite: Am. Jour. Sci., 1; Iles, 1.
- Ilsemanite: Lindgren and Ransome, 3.
- Jamesonite: Patton, 10.
- Jarosite: Cross, 5; Genth, 1a; Koenig, 2.
- Jasper: Hollister, 1.
- Kaolin: Patton, 10.
- Kaolinite: Cross, 5; Cross and Hillebrand, 4; Cross, Howe, and Ransome, 1; Cross and Penrose, 1; Cross and Ransome, 1; Dana, E. S., 6; Hills, R. C., 5; Lindgren and Ransome, 3; Milch, 1; Ransome, 2, 5.
- Kobellite: Kellar, 1; Min. Mag., 1.
- Krennerite: Chester, 2; Genth, 1a; Lindgren and Ransome, 3.
- Labradorite: Hunt, 1; Lindgren and Ransome, 3; Ransome, 5.
- Laumontite: Cross, 5; Cross and Hillebrand, 4; Lakes, 6; Patton, 4.
- Lavenite: Graton, 1.
- Lead: Cross and Hillebrand, 4.
- Levyneite: Cross and Hillebrand, 4.
- Limonite: Crawford, 3, 4; Cross, 5; Lakes, 143; Lindgren and Ransome, 3; Patton, 10; Ransome, 5; Smith, W. B., 1.
- Löllingite: Cross, 5; Cross and Hillebrand, 4; Hillebrand, 1.
- Magnetite: Crawford, 3, 4; Lindgren and Ransome, 3; Patton, 10; Ransome, 3; Patton, 10; Ransome, 2, 5; Snedaker, 2.
- Magnolite: Dana, E. S., 1; Genth, 1a; Min. Mag., 1.
- Malachite: Crawford, 3, 4; Hollister, 1; Lakes, 5, 143; Patton, 10; Ransome, 5.
- Mallardite: Lindgren and Ransome, 3.
- Manganese: Chauvenet, 8; Crawford, 4; Cross and Penrose, 1; Hollister, 1; Lakes, 143.

MINERALS DESCRIBED—Continued

- Manganiferous iron ores: Weeks, J. D., 5.
- Manganiferous silver ores: Weeks, J. D., 5.
- Manganite: Smith, W. B., 2.
- Marcasite: Lindgren and Ransome, 3.
- Mariposite: Hess, 4.
- Melanterite: Patton, 10.
- Melonite: Cross, 5; Hillebrand, 2, 9.
- Mercury: Lakes, 174.
- Mesolite: Cross, 5; Cross and Hillebrand, 2, 4; Lakes, 6; Patton, 4.
- Meteorite iron: Headden, 12.
- Mica: Clarke, F. W., 2, 3; Hollister, 1; Purington, 2; Schwarz, 4.
- Microcline: Cross, 5; Koenig, 1a; Lindgren and Ransome, 3; Ransome, 5; Smith, W. B., 1.
- Mimetite: Crawford, 3; Patton, 10.
- Minium: Hawkins, 1.
- Mirabilite: Lindgren and Ransome, 3.
- Molybdenite: Crawford, 4; Cross, Howe, and Ransome, 1; Hollister, 1; Lindgren and Ransome, 3; Ransome, 3; Schaaf-Regelman, 1; Schaller, 2; Sebben, 1.
- Molybdite: Crawford, 4; Schaller, 3, 4.
- Monazite: Schaaf-Regelman, 1.
- Morencite: Lindgren and Ransome, 3.
- Muscovite: Lindgren and Ransome, 3; Ransome, 5; Smith, W. B., 1.
- Natrolite: Cross and Hillebrand, 4; Lakes, 6; Lindgren and Ransome, 3.
- Natron: Headden, 13.
- Nepheline: Lindgren and Ransome, 3.
- Niccolite: Cross, 5.
- Nosean: Lindgren and Ransome, 3.
- Oligoclase: Lindgren and Ransome, 3.
- Olivine: Lindgren and Ransome, 3.
- Onyx: Hollister, 1.
- Opal: Hollister, 1; Lindgren and Ransome, 3; Patton, 1.
- Orthoclase: Lindgren and Ransome, 3; Purington, 2; Ransome, 5.
- Ozokerite: Ohly, 5.
- Pachnolite: Cross, 3, 5; Cross and Hillebrand, 4.
- Palladium: Headden, 6.
- Pearceite: Penfield, 8.
- Petzite: Eilers, 3; Genth, 1a; Hillebrand, 9; Lindgren and Ransome, 3; Rickard, T. A., 16.
- Phenacite: Cross, 5; Cross and Hillebrand, 4; Hidden, 12; Penfield, 1, 4; Penfield and Sperry, 2; Smith, W. B., 1, 2.
- Phosgenite: Warren, C. H., 1.
- Picrotitanite: Whitaker, 1.
- Pitchblende. *See* Uranium.
- Platinum: Kemp, 3.
- Polybasite: Cross, Howe, and Ransome, 1; Lakes, 5, 21, 143; Penfield, 8; Penfield and Pearce, 1; Ransome, 2, 3.
- Prosopite: Cross, 5; Cross and Hillebrand, 3, 4; Hillebrand, 8.
- Proustite: Cross, Howe, and Ransome, 1; Irving and Bancroft, 1; Patton, 10; Ransome, 2, 3; Van Horn, 1, 2.
- Psilomelane: Clarke, F. W., 9; Crawford, 3, 4; Lindgren and Ransome, 3; Patton, 10.
- Ptilolite: Clarke, F. W., 4; Cross and Eakins, 1, 2; Dana, E. S., 5, 7.
- Pyrargyrite: Irving and Bancroft, 1; Patton, 10.
- Pyrite: Ayres, 1; Crawford, 3, 4; Cross, Howe, and Ransome, 1; Cross and Penrose, 1; Cross and Ransome, 1; Irving and Bancroft, 1; Kraus and Scott, 1; Lakes, 5, 21, 143; Lindgren and Ransome, 3; Patton, 10; Purington, 2; Ransome, 2, 3, 5; Schaller, 1; Smith, W. B., 2; Spurr, Garrey, and Ball, 1.
- Pyrolusite: Crawford, 3, 4; Patton, 10.
- Pyromorphite: Patton, 10.
- Pyroxene: Cross, 1, 14; Cross and Ransome, 1.
- Pyrrhotite: Crawford, 4.
- Quartz: Crawford, 3, 4; Cross, 5; Cross, Howe, and Ransome, 1; Cross and Penrose, 1; Cross and Ransome, 1; Grabill, 1; Irving and Bancroft, 1; Lindgren and Ransome, 3; Patton, 10; Purington, 2; Ransome, 2, 3, 5; Smith, W. B., 1; Tassin, 1.
- Quartz (smoky): Peale, 5.

MINERALS DESCRIBED—Continued

- Ralstonite: Cross, 5; Cross and Hillebrand, 4.
 Rhodochrosite: Cross, 5; Cross and Ransome, 1; Dana, E. S., 6; Irving and Bancroft, 1; Kunz, 1; Lindgren and Ransome, 5; Patton, 10; Ransome, 2, 3.
 Rhodonite: Ransome, 3.
 Rickardite: Ford, 1, 2.
 Riebeckite: Clarke and Steiger, 2; Murgoci, G. M., 1.
 Roscoelite: Genth, 1a; Henahen, 1; Hillebrand and Ransome, 2; Lindgren, 6, 9; Lindgren and Ransome, 3; Min. Mag., 1.
 Rosin, mineral: Hollister, 1.
 Ruby silver: Lakes, 5.
 Rutile: Genth, 1; Lindgren and Ransome, 3; Smith, W. B., 2.
 Sanfordite: Ores and Metals, 6a.
 Sanidine: Cross, 4, 6.
 Sapphire: Smith, W. B., 2.
 Sardonyx: Hollister, 1.
 Scheelite: George, 3; Mg. Rept., 14.
 Schirmerite: Cross, 5; Genth, 1a.
 Schorlomite: Koenig, 1.
 Scolecite: Cross and Hillebrand, 4; Lakes, 6.
 Selenite: Gale, 6.
 Selenium: Ohly, 3.
 Sericite: Cross and Ransome, 1; Ransome, 2.
 Serpentine: Crawford, 4; Emmons, 9; Hollister, 1; Lindgren and Ransome, 3; Patton, 10.
 Siderite: Lakes, 5; Patton, 10; Purington, 2; Ransome, 5.
 Siderophyllite: Cross, 5; Lewri, H. C., 1a.
 Silver: Crawford, 4; Cross, Howe, and Ransome, 1; Cross, 5; Cross and Ransome, 1; Patton, 10; Ransome, 2, 3, 5.
 Smaltite: Cross, 5; Iles, 2; Min. Mag., 1; Smith, W. B., 1.
 Smithsonite: Crawford, 3, 4; Grabill, 1; Ransome, 5.
 Sodalite: Lindgren and Ransome, 3.
 Specularite: Cross and Ransome, 1; Lindgren and Ransome, 3; Ransome, 2.
 Sphalerite: Crawford, 3, 4; Cross, Howe, and Ransome, 1; Cross and Ransome, 1; Irving and Bancroft, 1; Lakes, 5, 21; Ransome, 2, 3, 5.
 Spinel (ceylonite): Read, 1.
 Staffelite: Min. Mag., 1.
 Stephanite: Crawford, 4; Lakes, 5; Patton, 10; Ransome, 2.
 Stibnite: Cross, Howe, and Ransome, 1; Lakes, 6; Lindgren and Ransome, 3; Patton, 10; Ransome, 3.
 Stilbite: Cross, 5; Cross and Hillebrand, 4; Lindgren and Ransome, 3; Patton, 4.
 Stromeyerite: Cross, Howe, and Ransome, 1; Pearce, 2; Ransome, 3.
 Sulphantimonites: Eakins, 2.
 Sulphobismuthites: Cross, Howe, and Ransome, 1; Ransome, 3.
 Sulphur: Ransome, 5.
 Sylvanite: Blake, 1b; Clarke, F. W., 9; Cross, 5; Davis, W. H., 1; Genth, 1a; Lindgren and Ransome, 3; Moses, 2; Palache, 1; Penfield, 7; Rickard, T. A., 8, 16; Silliman, 1.
 Tantalum: Schaaf-Regelman, 1.
 Tellurite: Cross, 5; Genth, 1, 2.
 Tellurium: Cross, 5; Cross, Howe, and Ransome, 1; Cross and Penrose, 1; Dana, E. S., 1; Genth, 1a; Grabill, 1; Headden, 3; Hess, 1; Hillebrand, 13; Hillebrand and Allen, 1; Irving and Bancroft, 1; Jennings, 1; Kemp, 2; Lakes, 25, 56, 61, 174; Lindgren, 7; Lindgren and Ransome, 3; Marvine, 1; Mg. Rev., 6; Ohly, 3; Palache, 1; Pearce, 11; Ransome, 3; Schaller, 1; Sharwood, 1; Silliman, 1; W—, C. H., 2.
 Tennantite: Crawford, 4; Patton, 10; Penfield and Pearce, 1.
 Tenorite: Crawford, 3, 4.

MINERALS DESCRIBED—Continued

- Tetradymite: Hillebrand, 13.
- Tetrahedrite: Crawford, 4; Cross, Howe, and Ransome, 1; Cross and Ransome, 1; Grabill, 1; Hollister, 1; Irving and Bancroft, 1; Lakes, 5, 21; Lindgren and Ransome, 3; Patton, 10; Ransome, 2, 3.
- Thomsenolite: Cross, 5.
- Thomsonite: Clarke and Steiger, 2; Cross, 5; Cross and Hillebrand, 4; Lakes, 6; Patton, 4.
- Titanite: Ransome, 5.
- Titanium: Chauvenet, 3, 4, 8; Hayden, 14; Jennings, 2; Lindgren and Ransome, 3; Putnam, 1; Schaaf-Regelman, 1; Singewald, 1, 2.
- Topaz: Cross, R. T., 2; Cross, 5, 8; Cross and Hillebrand, 1, 4; Eakle, 1; Min. Mag., 1; Penfield and Minor, 1; Smith, W. B., 1.
- Tourmaline: Lindgren and Ransome, 3; Min. Mag., 1; Patton, 3; Upham, 2.
- Tremolite: Crawford, 4.
- Tungsten minerals: Cooper, C. A., 1; George, 3; Mg. Rept., 14; Ohly, 8; Ransome, 3; Schaaf-Regelman, 1.
- Turgite: Crawford, 3, 4; Smith, W. B., 1.
- Tysonite: Allen and Comstock, 1; Cross, 5; Dana, E. S., 2; Hidden, W. E., 3; Hillebrand, 8, 10; Kunz, 2; Min. Mag., 1.
- Uraninite: Cross, 5; Hill, N. P., 1.
- Uranium minerals: Becke, 1; Blanc, 1; E. and M. J., 27; Fleck, 3; Fleck and Haldane, 1; Hill, N. P., 1; Hillebrand, 5; Hillebrand and Ransome, 1; Lee, H. A., 7; Mines and Mining, 1; Mg. Rev., 2; Ohly, 1; Ohtegnot, 1; Ores and Metals, 7; Ross, 1; Schaaf-Regelman, 1; Tovote, 1.
- Vanadium minerals: Fleck, 3; Fleck and Haldane, 1; Hillebrand and Ransome, 1, 2; Mines and Mining, 1; Ross, G. M., 1; Schaaf-Regelman, 1.
- Vandiestite: Pearce, 13.
- Von Diestite: E. Cumenge, 1.
- Warrenite: Eakins, 2.
- Wavellite: Lindgren and Ransome, 3.
- Willemite: Randall, 1.
- Wolframite: George, 3; Mg. Rept., 14; Moses, 1.
- Wollastonite: Cross and Ransome, 1.
- Wulfenite: Crawford, 3, 4; Lakes, 143.
- Wurtzite: George 5.
- Xenotime: Hidden, 1; Penfield, 6.
- Zeolites: Cross and Hillebrand, 2, 4; Emmons, Cross, and Eldridge, 2; Lakes, 218; Marvin, 1.
- Zinc blende: Crawford, 4; Lindgren and Ransome, 3; Weed, W. H., 1.
- Zinc spinel: Crawford, 4.
- Zinckenite: Cross, 5; Cross and Hillebrand, 4; Cross, Howe, and Ransome, 1; Hillebrand, 2; Patton, 10; Ransome, 3.
- Zircon: Cross, 5; Cross and Hillebrand, 1, 4; Genth, 1; Koenig, 1b; Lindgren and Ransome, 3; Min. Mag., 1; Ransome, 5.
- Zirconium: Schaaf-Regelman, 1.
- Zunyite: Cross, 5; Cross and Hillebrand, 4; Cross, Howe, and Ransome, 1; Hillebrand, 3; Penfield, 6; Ransome, 3.

ROCKS DESCRIBED

- Adamellite gneiss: Spurr, Garry, and Ball.
- Aegirine and aegirine-augite in phonolite: Graton, 1.
- Agglomerate: Larsen, 1.
- Alaskite phonolite: Spurr, Garrey, and Ball.
- Alaskitic quartz monzonite porphyry: Spurr, Garrey, and Ball.
- Alkali syenite porphyry: Clarke, F. W., 8; Mg. Sci., 2; Spurr, Garrey, and Ball.
- Amphibole and hornblende schist: Patton, 8.

ROCKS DESCRIBED—Continued

- Amphibolite: Cross, 14; Emmons, 2, 9.
 Analcite basalt: Cross, 28.
 Analcite in phonolite: Graton, 1.
 Andesite breccia: Clarke, F. W., 8; Cross, 24.
 Andesite, hypersthene: Cross, 1.
 Andesite porphyry: Crawford, 4; Grout, Worcester and Henderson, 1.
 Andesite, sanidine-bearing: Cross, 12.
 Andesite: Comstock, 7; Crawford, 2, 4; Conkling, 2; Cross, 24, 27; Cross, Howe, and Ransome, 1; Cross, Howe, and Irving, 1; Cross and Penrose, 1; Cross and Purington, 1; Emmons, 9; George and Crawford, 1; Hills, R. C., 15; Hogarty, 1; Irving and Bancroft, 1; Kedzie, 1; Lakes, 18, 143; Larsen, 1; Patton, 8; Ransome, 5; Van Horn, 3.
 Anorthosite: Graton, 1.
 Anthophyllite-epidote rock: Crawford, 4.
 Aplite: Crawford, 4; Cross, Howe, and Irving, 1; Patton, 10; Underhill, 4.
 Aplitic granite: Clarke, F. W., 8.
 Augite camptonite: Lee, H. A., 9.
 Augite diorite: Cross, 12.
 Augite granite porphyry: Hills, R. C., 25.
 Augite-hornblende vogesite: Stose, 1.
 Augite-mica syenite: Emmons, Cross, and Eldridge, 2.
 Augite minette: Lee, H. A., 9.
 Augite monzonite: Clarke, F. W., 8.
 Augite syenite: Clarke, F. W., 8; Cross, Spencer, and Purington, 1.
 Augite syenite porphyry: Cross and Penrose, 1.
 Basalt: Comstock, 7; Conkling, 2; Crawford, 2; Draper, 1; Emmons, Cross, and Eldridge, 1, 2; Grout, Worcester, and Henderson, 1; Hills, R. C., 15, 24, 25; Lakes, 21, 143; Stevenson, 8.
 Basalt-limbургite: Cross, 27.
 Basalt, quartz-bearing: Iddings, 1.
 Basic agglomerate: Cross, 24, 27.
 Basic breccia: Cross, 24.
 Basic dike rock: Clarke, F. W., 8; Cross and Ransome, 1; Cross, Spencer, and Purington, 1; Cross and Spencer, 1; Miller, G. W., 1.
 Binary granite: Underhill, 4.
 Biotite aplite: Patton, 7.
 Biotite diorite porphyrite: Patton, 10.
 Biotite gneiss: Patton, 8.
 Howe, and Ransome, 1.
 Biotite granite: Crawford, 4; Cross, Biotite latite: Mg. Sci., 2; Spurr, Garrey, and Ball, 1.
 Biotite schist: Cross, Howe, and Irving, 1; Spurr, Garrey, and Ball, 1.
 Biotite-sillimanite schist: Crawford, 4; Spurr, Garrey, and Ball, 1.
 Bostonite: Mg. Sci., 2; Spurr, Garrey, and Ball, 1.
 Breccia: Crawford, 4; Emmons, Cross and Eldridge, 1; Graton, 1; Grout, Worcester, and Henderson, 1; Lindgren and Ransome, 3; Miller, G. W., 1; Rickard, T. A., 15.
 Breccia, igneous: Patton, 8.
 Breccia, West Elk: Lee, W. T., 13.
 Burns andesite: Cross, 27.
 Burns latite complex: Cross, Howe, and Ransome, 1; Cross, 43 (in Irving and Bancroft, 1).
 Cordierite hornfels: Crawford, 4.
 Corundum in pegmatite: Finlay, G. I., 1, 2.
 Dacite: Crawford, 2; Cross, 27; Spurr, Garrey, and Ball, 1; George and Crawford, 1.
 Dacite porphyry: George and Crawford, 1; Grout, Worcester, and Henderson, 1.
 Diabase: Crawford, 2; Cross, 1, 27; Cross, Howe, and Ransome, 1; Cross, Howe, and Irving, 1; Cross and Penrose, 1; Graton, 1; Patton, 7; Stose, 1.
 Diabase and syenite: Cross, 24.
 Diorite: Ball, S., 1; Conkling, 2; Crawford, 4; Cross, 21, 23, 27; Cross, Spencer, and Purington, 1; Emmons, 9; Emmons, Cross, and Eldridge, 1; George and Crawford, 1; Lakes, 143; Patton, 8, 10; Spurr and Garrey, 1; Underhill, 4.

ROCKS DESCRIBED—Continued

- Diorite-monzonite: Cross and Purington, 1.
- Diorite porphyrite: Patton, 10.
- Diorite porphyry: Clarke, F. W., 8; Cross and Purington, 1; Cross, Spencer, and Purington, 1; Emmons, 27; Lee, H. A., 9; Spurr, 1.
- Dolerite: Conkling, 2; Emmons, Cross, and Eldridge, 2.
- Dolomite: Spurr, 1.
- Dolomitic quartzite: Spurr, 1.
- Eolus granite: Cross, 41.
- Epidote rock: Crawford, 4.
- Eureka rhyolite: Cross, 43; Cross, Howe, and Ransome, 1.
- Evergreenite: Ritter, 5.
- Felsite: Crawford, 2; Patton, 8.
- Feldspar basalt (tephrite): Stevens, E. A., 2.
- Floetz trap: James, 1.
- Fulgurite: Hills, R. C., 16.
- Gabbro: Cross, 41; George and Crawford, 1; Lakes, 143.
- Gabbro-diorite: Cross and Purington, 1.
- Gabbro porphyry: Clarke, F. W., 8.
- Garnet schist: Crawford, 4; Cross, Howe, and Irving, 1.
- Glauconitic grit: Spurr, 1.
- Gneiss: Ball, S., 1; Cross, 27; Cross, Howe, and Irving, 1; Emmons, 2, 9; George, 3; Graton, 1; Patton, 10; Spurr and Garrey, 1; Underhill, 4.
- Granite, Alma type: Patton, 10.
- Granite, Aspen type: Spurr, 1.
- Granite, Central City type: Underhill, 4.
- Granite, Crested Butte type: Emmons, Cross, and Eldridge, 1.
- Granite, Cripple Creek type: Clarke, F. W., 8; Graton, 1; Mathews, 1, 2; Rickard, T. A., 15.
- Granite, Eolus: Cross, Howe, and Irving, 1.
- Granite, fine grained: Lakes, 18; Mathews, 1, 2.
- Granite, Georgetown type: Ball, 1; Spurr and Garrey, 1.
- Granite, Monarch-Garfield type: Crawford, 3, 4.
- Granite, Monarch-Tomichi type: Crawford, 4.
- Granite, Montezuma type: Patton, 7.
- Granite, Mosquito Range type: Emmons, 9.
- Granite, muscovite-biotite: Cross, Howe, and Ransome, 1.
- Granite, Needle Mountains type: Cross, Howe, Irving, and Emmons, 1.
- Granite, Pikes Peak type: Crosby, 1; Cross, 24; Lakes, 18; Mathews, 1, 2.
- Granite, Rosalie: Spurr, Garrey, and Ball.
- Granite, Rosita Hills type: Cross, 27.
- Granite, Santa Fe type: Patton, 7.
- Granite, Silver Plume type (corn granite): Mg. Sci., 2.
- Granite, Summit type: Mathews, 1, 2.
- Granite, Tenmile type: Cross, Howe, and Irving, 1.
- Granite, Trimble type: Cross, Howe, and Irving, 1.
- Granite, Troutdale type: Underhill, 4.
- Granite, Twilight type: Cross, Howe, and Irving, 1.
- Granite, white: Henry, 1.
- Granite, Whitehead type: Cross, Howe, and Irving, 1.
- Granite: Conkling, 2; Cross and Penrose, 1; Emmons, 2; George, 3; Lakes, 143; Underhill, 4.
- Granite-felsophyre: Hills, R. C., 15, 25.
- Granite gneiss: Clarke, 8; Crawford, 4; Gunther, 1; Patton, 8; Spurr, Garrey, and Ball, 1.
- Granite porphyry: Crawford, 4; Cross, Howe, and Irving, 1; Hills, R. C., 25; Lee, H. A., 9; Spurr, Garrey, and Ball, 1.
- Granitic breccia: Stone, 7.
- Granodiorite: Cross, Howe, and Irving, 1.
- Greenstone: Howe, 1.
- Henson tuff: Cross, 43; Cross, Howe, and Irving, 1.

ROCKS DESCRIBED—Continued

- Hinsdale volcanic series: Cross, 43 (in Irving and Bancroft, 1).
- Hornblende andesite: Van Horn, 3.
- Hornblende-biotite diorite porphyrite: Patton, 10.
- Hornblende diorite porphyrite: Patton, 10.
- Hornblende gneiss: Patton, 7, 10; Spurr, Garrey, and Ball, 1.
- Hornblende monzonite porphyry: Cross and Ransome, 1; Cross and Spencer, 1.
- Hornblende schist: Crawford, 4; Cross, Howe, and Ransome, 1.
- Hornblende schist and amphibolite: Patton, 8.
- Hornblendite: Crawford, 4; Spurr, Garrey, and Ball, 1.
- Intermediate series: Cross and Purington, 1.
- Lacustrine sands: Hastings, 1.
- Lamprophyre dike: Clarke, F. W., 8; Cross, 41; Cross, Howe, and Irving, 1.
- Lamprophyre: Clarke, F. W., 8; Crawford, 2; Hills, R. C., 15, 24, 25.
- Latite: Clarke, F. W., 8; Crawford, 2, 3, 4; Cross, Howe, and Irving, 1; Clarke, F. W., 8.
- Latite-phonolite: Clarke, F. W., 8; Miller, G. W., 1.
- Latite porphyry: Crawford, 2, 3, 4; George and Crawford, 1; Graton, 1; Underhill, 4.
- Leucitophyre: Graton, 1.
- Limbargite: Crawford, 2; Stevens, E. A., 1, 2.
- Limestone, crystallized: Kedzie, 1.
- Limestone, magnesian: Farish, 3.
- Marble: Crawford, 4.
- Mica andesite: Blake, J. C., 1.
- Mica dacite: Cross, 27.
- Mica schist: Clarke, F. W., 8; Crawford, 4.
- Micaceous granite: Clarke, F. W., 8.
- Minette: Stose, 1.
- Monchiquite: Clarke, F. W., 8.
- Monzonite: Ball, 1; Cross, 41; Cross and Ransome, 1; Cross and Spencer, 1; Cross, Spencer, and Purington, 1.
- Monzonite-diorite: Crawford, 4.
- Monzonite porphyry: Clarke, 8; Crawford, 4; Cross, 41; Hills, R. C., 15, 25; Patton, 8; Ransome, 5.
- Nepheline basalt: Cross and Penrose, 1; Stevens, 2.
- Nepheline dolerite: Conkling, 2.
- Nepheline phonolite: Graton, 1.
- Nepheline syenite: Cross and Penrose, 1.
- Olivine basalt: Clarke, 8; George and Crawford, 1; Grout, Worcester, and Henderson, 1.
- Olivine-bearing augite vogesite: Stose, 1.
- Olivine-plagioclase basalt: Stose, 1.
- Olivine syenite: Graton, 1.
- Olivinitic marble: Crawford, 4.
- Opicalcite: Crawford, 4.
- Pegmatite: Ball, S., 1; Finlay, G. I., 2; Crawford, 4; George, 3; Mg. Sci., 2; Patton, 8, 10; Spurr and Garrey, 1; Spurr, Garrey, and Ball, 1; Underhill, 4.
- Pegmatite, corundum-bearing: Finlay, G. I., 1, 2.
- Peridotite: Cross, 11, 12, 27.
- Phonolite: Cross, 10, 24; Cross and Penrose, 1; Graton, 1; Lakes, 143; Miller, G. W., 1.
- Picayune andesite: Cross, Howe, and Ransome, 1.
- Picayune volcanic group: Cross, 43 (in Irving and Bancroft, 1).
- Pitchstone porphyry: Crawford, 4.
- Plagioclase basalt: Cross and Penrose, 1; Lee, H. A., 9.
- Porphyrite: Cross, 23; Emmons, 2, 9; Emmons, Cross, and Eldridge, 1.
- Porphyritic biotite granite: Spurr, Garrey, and Ball, 1.
- Porphyritic diorite: Emmons, Cross, and Eldridge, 1.
- Porphyritic granite: Crawford, 4; Cross and Howe, 1.

ROCKS DESCRIBED—Continued

- Porphyritic lamprophyre: Clarke, F. W., 8.
 Porphyry, Aspen type: Henrich, 2; Lakes, 2.
 Porphyry, Bear Mountain type: Patton, 7.
 Porphyry, Calico Peak type: Cross and Ransome, 1; Cross and Spencer, 1.
 Porphyry, Georgetown type: Spurr and Garrey, 1.
 Porphyry, granite: Patton, 7.
 Porphyry, gray: Emmons, 9.
 Porphyry, Grayback type: Patton, 8.
 Porphyry, green: Emmons, 9.
 Porphyry, Hahns Peak type: George and Crawford, 1.
 Porphyry, Leadville or White: Emmons, 3, 9; Gale, 1; Julien, 1; Lakes, 5, 21; Patton, 10.
 Porphyry, Lincoln: Emmons, 9; Patton, 10.
 Porphyry, Monarch-Garfield: Crawford, 3.
 Porphyry, Mosquito: Emmons, 9.
 Porphyry, Mount Zion: Emmons, 9.
 Porphyry, Sacramento: Emmons, 9.
 Porphyry, Silverheels: Emmons, 9.
 Porphyry, Silverton type: Cross and Howe, 1.
 Porphyry: Emmons, 2; Lakes, 5, 143; Patton, 7.
 Potosi volcanic series: Cross, Howe, and Ransome, 1; Cross, Howe, and Irving, 1; Cross and Purington, 1; Cross, 43 (in Irving and Bancroft, 1).
 Pringle andesite: Cross, 27.
 Pronolite (phonolite): Lakes, 18.
 Propylite: Comstock, 7.
 Prowersose (syenite lamprophyre): Cross, 34.
 Pyritiferous porphyry: Emmons, 9.
 Pyroxene andesite: Clarke, F. W., 8; Cross, Howe, and Ransome, 1; Cross, Howe, and Irving, 1.
 Pyroxene-hornblende andesite: Clarke, F. W., 8.
 Pyroxene latite: Cross, 43 (in Irving and Bancroft, 1).
 Pyroxene monzonite porphyry: Cross and Ransome, 1.
 Pyroxene: Crawford, 2.
 Quartz basalt: George and Crawford, 1.
 Quartz-biotite diorite: Patton, 10.
 Quartz-biotite latite: Clarke, F. W., 8.
 Quartz diorite: Crawford, 4; Larsen, 1; Mg. Sci., 2; Spurr, Garrey, and Ball, 1.
 Quartz diorite porphyrite: Patton, 10.
 Quartz gneiss: Spurr, Garrey, and Ball, 1.
 Quartz-hornblende diorite: Patton, 10.
 Quartz latite: Clarke, F. W., 8; Grout, Worcester, and Henderson, 1; Irving and Bancroft, 1; Larsen, 1.
 Quartz latite porphyry: Crawford, 4.
 Quartz monzonite: Clarke, F. W., 8; Crawford, 3, 4; Cross, Howe, and Ransome, 1; Cross, Howe, and Irving, 1.
 Quartz monzonite gneiss: Crawford, 4; Mg. Sci., 2; Irving and Bancroft, 1; Ransome, 5; Spurr, Garrey, and Ball, 1.
 Quartz monzonite porphyry: Clarke, F. W., 8; Crawford, 3, 4; Lee, W. T., 13; Patton, 10; Spurr, Garrey, and Ball, 1.
 Quartz porphyry: Cross, 23; Gunther, 1; Lakes, 21; Palmer, 1; Palmer and Fulton, 1; Patton, 8; Spurr, 1.
 Quartz-pyroxene latite: Clarke, F. W., 8.
 Quartz trachyte: Cross, 41.
 Quartzite: Crawford, 4; Cross, Howe, and Irving, 1; Cross and Spencer, 1; Kedzie, 1.
 Quartzite, lower: Emmons, 9; Kedzie, 1.
 Quartzite, Parting: Emmons, 9, 27; Spurr, 1.
 Quartzite, pink: Kedzie, 1.
 Riebeckite granite: Clarke, F. W., 8.
 Riebeckite rocks: Murgoci, 1.

ROCKS DESCRIBED—Continued

- Rhyolite: Clarke, F. W., 8; Comstock, 7; Crawford, 4; Cross, 8, 12, 23, 24, 27; Cross, Howe, and Ransome, 1; Cross, Howe, and Irving, 1; Cross and Penrose, 1; Cross and Purington, 1; Emmons, 9, 27; Emmons, Cross, and Eldridge, 1; George and Crawford, 1; Irving and Bancroft, 1; Graton, 1; Lakes, 18, 21, 143; Miller, G. W., 1; Stevenson, 8.
- Rhyolite porphyry: Crawford, 4.
- Rhyolitic vitrophyre: Clarke, F. W., 8.
- Sandstone: James, 1.
- Sandstone dike rock: Cross, 25.
- Sanidine rhyolite: Cross, 6.
- San Juan tuff: Cross, Howe, and Irving, 1; Cross, Howe, and Ransome, 1; Cross and Purington, 1; Cross, 43 (in Irving and Bancroft, 1).
- Schist: Berg, 1; Cross, 20; Cross, Howe, and Ransome, 1; Cross and Penrose, 1; Graton, 1; Howe, 1; Grout, Worcester, and Henderson, 1; Patton, 10.
- Silverton volcanic series: Cross, Howe, and Ransome, 1; Cross, 43 (in Irving and Bancroft, 1).
- Sodalite phonolite: Graton, 1.
- Smoky-quartz granite: Crawford, 4.
- Spherulites: Cross, 15; Patton, 2.
- Syenite: Clarke, F. W., 8; Cross, 12, 27; Crawford, 4; Graton, 1; Miller, G. W., 1.
- Syenite gneiss: Gunther, 1.
- Syenite porphyry: Cross, Spencer, and Purington, 1.
- Titanite phonolite: Graton, 1.
- Topaz rhyolite: Cross, 8.
- Tourmaline and tourmaline schists: Upham, 2.
- Trachorheites: Endlich, 1, 7; Peale, 7, 8.
- Trachydolerite: Clarke, F. W., 8; Graton, 1; Lindgren and Ransome, 3.
- Trachyte: Breed, 1; Clarke, F. W., 8; Comstock, 7; Conkling, 2; Cross, 12, 24, 27; Draper, 1; Lakes, 18, 21, 143; Miller, G. W., 1; Pearce, 1; Stevenson, 8.
- Trachytic phonolite: Cross and Penrose, 1.
- Tuff and breccia: Cross and Penrose, 1.
- Tuff, Burns: Cross, Howe, and Irving, 1.
- Tuff, Florissant: Wadsworth, 1.
- Tuff, Henson: Cross, Howe, and Irving, 1.
- Twilight granite: Cross, 41.
- Vanadiferous sandstone: Hess, 4.
- Vogesite: Clarke, F. H., 8; Graton, 1; Lee, H. A., 9.
- Volcanic breccia: Crawford, 4.
- Volcanic rocks: King, 1.

GEOLOGICAL FORMATIONS GROUPED ACCORDING TO AGE

(R. D. George.)

Where difference of opinion exists as to the age of formations, they are listed in two or more groups. In the less probable age groups the names are in parentheses.

Cenozoic

Quaternary (see *Quaternary* in the general index): *Quaternary*.—Continued.

Alluvial deposits.

Alluvium.

(Bishop Mountain Conglomerate.)

(Browns Park.)

Dune sand.

Eolian soil.

Glacial or Lake beds.

Loess.

Wash beds.

(Wyoming Conglomerate.)

GEOLOGICAL FORMATIONS GROUPED ACCORDING TO AGE—Continued

Cenozoic—Continued

Tertiary:

Alamosa.
 Alnwick.
 Amyzon.
 Animas.
 Arapahoe.
 Arikaree.
 Bad Lands group.
 Bishop Mountain Conglomerate.
 Bitter Creek.
 Bridger.
 Browns Park.
 Brule.
 Castle Conglomerate.
 Castle Rock Conglomerate.
 Ceratops beds.
 Chadron.
 Cuchara.
 Dawson Arkose.
 Denver.
 Florissant.
 Fort Union.
 High Park.
 Gallisteo.
 Green River.
 Horsetail Creek.
 Huerfano.
 Lacustrine (Scott, W. B., 3).
 Lake beds, in part.
 Loup Fork.
 Loup River.

Tertiary.—Continued.

Mauvaises Terres (White River).
 Middle Park.
 Monument Creek.
 Niobrara of King.
 Nussbaum.
 Ogalalla.
 Ohio.
 Ohio Creek.
 Pawnee Creek.
 Pliocene.
 (Point of Rocks).
 Poison Canyon.
 Post-Laramie.
 Puerco.
 Puerco Marl.
 Ruby.
 San Juan.
 San Miguel.
 Santa Fe.
 Shoshone.
 Telluride.
 Titanotherium beds.
 Uinta.
 Vermillion Creek.
 Wasatch (Wahsatch).
 Washakie.
 White River.
 Wind River.
 Wyoming Conglomerate.

Mesozoic

Cretaceous:

(Animas beds.)
 Apishapa.
 (Arapahoe.)
 (Bad Lands group.)
 Benton.
 (Bitter Creek.)
 Bowie.
 Carlile.
 (Ceratops beds.)
 Colorado.
 Comanche.
 (Cuchara.)
 Dakota.

Cretaceous.—Continued.

(Denver.)
 Escarpment sandstone.
 Fox Hills.
 Graneros.
 Greenhorn.
 Halymenites.
 Hell Creek.
 Henrys Fork.
 (Huerfano.)
 Hygiene.
 Judith River.
 Laramie.
 Lewis.

GEOLOGICAL FORMATIONS GROUPED ACCORDING TO AGE—Continued

Mesozoic—Continued

Cretaceous.—Continued.

Lignitic.
 Mancos.
 Mesaverde.
 (Middle Park.)
 Montana.
 (Monument Creek.)
 (Morrison.)
 Niobrara.
 (Ohio and Ohio Creek.)
 Paonia.
 Pictured Cliff.
 Pierre.
 Platte series.
 Point of Rocks.
 (Poison Canyon.)
 Purgatoire.
 Rollins.
 (Ruby and Ruby Creek.)
 Salt Wells.
 Sulphur Creek.
 Tepee zone (Pierre).
 Timpas.
 Trinidad.
 Trout Creek.
 Twenty Mile.
 Vermejo.

Jurassic:

Atlantosaurus beds.
 Baptonodon beds.
 Flaming Gorge.
 Gunnison.
 La Plata.
 McElmo.
 Mariposite Sandstone.
 Morrison.
 Red Beds, in part.
 Sauranodon.
 Saurian Conglomerate.
 Saurian Sandstone.
 Sundance.
 White Cliff.

Triassic:

Chugwater, possibly upper part.
 Dolores.
 Lykins, possibly upper part.
 Red Beds, in part.
 Shinarump, in part.
 Upper Wyoming, possibly upper part.
 Vermilion Cliff.
 Wyoming, possibly part of the Upper Wyoming.

Paleozoic

Permian:

Chugwater, lower part, possibly all.
 Crinkled Sandstone, probably.
 Cutler.
 Jaque Mountain.
 Kangaroo, probably Permo-Pennsylvanian.
 Lykins, lower part.
 Maroon, upper may be Permian.
 Permo-Carboniferous of King, and in part the Permo-Carboniferous of other early writers.
 Red Beds.
 Rico.
 Shinarump, in part.
 Upper Carboniferous of Hayden geologists and other early workers, in part.
 Upper Wyoming, in large part.
 Wyoming, part of Upper Wyoming.

Pennsylvanian (Upper Carboniferous):

Arkansas Sandstone.
 Aubrey.
 Badito.
 Carboniferous (undivided) of earlier writers, in part.
 Casper.
 Coal Measures (Carboniferous). The same name has been applied to Cretaceous coal strata.
 Creamy Sandstone.
 Fountain.
 Garfield.
 Gleneyrie.
 Hermosa.
 Kangaroo, probably Permo-Pennsylvanian.
 Lower Wyoming.
 Lyons.

GEOLOGICAL FORMATIONS GROUPED ACCORDING TO AGE—Continued

Paleozoic—Continued

- Pennsylvanian (Upper Carboniferous).*
 —Continued.
 Middle Carboniferous of Hayden geologists is largely Pennsylvanian.
 Pennsylvanian.
 Red Beds, in part.
 Red Wall, probably Mississippian at the base.
 Robinson Limestone.
 Shinarump, in part.
 Tensleep.
 (Uinta Sandstone.)
 Upper Carboniferous of earlier literature, in part.
 Upper Coal Measures of the King Survey are probably equivalent to the Weber (Pennsylvanian), and the Wasatch (Mississippian), of the Wasatch Mountains.
 Wasatch, upper part.
 Weber Grits.
 Weber Limestone.
 Weber Sandstone (Uinta Mountains).
 Weber Shale.
- Mississippian (Lower Carboniferous):*
 Blue Limestone, upper part.
 Brown Limestone (Aspen).
 Leadville Limestone, upper part.
 Lower Carboniferous. The Hayden geologists appear to have used this term as a name for the lowest Carboniferous rocks locally present, without regard to their place in a full Carboniferous section.
 Millsap.
 Ouray, upper part.
 Red Beds, in part.
 Red Wall, possibly lower part.
 Wasatch, lower part.
- Devonian:*
 Blue Limestone, lower part.
 Elbert.
 Leadville Limestone, lower part.
 Ouray, lower part.
 (Parting Quartzite, probably Ordovician.)
- Devonian.—Continued.*
 (Uinta Sandstone, probably Pre-Cambrian.)
- Silurian (Upper Silurian):*
 Silurian strata have not been found in Colorado. The "Silurian" of the Hayden geologists includes strata ranging in age from Cambrian to middle Devonian. That of the earlier literature of the present U. S. Geological Survey is mainly Ordovician. The "Niagara" of the Hayden geologists is probably Ordovician.
- Ordovician (Lower Silurian):*
 Calciferous.
 Canadian.
 Fremont.
 Harding.
 Lower Paleozoic, includes Ordovician.
 Manitou.
 Niagara of Hayden Survey.
 Ogden, possibly Devonian.
 Parting Quartzite.
 Quebec, mainly.
 Silurian. *See above.*
 Tomichi.
 Trenton.
 White Limestone.
- Cambrian:*
 Ignacio.
 Lodore.
 Lower Quartzite.
 Potsdam.
 Primordial.
 Quebec group, in part.
 Saratogan.
 Sawatch.
 Silurian of the earlier literature contains Cambrian.
 (Uinta sandstone, probably Pre-Cambrian.)
 Ute limestone, variously regarded as Cambrian, Ordovician, Silurian, Carboniferous, etc.
 (White Limestone, probably Ordovician.)

GEOLOGICAL FORMATIONS GROUPED ACCORDING TO AGE—Continued

Proterozoic

Pre-Cambrian (see general index):

Algonkian.
Huronian.
Idaho Springs.
Irving Greenstone.
Laurentian.
Needle Mountains.
Pre-Cambrian, general.
Red Creek Quartzite.

Pre-Cambrian.—Continued.

Uinta Quartzite (Sandstone) has been assigned to every age from Pennsylvanian to pre-Cambrian.
Uncompahgre.
Vallecito.
Weber Quartzite of King, regarded by him as Pennsylvanian and Mississippian, but probably equivalent to the Uinta.

GEOLOGICAL FORMATIONS DESCRIBED

- Alamosa formation, San Luis Valley: Siebenthal, 4.
Algonkian: *See* Algonkian in general index.
Alluvial deposits, Breckenridge: Lakes, 199.
Alluvium, Quaternary: Darton, 13.
Alnwick lake beds, Pikes Peak district: Cross, 24.
Amyzon shales: Clark, W. B., 1; Cope, 43; Scudder, 12; Smith, J. H., 1.
Animas, Durango-Gallup field: Shaler, 1.
Animas: Cross, 18; Hills, R. C., 10; Howe, 2; Spencer, A. C., 1.
Apishapa, Apishapa quadrangle: Stose, 1.
Apishapa, Arkansas Valley: Darton, 9; Gilbert, 5.
Apishapa, Cretaceous: Darton, 13.
Apishapa, Elmoro quadrangle: Hills, R. C., 24.
Apishapa, Nepesta quadrangle: Fisher, 1.
Apishapa, Spanish Peaks: Hills, R. C., 25.
Apishapa, Walsenburg quadrangle: Hills, R. C., 15.
Arapahoe, Castle Rock district: Lee, W. T., 5; Richardson, 4.
Arapahoe, Cretaceous (?): Darton, 13.
Archean: *See* Archean in general index.
Arapahoe, Denver Basin: Cannon, 10; Eldridge, 2; Emmons, Cross, and Eldridge, 2.
Arapahoe, eastern Colorado: Darton, 7; Richardson, 4.
Arapahoe: Cross, 18; Geijsbeek, 1; Hatcher, 3; Stanton and Knowlton, 1; Washburne, 5.
Arikaree: Cragin, 3; Darton, 9, 13; Osborn, 4.
Arkansas sandstone: Butters, 2; Endlich, 1, 5; Girty, 2.
Atlantosaurus beds: Emmons, Cross, and Eldridge, 2; White, 19.
Aubrey: Girty, 2; Powell, 3.
Badito, Walsenburg quadrangle: Hills, R. C., 15.
Badito: Butters, 2; Girty, 2.
Bad Land group: Holmes, 2.
Baptanodon beds: White, 19.
Bellerophon limestone: Girty, 2; Powell, 3.
Benton shale, Anthracite-Crested Butte quadrangle: Emmons, Cross, and Eldridge, 1.
Benton, Apishapa quadrangle: Stose, 1.
Benton, Arkansas Valley: Gilbert, 5.
Benton, Boulder district: Fenneman, 5.
Benton, Castle Rock: Lee, W. T., 5.
Benton, Cretaceous: Darton, 9.
Benton, Denver Basin: Cannon, 10; Emmons, Cross, and Eldridge, 2.
Benton, eastern Colorado: Darton, 7.
Benton, Florence: Eldridge, 4.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

- Benton, Hahns Peak: Gale, 1.
 Benton, Rabbit Ears region: Grout, Worcester, and Henderson, 1.
 Benton, San Juan: Comstock, 7.
 Benton, southeastern Colorado: Stevenson, 8.
 Benton, southern Colorado: Stevenson, 12.
 Benton, Yampa: Fenneman and Gale, 1.
 Benton: Eldridge, 1; Geijsbeek, 1; Hayden, 6, 19; Henderson, J., 10; King, 1; Lakes, 117, 165; Logan, 1; Martin, 1; Marvine, 1; Peale, 7; Ries, 1; Spencer, 1.
 Bishop Mountain conglomerate: Gale, 8; Powell, 3.
 Bitter Creek: Peale, 7; Powell, 3; Scott, W. B., 2; Stanton and Knowlton, 1.
 Blue limestone, Alma: Patton, 10.
 Blue limestone, Aspen: Henrich, 2; Newberry, 16; Spurr, 1.
 Blue limestone, Carboniferous: Emmons, 9; Spurr, 1.
 Blue limestone, Leadville: Emmons and Irving, 1; Girty, 2.
 Blue limestone, San Miguel County: Spaulding, 1.
 Blue limestone, Tenmile district: Emmons, 27.
 Bowie, Grand Mesa district: Lee, W. T., 13.
 Bridger beds, Huerfano lake basin: Cross, 18; Osborn, 1, 2, 4; Osborn and Wortman, 3.
 Bridger beds, northwestern Colorado: Powell, 3; Smith, J. H., 1; White, 4.
 Bridger beds: Cope, 54, 60; Hills, R. C., 19; King, 1; Peale, 7; Scott, W. B., 2, 3; White, 26b.
 Brown limestone, Aspen: Henrich, 2; Newberry, 16.
 Browns Park formation: Gale, 7, 8; Hague and Emmons, 1; King, 1; Powell, 3; White, 26.
 Brule: Darton, 9; Osborn, 4.
 Calcareous: Hayden, 19; Peale, 7.
 Canadian: Peale, 7.
 Carlile, Arkansas Valley: Gilbert, 5.
 Carlile, Cretaceous: Darton, 13.
 Carlile, eastern Colorado: Darton, 7.
 Carlile, Elmore quadrangle: Hills, R. C., 24.
 Carlile, Nepesta quadrangle: Fisher, 1.
 Carlile, Pueblo quadrangle: Gilbert, 7.
 Carlile, Spanish Peaks: Hills, R. C., 25.
 Carlile, Walsenburg: Hills, R. C., 15.
 Castle Rock conglomerate: Lee, W. T., 5; Richardson, 4.
 Ceratops beds, Wyoming, Converse County: Hatcher, 1.
 Ceratops beds: Hatcher, 1, 3; Marsh, in Emmons, Cross, and Eldridge, 2; Knowlton, 3; Stanton, 5.
 Chadron: Darton, 9; Osborn, 4.
 Chart of formations from folios: Underhill, 3.
 Chugwater: Darton, 7, 9, 13; Girty, 2.
 Coal measures, age of: Chauvenet, 10.
 Coal measures, Rio Blanco County: Gale, 2.
 Coal measures, southeastern Colorado: van Diest, 10.
 Coal measures: Holmes, 2; King, 1; Lakes, 186; Peale, 8.
 Colorado, Aspen (Niobrara): Spurr, 1.
 Colorado, Colorado Range: Hague and Emmons, 1.
 Colorado, Denver Basin: Eldridge, 2; Emmons, Cross, and Eldridge, 2.
 Colorado, North Park: Grout, Worcester, and Henderson, 1; Hague and Emmons, 1.
 Colorado, northwestern Colorado: White, 4.
 Colorado, Perry Park district: Kruger, Hamilton, and Enriquez, 1.
 Colorado, Pikes Peak district: Cross, 24.
 Colorado, Rabbit Ears region: Grout, Worcester, and Henderson, 1.
 Colorado, shales: Hewett, 1.
 Colorado, southeastern division: Endlich, 4.
 Colorado, usage of term: Eldridge, 1.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

- Colorado: Henderson, J., 10; Holmes, 2; King, 1; Stevenson, 7, 13; White, 26.
- Comanche, Apishapa: Stose, 1.
- Comanche, correlation with Dakota: Stanton, 3.
- Comanche, Cretaceous, Darton, 9, 13.
- Comanche, eastern Colorado: Darton, 7.
- Comanche, southeastern Colorado: Darton, 11.
- Comanche (?): Henderson, J., 10.
- Creamy sandstone, eastern foothills: Butters, 2; Emmons, Cross, and Eldridge, 2; Fenneman, 5.
- Crinkled sandstone, eastern foothills: Butters, 2; Fenneman, 5; Henderson, 10.
- Cuchara, Cretaceous (?): Darton, 13.
- Cuchara, Spanish Peaks: Hills, R. C., 25.
- Cuchara, Trinidad: Richardson, 2.
- Cuchara, Walsenburg: Hills, R. C., 15.
- Cuchara: Hills, R. C., 19.
- Cutler, Durango quadrangle: Emmons, W. H., 1.
- Cutler, Engineer Mountain quadrangle: Cross, 41.
- Cutler, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
- Cutler, Ouray district: Irving, 2.
- Cutler, Rico quadrangle: Cross and Ransome, 1.
- Cutler, San Juan: Cross, 35; Cross and Howe, 1.
- Cutler, Silverton: Cross, Howe, and Ransome, 1; Cross, Howe, and Irving, 2; Howe, 2.
- Cutler: Butters, 2.
- Dakota, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
- Dakota, Apishapa quadrangle: Stose, 1.
- Dakota, Arkansas Valley: Darton, 9, 13; Gilbert, 5.
- Dakota, Aspen: Spurr, 1.
- Dakota, Book Cliffs district: Richardson, 1.
- Dakota, Boulder district: Fenneman, 5; Henderson, J., 3.
- Dakota, Breckenridge district: Ransome, 5.
- Dakota, coal in: Stone, 8.
- Dakota, Colorado group: Hague and Emmons, 1.
- Dakota, Cretaceous: Darton, 9, 13; Spurr, 1.
- Dakota, Denver Basin: Cannon, 10; Eldridge, 2; Emmons, Cross, and Eldridge, 2.
- Dakota, Durango-Gallup field: Shaler, 1.
- Dakota, eastern Colorado: Darton, 7.
- Dakota, Elk Range: Holmes, 1.
- Dakota, Elmoro quadrangle: Hills, R. C., 24.
- Dakota, Engineer Mountain quadrangle: Cross, 41.
- Dakota, Florence: Eldridge, 5.
- Dakota formation, relation to Comanche: Stanton, 3.
- Dakota, Front Range: Stanton, 3.
- Dakota, Grand Mesa: Lee, W. T., 13.
- Dakota, Grand River district: Peale, 12.
- Dakota, Grand River Valley: Riggs and Farrington, 1.
- Dakota, Hahns Peak: Gale, 1; George and Crawford, 1.
- Dakota, LaPlata Mountains: Cross, Spencer, and Purington, 1.
- Dakota, Montrose County: Emmons, W. H., 3.
- Dakota, Morrison, relation to: Stanton, 3.
- Dakota, Nepesta quadrangle: Fisher, 1.
- Dakota, North Park: Grout, Worcester, and Henderson, 1; Hague and Emmons, 1.
- Dakota, northwestern Colorado: Gale, 8; Henderson, J., 13; White, 4.
- Dakota, ore in: Lakes, 135.
- Dakota, Ouray district, upper quartzite: Irving, 2.
- Dakota, Perry Park: Kruger, Hamilton, and Enriquez, 1.
- Dakota, Pikes Peak: Cross, 24.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

- Dakota, Placerville: Hillebrand and Ransome, 1.
- Dakota, Pueblo quadrangle: Gilbert, 7.
- Dakota, Rabbit Ears region: Grout, Worcester, and Henderson, 1.
- Dakota, Rico quadrangle: Cross and Ransome, 1.
- Dakota, Rio Blanco County: Gale, 2, 5.
- Dakota, San Juan: Comstock, 7.
- Dakota, southeastern division: Endlich, 4; Lee, W. T., 4, 7; Stevenson, 8.
- Dakota, southern Colorado: Stevenson, 12.
- Dakota, Telluride: Cross and Purginton, 1, 2.
- Dakota, Uncompahgre region: Sieben-thal, 1.
- Dakota, Walsenburg: Hills, R. C., 15.
- Dakota, Yampa: Fenneman and Gale, 1, 2.
- Dakota: Cross, Howe, and Irving, 1; Endlich, 5; Gale, 7; Gardner, J. H., 1; Geijsbeek, 1; Hayden, 6, 12, 14, 19, 22; Henderson, J., 10; Holmes, 6; King, 1; Lakes, 67, 95, 117, 165; Lee, W. T., 9, 10; Martin, 1; Marvinne, 1; Peale, 7, 8; Ries, 1; Spencer, A. C., 1; Stevenson, 7; White, 26.
- Dawson arkose, Castle Rock area: Richardson, 4.
- Denver beds, age of: Cross, 13, 18, 19, 38; Knowlton, 3; Stanton, 5.
- Denver, Cretaceous (?): Darton, 13.
- Denver, Denver Basin: Cannon, 6, 10; Eldridge, 3; Emmons, Cross, and Eldridge, 2; Lakes, 165; Richardson, 4.
- Denver, eastern Colorado: Darton, 7.
- Denver, lacustrine or fluviatile?: Davis, W. M., 5.
- Denver, Tertiary: Cross, 13.
- Denver: Cross, 18; Dall, 1; Hatcher, J. B., 3; Spencer, A. C., 1; Washburne, 5.
- Doleritic breccia: Cross, 19.
- Dolores, LaPlata Mountains: Cross and Spencer, 1.
- Dolores, Montrose County: Emmons, W. H., 3.
- Dolores, Ouray district: Irving, 2; Purginton, 3.
- Dolores, Placerville: Hillebrand and Ransome, 1.
- Dolores, Rico quadrangle: Cross and Ransome, 1; Cross and Spencer, 1.
- Dolores, San Juan: Cross and Howe, 1.
- Dolores, Telluride: Cross and Purginton, 1.
- Dolores: Butters, 2; Cross, Howe, and Irving, 1; Hess, 4; Howe, 2; Lee, H. A., 9.
- Dune sands, Quaternary: Darton, 13.
- Elbert, Engineer Mountain quadrangle: Cross, 41.
- Elbert, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
- Elbert, Ouray district: Irving, 2.
- Elbert, Silverton: Cross, Howe, and Ransome, 1.
- Elbert: Cross, 33; Cross, Howe, and Irving, 1; Howe, 2.
- Eolian soil: San Juan: Cross, 37.
- Eolus granite, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
- Escarpment, lower: Holmes, 2.
- Escarpment, upper: Holmes, 2.
- Flaming Gorge, Rio Blanco field: Gale, 5, 8.
- Flaming Gorge: Powell, 3.
- Florissant lake beds, Pikes Peak district: Cross, 24.
- Fort Union group: Hayden, 19; Knowlton, 1; Newberry, 17; Smith, J. H., 1; Weed, 1a.
- Fountain, age of: Finlay, G. I., 3.
- Fountain, Boulder district: Butters, 2; Fenneman, 5.
- Fountain, Boulder and Larimer counties: Martin, 1.
- Fountain (?), Cripple Creek: Lindgren and Ransome, 3.
- Fountain, Manitou district: Finlay, G. I., 3.
- Fountain, Pikes Peak district: Cross, 24.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

- Fountain, Pueblo: Gilbert, 7.
- Fountain: Butters, 2; Girty, 2; Henderson, J., 10, 11.
- Fox Hills, Arkansas Valley: Gilbert, 5.
- Fox Hills, Boulder district: Fenneman, 5.
- Fox Hills, Castle Rock district: Lee, W. T., 5.
- Fox Hills, Cretaceous: Darton, 9, 13.
- Fox Hills, Denver Basin: Cannon, 10; Eldridge, 2; Emmons, Cross, and Eldridge, 2.
- Fox Hills, eastern Colorado: Cannon, 5; Darton, 7; Hayden, 20.
- Fox Hills, Florence: Eldridge, 5.
- Fox Hills, Grand River district: Peale, 12.
- Fox Hills, northwestern Colorado: White, 4, 26.
- Fox Hills, paleobotany: Cockerell, 9.
- Fox Hills, paleontology: Cragin, 2.
- Fox Hills, San Juan: Comstock, 7.
- Fox Hills southeastern division: Endlich, 4.
- Fox Hills, southern Colorado: Stevenson, 12.
- Fox Hills: Cope, 19; Eldridge, 1; Endlich, 5; Geijsbeek, 1; Hayden, 6, 19; Henderson, J., 10; King, 1; Lakes, 95, 165; Martin, 1; Marvine, 1; Newberry, 16; Peale, 7; Ries, 1; Spencer, A. C., 1; Stevenson, 5.
- Fremont limestone, Canon City: Walcott, 3.
- Fremont limestone, eastern Colorado: Darton, 7.
- Fremont limestone, Ordovician: Darton, 9, 13.
- Fremont limestone, Pikes Peak: Cross, 24.
- Fremont limestone: Darton, 14; Girty, 2.
- Gallisteo sand group: Hayden, 6, 12; Peale, 7.
- Garfield, Monarch-Tomichi: Crawford, 4.
- Glacial or lake beds, Mosquito Range: Emmons, 9.
- Gleneyrie, Manitou district: Finlay, G. I., 3.
- Graneros, Arkansas Valley: Gilbert, 5.
- Graneros, Apishapa quadrangle: Stose, 1.
- Graneros shale, Cretaceous: Darton, 13.
- Graneros shale, eastern Colorado: Darton, 7.
- Graneros shale, Elmore quadrangle: Hills, R. C., 24.
- Graneros shale, Nepesta quadrangle: Fisher, 1.
- Graneros shale, Pueblo quadrangle: Gilbert, 7.
- Graneros shale, Walsenburg: Hills, R. C., 15.
- Granitic rocks: Hollister, 1.
- Gray porphyry, Leadville: Emmons and Irving, 1.
- Greenhorn, Apishapa quadrangle: Stose, 1.
- Greenhorn, Arkansas Valley: Gilbert, 5.
- Greenhorn, Cretaceous: Darton, 13.
- Greenhorn, eastern Colorado: Darton, 7.
- Greenhorn, Elmore quadrangle: Hills, R. C., 24.
- Greenhorn, Nepesta quadrangle: Fisher, 1.
- Greenhorn, Pueblo quadrangle: Gilbert, 7.
- Greenhorn, Walsenburg quadrangle: Hills, R. C., 15.
- Green River, Grand Mesa: Lee, W. T., 13.
- Green River, Grand River district: Peale, 12.
- Green River, northwestern Colorado: Gale, 8; Powell, 3; White, 4, 26.
- Green River, Río Blanco oil fields: Gale, 5.
- Green River: Endlich, 5; Gale, 7; King, 1; Lee, W. T., 10; Peale, 7.
- Gunnison, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
- Gunnison, Aspen: Spurr, 1.
- Gunnison, Grand Mesa: Lee, W. T., 13.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

- Gunnison, Telluride: Purington, 2.
 Gunnison: Lee, W. T., 10, 13.
 Halymenites sandstone: Hewett, 1; Stevenson, 8.
 Harding sandstone, Canon City: Walcott, 3.
 Harding sandstone, eastern Colorado: Darton, 7.
 Harding sandstone, Ordovician: Darton, 9, 13.
 Harding sandstone, Pikes Peak: Cross, 24.
 Harding sandstone, Pueblo quadrangle: Gilbert, 7.
 Harding sandstone: Darton, 14; Girty, 2.
 Hell Creek beds: Brown, B., 1; Knowlton, 3; Stanton, 5.
 Henrys Fork group: Peale, 8; Powell, 3.
 Hermosa, Engineer Mountain quadrangle: Cross, 41.
 Hermosa, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
 Hermosa, Ouray district: Irving, 2; Purington, 3.
 Hermosa, Rico quadrangle: Cross and Ransome, 1; Cross and Spencer, 1.
 Hermosa, Silverton: Cross, Howe, and Ransome, 1.
 Hermosa: Cross, Howe, and Irving, 1; Girty, 2; Howe, 2.
 High Park beds, Pikes Peak district: Cross, 24; Cross and Penrose, 1.
 Horsetail Creek: Darton, 9; Osborn, 4.
 Huerfano, Spanish Peaks: Hills, R. C., 25.
 Huerfano, Trinidad: Richardson, 2.
 Huerfano: Cross, 18; Hills, R. C., 13, 19; Lakes, 156; Osborn, 2; Smith, J. H., 1; Weller, 1.
 Huronian: Hague and Emmons, 1; King, 1.
 Hygiene sandstone: Fenneman, 5; Henderson, J., 10.
 Idaho Springs: Patton, 7; Spurr, Garey, and Ball, 1.
 Ignacio quartzite, Engineer Mountain: Cross, 41.
 Ignacio quartzite, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
 Ignacio quartzite, Rico Mountains: Cross and Ransome, 1.
 Ignacio quartzite, Silverton: Cross, Howe, and Ransome, 1.
 Ignacio quartzite: Cross, 33; Cross, Howe, and Irving, 1; Howe, 2.
 Ingleside, eastern foothills: Butters, 2.
 Irving greenstones, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
 Jaque Mountain: Emmons, 27.
 Judith River beds: Peale, 18; Stanton and Knowlton, 1.
 Kangaroo: Monarch-Tomichi: Crawford, 4.
 Lacustrine: Scott, W. B., 3.
 Lake beds, age of: Cross, 18.
 Lake beds, Hahns Peak: George and Crawford, 1.
 Lake beds, Leadville: Emmons, 2; Emmons and Irving, 1.
 Lake beds, Mosquito Range: Emmons, 9.
 Lake beds: Cross, 27; Marvine, 1.
 Lake beds. *See also* Alnwick, High Park, Middle Park, etc.
 LaPlata sandstone: Engineer Mountain, Cross, 41.
 LaPlata, Montrose County: Emmons, W. H., 3.
 LaPlata, ore deposits in: Lindgren, 9.
 LaPlata, Ouray district: Irving, 2.
 LaPlata, Placerville: Hess, 4; Hillebrand and Ransome, 1, 2; Lindgren, 9.
 LaPlata, Rico Mountains: Cross and Spencer, 2.
 LaPlata, sandstone: Cross, Howe, and Irving, 1; Cross and Ransome, 1; Cross and Spencer, 1; Hess, 4; Howe, 2; Lee, H. A., 9; Lindgren, 9.
 LaPlata, San Juan: Cross and Howe, 2.
 LaPlata, Telluride: Cross and Purington, 1; Purington, 2.
 LaPlata: Cross, 35; Girty, 2; Woolsey, 1.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

- Laramie, age of: Bannister, 1; Cross, 18; Knowlton, 3; Stanton, 5; Veach, 1.
- Laramie, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
- Laramie, Aspen: Spurr, 1.
- Laramie, Boulder: Fenneman, 5.
- Laramie, Castle Rock: Lee, W. T., 5.
- Laramie, coal-bearing: Hills, R. C., 22; Lakes, 149.
- Laramie, correlation: White, 7.
- Laramie, Crested Butte: Warren, E. R., 2.
- Laramie, Cretaceous: Darton, 9, 13.
- Laramie, Denver Basin: Cannon, 10; Cross, 3, 13; Eldridge, 2; Emmons, Cross, and Eldridge, 2.
- Laramie, Durango coal field: Taff, 1.
- Laramie, Durango-Gallup field: Shaler, 1; Shaler and Gardner, 1.
- Laramie, eastern Colorado: Darton, 7.
- Laramie, Elmoro quadrangle: Hills, R. C., 24.
- Laramie, extent and correlation: White, 7.
- Laramie, Florence: Eldridge, 5.
- Laramie, Grand River district: Peale, 12.
- Laramie, Hahns Peak: George and Crawford, 1.
- Laramie, literature: Hay, O. P., 3.
- Laramie, northwestern Colorado: Gale, 8; White, 4, 26.
- Laramie, ore in: Lakes, 135.
- Laramie, origin: Veatch, 1.
- Laramie, paleontology: Hollick, A., 2.
- Laramie, relation to earlier and later formations: White, 25.
- Laramie, Routt County: E. and M. J., 37.
- Laramie, Shoshone group: Cross, 38.
- Laramie, southeastern Colorado: Stevenson, 8; van Diest, 10.
- Laramie, southern Colorado: Stevenson, 6, 10, 12.
- Laramie, Spanish Peaks: Hills, R. C., 25.
- Laramie, Trinidad: Richardson, 2.
- Laramie, Walsenburg quadrangle: Hills, R. C., 15.
- Laramie, western Wyoming and adjacent regions: Peale, 13.
- Laramie, Yampa: Fenneman and Gale, 2.
- Laramie: Eldridge, 1; Endlich, 5; Gale, 7; Gardner, J. H., 1; Geijsbeek, 1; Hayden, 19; Henderson, J., 10; Howe, 2; King, 1; Lakes, 95, 117, 165; Lee, W. T., 11, 12, 14; Martin, 1; Newberry, 12, 16; Peale, 17; Spencer, A. C., 1; Stevenson, 7; Washburne, 5.
- Laurentian: Hague and Emmons, 1; Hunt, 4; King, 1.
- Leadville limestone. *See also* Blue limestone.
- Leadville limestone, Alma: Patton, 10.
- Leadville limestone, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
- Leadville limestone, Aspen, Carboniferous: Spurr, 1.
- Leadville limestone: Raymond, 11.
- Leadville porphyry, Alma: Patton, 10.
- Lewis shale, Durango-Gallup field: Shaler, 1; Shaler and Gardner, 1.
- Lewis shale, LaPlata Mountains: Cross and Spencer, 1.
- Lewis shale, northwestern Colorado: Gale, 8.
- Lewis shale, Yampa: Fenneman and Gale, 2.
- Lewis shale: Gale, 7; Lee, W. T., 14.
- Lignites, age of: Cope, 12; Stevenson, 3.
- Lignitic, age of Laramie: Bannister, 1.
- Lignitic, Denver: Brooks, 1; Mally, 1.
- Lignitic, eastern Colorado: Hayden, 20.
- Lignitic, Golden: Berthand, 2.
- Lignitic, Marshall mine: Hayden, 15.
- Lignitic, paleontology: Lesquereux, 2.
- Lignitic, Rocky Mountain region: Lesquereux, 5, 6.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

- Lignitic, southeastern division: Endlich, 4.
- Lignitic: Cross, 19; Dana, J. D., 2; Endlich, 1; Hayden, 14, 18, 19, 22; Holmes, 2; Marvine, 1; Peale, 5, 7; West, H. T., 1.
- Lodore group: Berkey, 1; Emmons, 32; Gale, 8; Hague and Emmons, 1; King, 1; Powell, 3; Weeks, 15.
- Loup Fork: Cope, 54, 60.
- Loup River beds: Hayden, 19.
- Lower Carboniferous, Aspen: Henrich, 2; Newberry, 16. *See* Brown limestone.
- Lower quartzite, Cambrian: Emmons, 9.
- Lower quartzite, Leadville: Emmons and Irving, 1.
- Lykins, Boulder district: Butters, 2; Fenneman, 5.
- Lykins: Henderson, J., 10; Martin, 1.
- Lyons, Boulder and Larimer counties: Butters, 2; Fenneman, 5; Martin, 1.
- Lyons, stains on: Tillman, 1.
- Lyons: Henderson, J., 10.
- Mancos, Book Cliffs: Richardson, 1.
- Mancos, Cretaceous section: Stanton, 2.
- Mancos, Durango coal field: Taff, 1.
- Mancos, Durango-Gallup field: Shaler, 1; Shaler and Gardner, 1.
- Mancos, Engineer Mountain: Cross, 41.
- Mancos, Grand Mesa: Lee, W. T., 13.
- Mancos, Hahns Peak: George and Crawford, 1.
- Mancos, LaPlata Mountains: Cross, Spencer, and Purington, 1.
- Mancos, Ouray district: Irving, 2.
- Mancos, northwestern Colorado: Gale, 8; Henderson, J., 13.
- Mancos, Placerville: Hillebrand and Ransome, 1.
- Mancos, Rico quadrangle: Cross and Ransome, 1; Holmes, 4.
- Mancos, Rio Blanco: Gale, 2, 5.
- Mancos, Telluride: Cross and Purington, 1; Purington, 2.
- Mancos, Yampa: Fenneman and Gale, 2.
- Mancos: Cross, Howe, and Irving, 1; Gale, 7; Gardner, J. H., 1; Howe, 2; Lee, W. T., 9, 10, 13, 14.
- Manitou, eastern Colorado: Darton, 7.
- Manitou, Ordovician: Darton, 9, 13.
- Manitou, Pikes Peak district: Cross, 24.
- Manitou: Darton, 14; Girty, 2.
- Mariposite sandstone: Hess, 4.
- Maroon, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
- Maroon, Aspen: Spurr, 1.
- Maroon, Grand Mesa: Lee, W. T., 13.
- Maroon, Tenmile: Emmons, 27.
- Maroon: Girty, 2.
- Mauvaises Terres or White River: Marsh, 1.
- McElmp, Engineer Mountain: Cross, 41.
- McElmo, LaPlata Mountains: Cross, Spencer, and Purington, 1.
- McElmo, Montrose County: Emmons, W. H., 3.
- McElmo, Ouray district: Irving, 2.
- McElmo, Placerville: Hess, 4; Hillebrand and Ransome, 1, 2.
- McElmo, Rico quadrangle: Cross and Ransome, 1; Cross and Spencer, 1.
- McElmo, San Juan: Cross and Howe, 1.
- McElmo, Telluride: Cross and Purington, 1.
- McElmo: Cross, 35; Cross, Howe, and Irving, 1; Howe, 2; Lee, H. A., 9.
- Mesaverde, Book Cliffs: Richardson, 1.
- Mesaverde, Durango coal field: Shaler, 1; Shaler and Gardner, 1; Taff, 1.
- Mesaverde, Grand Mesa: Lee, W. T., 13.
- Mesaverde, LaPlata mountains: Cross, Spencer, and Purington, 1.
- Mesaverde, northwestern Colorado: Gale, 8; Henderson, 13.
- Mesaverde, Rio Blanco oil field: Gale, 5.
- Mesaverde, Yampa: Fenneman and Gale, 2.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

- Mesaverde: Cross, Howe, and Irving, 1; Gale, 7; Gardner, J. H., 1; Hayden, 22; Holmes, 2; Howe, 2; Lee, W. T., 10, 13, 14.
- Middle Park formation: Cross, 18, 19; Eldridge, 6.
- Millsap, Carboniferous-Triassic: Darton, 9, 13.
- Millsap, eastern Colorado: Darton, 7.
- Millsap (?), Manitou region: Finlay, G. I., 3.
- Millsap, Pikes Peak district: Cross, 24.
- Millsap, Pueblo quadrangle: Gilbert, 7.
- Mississippian, map showing: Willis, 2.
- Mississippian: Girty, 2.
- Molas, Engineer Mountain: Cross, 41.
- Molas, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
- Molas, Ouray district: Irving, 2.
- Molas, Silverton: Cross, Howe, and Ransome, 1.
- Molas: Cross, Howe, and Irving, 1; Girty, 2; Howe, 2.
- Montana, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
- Montana, Aspen, (Pierre): Spurr, 1.
- Montana, Cretaceous: Lakes, 157.
- Montana, Denver Basin: Emmons, Cross, and Eldridge, 2.
- Montana, Florence oil field: Eldridge, 5.
- Montana, ore in: Lakes, 135.
- Montana, Pikes Peak district: Cross, 24.
- Montana, Rabbit Ears region: Grout, Worcester, and Henderson, 1.
- Montana, usage of term: Eldridge, 1.
- Montana: Lakes, 99, 117, 165.
- Monument Creek, age of: Darton, 12.
- Monument Creek, Castle Rock: Lee, W. T., 5; Richardson, 4.
- Monument Creek, Denver district: Cannon, 10; Eldridge, 2; Emmons, Cross, and Eldridge, 2.
- Monument Creek, Palmer Lake: Cannon, 9.
- Monument Creek, Tertiary: Darton, 13.
- Monument Creek: Hayden, 6, 12, 14, 18, 19; Lakes, 6; Peale, 7; Richardson, 4.
- Morrison, Apishapa quadrangle: Stose, 1.
- Morrison, Boulder district: Fenneman, 5.
- Morrison, Canon City: Stanton, 3.
- Morrison, Castle Rock: Lee, W. T., 5.
- Morrison, correlation, Comanche and Dakota: Stanton, 3.
- Morrison, Cretaceous: Darton, 9, 13.
- Morrison, Denver Basin: Emmons, Cross, and Eldridge, 2.
- Morrison, eastern Colorado: Darton, 7.
- Morrison, fresh water beds: Henderson, J., 10.
- Morrison, Front Range: Stanton, 3.
- Morrison, Perry Park: Kruger, Hamilton, and Enriquez, 1.
- Morrison, Pikes Peak district: Cross, 24.
- Morrison, Pueblo: Gilbert, 7.
- Morrison, Purgatory River: Stanton, 3.
- Morrison, Rabbit Ears region: Grout, Worcester, and Henderson, 1.
- Morrison, Rio Cimarron: Stanton, 3.
- Morrison (?), southeastern Colorado: Lee, W. T., 4.
- Morrison, Walsenburg quadrangle: Hills, R. C., 15.
- Morrison: Cross, 22; Girty, 2; Henning, 3; Lee, W. T., 6; Martin, 1.
- Needle Mountain group, Engineer Mountain: Cross, 41.
- Niagara: Hayden, 12; Peale, 5.
- Niobrara, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
- Niobrara, Apishapa quadrangle: Stose, 1.
- Niobrara, Arkansas Valley: Gilbert, 5.
- Niobrara, Boulder district: Fenneman, 5.
- Niobrara, Castle Rock: Lee, W. T., 5.
- Niobrara, Colorado Range: Hague and Emmons, 1.
- Niobrara, Cretaceous: Darton, 9.
- Niobrara, Denver Basin: Cannon, 10; Emmons, Cross, and Eldridge, 2.

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- Niobrara, eastern Colorado: Darton, 7.
 Niobrara, Florence: Eldridge, 5.
 Niobrara, ore in: Lakes, 135.
 Niobrara, Pueblo quadrangle: Gilbert, 7.
 Niobrara, Rabbit Ears region: Grout, Worcester, and Henderson, 1.
 Niobrara, San Juan: Comstock, 7.
 Niobrara, southeastern Colorado: Stevenson, 8.
 Niobrara, southern Colorado: Stevenson, 12.
 Niobrara, Tertiary: Hague and Emmons, 1; King, 1.
 Niobrara, Yampa: Fenneman and Gale, 1.
 Niobrara: Eldridge, 1; Geijsbeek, 1; Hayden, 6, 19; Henderson, J., 10; King, 1; Lakes, 99, 117, 165, 204; Logan, 1; Martin, 1; Marvine, 1; Peale, 7; Ries, 1; Spencer, 1.
 Nussbaum, Apishapa quadrangle: Stose, 1.
 Nussbaum, Elmore quadrangle: Hills, R. C., 24.
 Nussbaum, Nepesta quadrangle: Fisher, 1.
 Nussbaum, Pueblo quadrangle: Gilbert, 7.
 Nussbaum, Spanish Peaks: Hills, R. C., 25.
 Nussbaum, Tertiary: Darton, 13.
 Nussbaum, Walsenburg: Hills, R. C., 15.
 Ogalalla: Darton, 9, 13; Osborn, 4.
 Ogden Quartzite: Berkey, 1; Emmons, 32; Gale, 8; Hague and Emmons, 1; King, 1; Weeks, 15.
 Ohio, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
 Ohio Creek, Grand Mesa: Lee, W. T., 10, 13.
 Ouray, Engineer Mountain: Cross, 41.
 Ouray, Monarch-Tomichi: Crawford, 4.
 Ouray, Needle Mountains: Cross, Howe, Irving, and Emmons, 1; Hay, O. P., 2.
 Ouray, Ouray district: Irving, 2.
 Ouray, Rico Mountains: Cross and Ransome, 1; Cross and Spencer, 1.
 Ouray, Silverton: Cross, Howe, and Spencer, 1.
 Ouray: Cross, Howe, and Irving, 1; Girty, 2; Howe, 2; Kindle, 1; Purington, 3.
 Paonia, Grand Mesa: Lee, W. T., 13.
 Parting quartzite, Alma: Patton, 10.
 Parting quartzite, Aspen: Henrich, 2.
 Parting quartzite, Cambrian: Emmons, 9.
 Parting quartzite, Leadville: Emmons and Irving, 1.
 Parting quartzite, Tenmile district: Emmons, 27.
 Parting quartzite: Cross, 33; Girty, 2; Spencer, A. C., 2.
 Pawnee Creek: Osborn, 4.
 Pennsylvanian, Monarch-Tomichi district: Crawford, 4.
 Pennsylvanian: Girty, 2; Henderson, J., 10.
 Permo-Carboniferous, San Juan: Read, 4.
 Permo-Carboniferous: Butters, 2; King, 1; Peale, 7, 8.
 Pictured Cliff group: Holmes, 2.
 Pierre, Arkansas Valley: Gilbert, 5.
 Pierre, Boulder district: Fenneman, 5.
 Pierre, Canon City: Washburne, 5.
 Pierre, Castle Rock: Lee, W. T., 5.
 Pierre, Cretaceous: Darton, 9, 13.
 Pierre, Denver Basin: Cannon, 10; Emmons, Cross, and Eldridge, 2.
 Pierre, eastern Colorado: Darton, 7.
 Pierre, Elmore quadrangle: Hills, R. C., 24.
 Pierre, Florence: Eldridge, 5.
 Pierre, Nepesta quadrangle: Fisher, 1.
 Pierre, Pueblo quadrangle: Gilbert, 7.
 Pierre, Rabbit Ears region: Grout, Worcester, and Henderson, 1.
 Pierre, San Juan: Comstock, 7.
 Pierre, southeastern Colorado: Stevenson, 8.
 Pierre, southern Colorado: Stevenson, 12.
 Pierre, Spanish Peaks: Hills, R. C., 25.

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- Pierre, Tepee Buttes: Gilbert and Gulliver, 1.
- Pierre, Walsenburg quadrangle: Hills, R. C., 15.
- Pierre: Eldridge, 1; Geijsbeek, 1; Hayden, 6, 19; Henderson, J., 9, 10; King, 1; Martin, 1; Marvine, 1; Peale, 7; Richardson, 2; Ries, 1; Spencer, A. C., 1; White, 4.
- Platte series: Cragin, 3.
- Pliocene (?), Apishapa quadrangle: Stose, 1.
- Point of Rocks: Powell, 3.
- Poison Canyon, Cretaceous (?): Darton, 13.
- Poison Canyon, Spanish Peaks: Hills, R. C., 25.
- Poison Canyon, Trinidad: Richardson, 2.
- Poison Canyon, Walsenburg: Hills, R. C., 15.
- Poison Canyon: Osborn, 2, 4.
- Post-Laramie, coal-bearing, northwestern Colorado: Gale, 8.
- Post-Laramie deposits of Colorado: Cross, 18, 19; Hills, 17, 21.
- Potosi rhyolite, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
- Potosi rhyolite, Telluride: Cross and Purington, 1.
- Potosi rhyolite: Cross, 32; Cross and Purington, 1; Finch, 1; Howe, 2; Lee, H. A., 9; Purington, 3.
- Potosi volcanics, Creede: Emmons and Larsen, 1.
- Potsdam, contact with Archean: Hovey, 1.
- Potsdam: Endlich, 5; Hayden, 14; King, 1; Peale, 5, 7, 8.
- Pre-Cambrian. *See* Pre-Cambrian in general index.
- Primordial period: Endlich, 5; Peale, 7.
- Prozoic: Endlich, 5.
- Puerco, Durango-Gallup field: Shaler, 1.
- Puerco, southern Colorado: Scott, W. B., 3; Smith, J. H., 1.
- Puerco: Cope, 54, 60, 63; Howe, 2; Newberry, 17.
- Purgatoire, Apishapa quadrangle: Stose, 1.
- Quartzite, Monarch-Tomichi: Crawford, 4.
- Quebec: Hague and Emmons, 1; King, 1; Peale, 5, 7.
- Red Beds, Carboniferous and Triassic (?): Darton, 13.
- Red Beds, Castle Rock: Lee, W. T., 5.
- Red Beds, Colorado Range: Butters, 2; Hague and Emmons, 1.
- Red Beds, Denver Basin: Cannon, 10.
- Red Beds, Durango quadrangle: Emmons, W. H., 1.
- Red Beds, eastern slope: Butters, 2; Hayden, 24.
- Red Beds, Florence: Eldridge, 5.
- Red Beds, Fremont County: Lindgren, 8.
- Red Beds, Grand River district: Peale, 12.
- Red Beds, Hahns Peak: Gale, 1; George and Crawford, 1.
- Red Beds, North Park: Hague and Emmons, 1.
- Red Beds, Perry Park: Cannon, 7.
- Red Beds, Rabbit Ears region: Grout, Worcester, and Henderson, 1.
- Red Beds, San Miguel County: Spaulding, 1.
- Red Beds, southwestern Colorado: Cross and Howe, 1; S—, C., 1.
- Red Beds, Triassic, Aspen: Spurr, 1.
- Red Beds, western Colorado: Cross, 35.
- Red Beds: Endlich, 5; Gale, 2; Girty, 2; Hayden, 5, 6, 14, 19, 22; Henderson, J., 11; King, 1; Lakes, 95; Marvine, 1; Peale, 8.
- Red Creek Quartzite: Powell, 3.
- Red Wall: Powell, 3.
- Rhyolite, Castle Rock district: Lee, W. T., 5.
- Rhyolite, Needle Mountains: Cross, Howe, and Irving, 1.
- Rico, Engineer Mountain: Cross, 41.

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- Rico, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
- Rico, Rico quadrangle: Cross and Ransome, 1; Cross and Spencer, 1; Ransome, 2.
- Rico, Silverton: Cross and Howe, 1.
- Rico: Butters, 2; Girty, 2.
- River beds: Peale, 7.
- Robinson: Emmons, 27.
- Rollins sandstone, Grand Mesa: Lee, W. T., 13.
- Ruby, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
- Ruby, Grand Mesa: Lee, W. T., 13.
- Ruby (Wasatch): Lee, W. T., 10.
- Salt Wells: Powell, 3.
- San Juan, Telluride: Cross and Purington, 1.
- San Juan breccias: Purington, 3, 7.
- San Juan tuff, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
- San Juan tuff, Ouray district: Irving, 2.
- San Juan tuff: Cross, Howe, and Irving, 1; Howe, 2; Cross, 32; Finch, 1; Lakes, 50; Lay, 1; Lee, H. A., 9; Spaulding, 1; Winslow, 2.
- San Miguel, Camp Bird mine: Titcomb, 1.
- San Miguel, Telluride: Cross, 30; Cross and Purington, 1; Purington, 2.
- San Miguel: Cross, 30; Hills, R. C., 11, 17; Lakes, 50; Lay, 1; Lee, H. A., 9; Spaulding, 1.
- Santa Fe: San Luis Valley, Siebenthal, 4.
- Saratogan: Cross and Ransome, 1.
- Sauranodon beds: White, 19.
- Saurian sandstone: Denver Basin, Cannon, 10.
- Sawatch, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
- Sawatch, Tenmile quadrangle: Emmons, 27.
- Sawatch: Girty, 2.
- Sawatch quartzite, Monarch-Tomichi: Crawford, 4.
- Section, Aguilar coal field: Lakes, 117.
- Section, Alma, South Mosquito Gulch: Patton, 10.
- Section, Animas canyon: Hawn, L., 1; Lakes, 223.
- Section, Arkansas River to New Mexico line: Butters, 2.
- Section, Arkins: Butters, 2.
- Section, Aspen region: Lakes, 2, 21.
- Section, Bear Canyon: Butters, 2.
- Section, Bellvue: Butters, 2.
- Section, Book Cliffs: Lakes, 96.
- Section, Boulder: Butters, 2; Fenneman, 5; Lakes, 124.
- Section, Box Elder Canyon: Butters, 2.
- Section, Carter Lake: Butters, 2.
- Section, Chicago Park, Gunnison County: Mg. Rept., 11.
- Section, Colorado: Lakes, 21.
- Section, Colorado-New Mexico boundary: Cope, 54.
- Section, Colorado Springs: Butters, 2.
- Section, Colorado-Wyoming boundary: Darton, 15.
- Section, Cottonwood Creek: Butters, 2.
- Section, Deer Creek: Butters, 2.
- Section, Eagle County, Battle Mountain: Tilden, 1.
- Section, Florence: Lakes, 86; Newberry, 15.
- Section, foot hills, eastern Colorado: Lakes, 3, 93, 111.
- Section, Front Range: Lakes, 125.
- Section, Glenwood Springs: Newberry, 11.
- Section, Grand River near Grand Junction, Book Cliffs, Debeque: Lakes, 104.
- Section, Gunnison County, Chicago Park: Mg. Rept., 11.
- Section, Hahns Peak: Parsons and Liddell, 1.
- Section, Heygood Canyon: Butters, 2.
- Section, Huerfano County: Lakes, 147.
- Section, Indian Creek: Butters, 2.
- Section, LaPlata Mountains: Lakes, 87.
- Section, Larimer County, North Table Mountain: Butters, 2.
- Section, Las Animas River: Clayton, 1.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

- Section, Leadville: Ameling, 2; Miller, G. W., 1; Robbins, F., 1.
- Section, Leadville, cut by Yak tunnel: Armington and Stotesbury; 1.
- Section, Lefthand Creek: Butters, 2.
- Section, Leyden coal mine: Mg. Rept., 35.
- Section, Lyons: Butters, 2.
- Section, Masonville: Butters, 2.
- Section, Morrison: Butters, 2.
- Section, Nepesta quadrangle: Fisher, 1.
- Section, one hundred and second meridian: Hay, R., 1.
- Section, Owl Canyon: Butters, 2.
- Section, Park County: Lakes, 5.
- Section, Perry Park: Butters, 2.
- Section, Pictou: Meade, 1.
- Section, Pitkin County: Lakes, 5.
- Section, Purgatory Canyon: Stevenson, 8.
- Section, Ralston Creek: Butters, 2.
- Section, Rio Blanco County: Lakes, 97.
- Section, Rocky Mountains, generalized: Ball, J., 1.
- Section, St. Charles River: Hawn, L., 1.
- Section, Sand Creek: Butters, 2.
- Section, South Park: Lakes, 115; Mg. Rev., 5.
- Section, South Table Mountain: Butters, 2.
- Section, southwestern Colorado: Lakes, 107.
- Section, Sterling: Lakes, 112.
- Section, Stout: Butters, 2.
- Section, Trinidad coal field: Stevenson, 8.
- Section, Turkey Creek: Butters, 2.
- Sedimentary rocks, San Juan: Snedaker, 1.
- Shinarump: Cross, 36; Gale, 8; Girty, 2; Powell, 3.
- Shoshone group: Cross, 38; Richardson, 2.
- Silverton series: Cross, 32; Finch, 1; Purington, 3, 7.
- Stratigraphy: Hayden, 14, 28; Lesquereux, 2.
- Sulphur Creek: Powell, 3.
- Sundance, eastern Colorado: Butters, 2; Darton, 7.
- Sundance, marine beds: Henderson, J., 10.
- Telluride, Engineer Mountain: Cross, 41.
- Telluride, Silverton: Cross and Howe, 1.
- Telluride: Cross, Howe, and Irving, 1; Finch, 1; Hills, R. C., 11, 17.
- Tensleep: Butters, 2; Darton, 9, 13; Henderson, J., 11.
- Tepee zone, Pierre shale: Gilbert, 5, 7.
- Timpas, Apishapa quadrangle: Stose, 1.
- Timpas, Arkansas Valley: Gilbert, 5.
- Timpas, Cretaceous: Darton, 13.
- Timpas, Elmore quadrangle: Hills, R. C., 24.
- Timpas, Nepesta quadrangle: Fisher, 1.
- Timpas, Spanish Peaks: Hills, R. C., 25.
- Timpas, Walsenburg quadrangle: Hills, R. C., 15.
- Timpas: Logan, 1.
- Titanotherium beds: Hatcher, 2.
- Tomichi limestone: Crawford, 4.
- Trenton: Endlich, 5; Girty, 2; Wolcott, 3.
- Trinidad, Elmore quadrangle: Hills, R. C., 24.
- Trinidad, Spanish Peaks: Hills, R. C., 25.
- Trinidad, Walsenburg: Hills, R. C., 25.
- Trinidad: Lakes, 156, 158; Richardson, 2; Washburne, 5.
- Trout Creek, Yampa: Fenneman and Gale, 2.
- Twenty Mile sandstone, Yampa: Fenneman and Gale, 2.
- Uinta formation, Tertiary: Clark, W. B., 1; Cope, 60; Gale, 2, 3, 5, 6, 7, 8; King, 1; Osborn, 4; Scott, W. B., 2; Smith, J. H., 1; White, 4, 26b.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

- Uinta Quartzite, Pre-Cambrian: Berkey, 1; Emmons, 32; Gale, 8; Girty, 2; Hague and Emmons, 1; King, 1; Powell, 3; Weeks, 15; White, 26b.
- Uncompahgre, Engineer Mountain: Cross, 41.
- Uncompahgre, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
- Uncompahgre, Ouray district: Irving, 2.
- Uncompahgre, Rico Mountains: Cross and Ransome, 1.
- Uncompahgre, Silverton: Cross, Howe, and Ransome, 1.
- Uncompahgre: Emmons, W. H., 2; Cross, Howe, and Irving, 1.
- Upper Coal-Measures: Berkey, 1; Emmons, 2, 9, 32; Hague and Emmons, 1; King, 1; Weeks, 15.
- Vallecito, Needle Mountains: Cross, Howe, Irving, and Emmons, 1.
- Vermejo: Lee, 12.
- Vermilion Cliff group: Gale, 8; Girty, 2; Powell, 3.
- Vermilion Creek, Routt County: Gale, 4; Hague and Emmons, 1; King, 1.
- Wasatch, Durango-Gallup field: Shaler, 1.
- Wasatch, Grand Mesa: Lee, W. T., 13.
- Wasatch, Grand River district: Peale, 12.
- Wasatch limestone: Berkey, 1; Emmons, 32; Hague and Emmons, 1; King, 1; Powell, 3; Weeks, 15.
- Wasatch, northwestern Colorado: Gale, 8; Henderson, J., 13; Smith, J. H., 1; White, 4, 26.
- Wasatch, Rio Blanco oil field: Gale, 5.
- Wasatch, Routt County: Gale, 4.
- Wasatch, San Juan and Yampa districts: Cope, 15.
- Wasatch: Cope, 54; Endlich, 5; Girty, 2; Hayden, 27; Lee, W. T., 10; Scott, W. B., 3.
- Washakie: Osborn, 4; Scott, W. B., 2.
- Wash Beds, Leadville: Emmons and Irving, 1.
- Weber, Anthracite-Crested Butte: Emmons, Cross, and Eldridge, 1.
- Weber, Aspen, Carboniferous: Spurr, 1.
- Weber, Tenmile district: Emmons, 27.
- Weber: Girty, 2.
- Weber grits, Alma: Patton, 10.
- Weber grits, Carboniferous: Emmons, 9.
- Weber quartzite, northwestern Colorado: Berkey, 1; Emmons, 32; Gale, 8; Hague and Emmons, 1; King, 1; Powell, 3; Weeks, 15; White, 4.
- Weber shales, Carboniferous: Emmons, 9.
- White Cliff, Rio Blanco oil field: Gale, 5.
- White Cliff: Gale, 8; Girty, 2; Powell, 3.
- White limestone, Alma district: Patton, 10.
- White limestone, Cambrian: Emmons, 9.
- White limestone, Leadville: Emmons and Irving, 1.
- White porphyry, Alma: Patton, 10.
- White porphyry, Leadville: Emmons and Irving, 1.
- White River: Cope, 54, 60; Darton, 9, 13; Hayden, 19; King, 1; Matthew, 1a; Osborn, 1, 4; Peale, 7.
- Wind River: Hayden, 19; Hills, 10, 13, 19; Osborn, 1, 2, 4; Osborn and Wortman, 3; Scott, W. B., 2.
- Wyoming, Breckenridge: Ransome, 5.
- Wyoming, Carboniferous-Triassic: Darton, 9.
- Wyoming, Chugwater, eastern Colorado: Darton, 7.
- Wyoming Conglomerate: Hague and Emmons, 1; King, 1. *See* Bishop Mountain Conglomerate.
- Wyoming, Denver Basin: Emmons, Cross, and Eldridge, 2.
- Wyoming, Fountain, eastern Colorado: Darton, 7.
- Wyoming, Front Range, Red Beds: Butters, 2; Fenneman, 6.
- Wyoming, lower: Butters, 2.

GEOLOGICAL FORMATIONS DESCRIBED—Continued

Wyoming, lower, Perry Park: Kruger, Hamilton, and Enriquez, 1.	Wyoming: Girty, 2.
Wyoming, Tenmile district: Emmons, 27.	Yampa: Girty, 2; Powell, 3.
Wyoming, upper: Butters, 2.	Yule, Anthracite-Crested Butte: Em- mons, Cross, and Eldridge, 1.
Wyoming, upper, Perry Park: Kruger, Hamilton, and Enriquez, 1.	Yule, Tenmile quadrangle: Emmons, 27.
	Yule: Girty, 2.