

# NEW MEXICO SCHOOL OF MINES

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BULLETIN NO. 22

## Geologic Literature of New Mexico Through 1944

by  
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and  
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SOCORRO, NEW MEXICO  
1945



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## THE STATE BUREAU OF MINES AND MINERAL RESOURCES

The State Bureau of Mines and Mineral Resources, designated as "a department of the New Mexico School of Mines and under the direction of its Board of Regents," was established by the New Mexico Legislature of 1927. Its chief functions are to compile and distribute information regarding mineral industries in the State, through field studies and collections, laboratory and library research, and the publication of the results of such investigations. A full list of the publications of the State Bureau of Mines and Mineral Resources is given on the last pages of this Bulletin.

### BOARD OF REGENTS

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# Geologic Literature of New Mexico Through 1944

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MARIAN R. BURKS

## INTRODUCTION

### GENERAL NOTE

In this bibliography are listed bulletins, articles, papers, and reports on the geology of New Mexico that have appeared from the earliest publications through 1944. The term "geology" has been interpreted broadly; the list includes papers on methods and data of mineral production, as well as articles on such subjects as meteorites and the antiquity of man, which are not strictly geological topics but are closely related to geology.

*Part I, Bibliography*, is a list of authors, arranged alphabetically. Each author's writings are placed under his name in chronological order and are numbered. Each title is given in full; explanatory notes added to the title by the compilers of this bibliography are enclosed in brackets. Following the title is the name of the publication, together with the series number, if any, enclosed in parentheses. The volume and number of the periodical come next; then the page or pages on which the paper appears; notes on illustrations, if any; and finally the date. Appropriate abbreviations are used, as indicated in the lists on pages 7-8.

*Part II, Index*, is an alphabetical list of subjects, which are arranged under seven major heads. These heads are subdivided according to the nature of the material indexed. One paper may be indexed under more than one head. In each case the name of the author and the serial number of his paper follow the appropriate heading. Using these data the reader can find the title and reference of the paper in the Bibliography, Part I. Further details regarding subdivision of the Index are given on page 113.

*Part III, Maps*, is a list of geologic and other maps of New Mexico. Explanatory remarks are given at the beginning of this section, page 139.

## SOURCES OF INFORMATION

The papers listed in this bulletin through the year 1929 have in large part been taken from a previous bibliography, "Geologic Literature of New Mexico," by T. P. Wootton, issued in 1930 as Bulletin 5 of the State Bureau of Mines and Mineral Resources. Bulletins 746, 747, and 823 of the U. S. Geological Survey have also been used as sources for these papers. Entries from 1930 through 1941 have been taken largely from U. S. Geological Survey Bulletins 937 and 938. Although some minor omissions may have been made, the bibliography through 1941 is considered essentially complete.

The literature for 1942-1944 inclusive has been examined by the compilers of this bulletin in the library of the New Mexico School of Mines. While some periodicals in fields allied to geology, such as astronomy, were not available in this compilation, all important geological, mining, and petroleum journals were consulted. These journals are indicated by an asterisk (\*) in the list of serials, pages 8-14. It is thought that the entries for 1942-1944, while not exhaustive, include all major contributions.

## ACKNOWLEDGMENTS

The compilers extend their appreciation to W. M. Speare, Librarian in the New Mexico School of Mines, for his active assistance in this work. L. P. Entwistle of the American Smelting and Refining Company called to the compilers' attention several papers that might otherwise have been overlooked. Assistance was also given by the library staffs of the American Institute of Mining and Metallurgical Engineers, the University of New Mexico, and the U. S. Geological Survey.

## HOW PUBLICATIONS MAY BE OBTAINED

Many publications of the various Governmental agencies may be obtained from the department or bureau of issue; there is a charge for some reports, but others will be furnished gratis. The stock of many bulletins has been exhausted. Whether or not a given publication of the U. S. Geological Survey is available, and its price, can be determined from a pamphlet entitled "Publications of the Geological Survey," issued in July 1942. This pamphlet may be obtained free of charge from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Many volumes or numbers of periodicals may be obtained from the issuing society or association. Books, indicated in the Bibliography by italic print, may be ordered from the publisher. Out-of-print periodicals and books may occasionally be found in the stock of dealers in second-hand books.

A number of New Mexico libraries are officially designated depositories for U. S. Geological Survey and various other government publications, and they may have on their shelves other publications listed in this bibliography. These can be consulted

in the libraries and some of them may be loaned under certain conditions. A list of these New Mexico libraries is as follows:

Albuquerque, University of New Mexico.  
 Las Vegas, New Mexico Highlands University.  
 Santa Fe, State Library.  
 Silver City, New Mexico State Teachers College.  
 Socorro, New Mexico School of Mines.  
 State College, New Mexico College of Agriculture and  
 Mechanic Arts.

The State Bureau of Mines and Mineral Resources will be glad to supply current data regarding the availability of New Mexico geologic literature and to assist in obtaining original, typewritten and photostat copies.

A complete stock of published U. S. Geological Survey geologic and topographic maps of areas in New Mexico is kept on file at the State Bureau of Mines and Mineral Resources. These maps are for sale at the regular retail prices of the Survey.

#### ABBREVIATIONS USED

Acad. ....	Academy	Geophys. ....	Geophysical
Agr. ....	Agriculture	H. ....	Heft
Am. ....	American	Hist. ....	History
Anon. ....	Anonymous	H. Ex. Doc.	
Ann. ....	Annual		House executive document
anthrop. ....	anthropological	H. Res. ....	House resolution
app. ....	appendix	illus. ....	illustrated, illustration
Archeol. ....	Archeological	incl. ....	including
art. ....	article	Indust. ....	Industrial
Assoc. ....	Association	Info. ....	Information
Bd. ....	Band	Inst. ....	Institute, institution
Bienn. ....	Biennial	Internat. ....	International
Bull. ....	Bulletin	Inv. ....	Investigations
Bur. ....	Bureau	Jahrb. ....	Jahrbuch
Chem. ....	Chemical, chemistry	Jour. ....	Journal
Cin. ....	Cincinnati	Kryst. ....	Krystallographie
Circ. ....	Circular	Lab. ....	Laboratories
Coll. ....	Collections	Mtg. ....	Meeting
Cong. ....	Congress	Mem. ....	Memoirs, memoranda
Contr. ....	Contributions	Met. ....	Metallurgical, metallurgy
Co. ....	County	Min. ....	Mineral, mineralogy, mineralogic, mineralogische, mining
Dept. ....	Department	Misc. ....	Miscellaneous
Doc. ....	Document	Mitt. ....	Mitteilungen
Econ. ....	Economic	Mon. ....	Monograph
ed. ....	edition	Mt. ....	Mountain
Eng. ....	Engineering, engineers	Mus. ....	Museum
Ex. ....	Executive	Nat. ....	National, natural
Exper. ....	Experiment	Naturhist. ....	Naturhistorische
Expl. ....	Explorations	N. Mex. ....	New Mexico
fasc. ....	fascicle	no. ....	number
fig. ....	figure	n. d. ....	no date of publication given
Geog. ....	Geographic, geographical, geography	n. p. ....	no place of publication given
Geol. ....	Geologic, geological, geologic, geologische	Paleont. ....	Paleontological, palaontologie

Petrog. _____	Petrographische	Seismol. _____	Seismological
Phila. _____	Philadelphia	S. Ex. Doc. _____	Senate executive
Philos. _____	Philosophical		document
pl. _____	plate	ser. _____	series
pp. _____	pages	Sess. _____	Session
Prel. _____	Preliminary	Sitzungsber. _____	Sitzungsberichte
Preuss. _____	Preussische	Sta. _____	Station
Proc. _____	Proceedings	Suppl. _____	Supplement
Prof. _____	Professional	Tech. _____	Technical
pt. _____	part	Terr. _____	Territory
Pub. _____	Publication	topog. _____	topographic
q. v. _____	which see	Trans. _____	Transactions
R. R. _____	Railroad	U. S. _____	United States
Rept. _____	Report	Univ. _____	University
Res. _____	Resources	vol. _____	volume
R. _____	Royal	Wash. _____	Washington
St. _____	Saint	Zeitschr. _____	Zeitschrift
Sci. _____	Science, scientific	Zool. _____	Zoological, zoologie
sec. _____	section		

### SERIALS

[An asterisk (\*) denotes serials examined for the years 1942, 1943, and 1944.]

- Acad. Nat. Sci. Phila. Preprint; Proc.**  
Academy of Natural Sciences of Philadelphia, Preprint; Proceedings.
- Acad. Sci. Paris, Comptes Rendus.**  
Academie des sciences, Paris, Comptes rendus.
- Acad. Sci. St. Louis Trans.**  
Academy of Science of St. Louis, Transactions.
- Am. Assoc. for the Advancement of Science Proc.**  
American Association for the Advancement of Science, Proceedings.
- \***Am. Assoc. Petroleum Geologists Bull.**  
American Association of Petroleum Geologists, Bulletin. Tulsa, Oklahoma.
- Am. Ceramic Soc. Jour.**  
American Ceramic Society, Journal. Columbus, Ohio.
- Am. Forestry.**  
American Forestry. Place of publication not known.
- Am. Geologist.**  
American Geologist. Formerly published at Minneapolis, Minn.; consolidated with Economic Geology, q. v., in 1905.
- Am. Geophys. Union Trans.**  
American Geophysical Union, Transactions. Washington, D. C.
- Am. Inst. Min. Eng. Bull.; Trans.**  
American Institute of Mining Engineers, Bulletin; Transactions. New York City. (Superseded in 1918 by publications of American Institute of Mining and Metallurgical Engineers, q. v.)
- \***Am. Inst. Min. Met. Eng. Bull.; Contr.; Preprint; Tech. Pub.; Trans.; Year Book.**  
American Institute of Mining and Metallurgical Engineers, Bulletin; Contributions; Preprint; Technical Publication; Transactions; Year Book. New York City.
- \***Am. Jour. Sci.**  
American Journal of Science. New Haven, Connecticut.
- Am. Midland Naturalist.**  
American Midland Naturalist. Notre Dame, Indiana.
- \***Am. Mineralogist.**  
American Mineralogist. Princeton University, Princeton, New Jersey.
- Am. Mining Cong. Jour.; Proc.**  
American Mining Congress, Journal; Proceedings. Washington, D. C.  
See also International Mining Congress.



- Am. Mus. Nat. Hist. Bull.; Jour.**  
American Museum of Natural History, Bulletin; Journal. New York City.
- Am. Mus. Novitates.**  
American Museum Novitates. American Museum of Natural History. New York City.
- Am. Naturalist.**  
American Naturalist. Salem, Massachusetts, and elsewhere.
- Am. Philos. Soc. Proc.**  
American Philosophical Society, Proceedings. Philadelphia.
- Am. Soc. Civil Eng. Proc.; Trans.**  
American Society of Civil Engineers, Proceedings; Transactions. New York City.
- Annales des Mines.**  
Annales des mines. Paris.
- Aquila.**  
Aquila. Budapest.
- Ariz. Mining Jour.**  
Arizona Mining Journal. Later, The Mining Journal. Phoenix, Arizona.
- Assoc. Am. Geographers Annals.**  
Association of American Geographers, Annals. Albany, New York.
- Auk.**  
Auk. Lancaster, Pennsylvania.
- Boston Soc. Nat. Hist. Proc.**  
Boston Society of Natural History, Proceedings. Boston.
- Brooklyn Entomological Soc. Bull.**  
Brooklyn Entomological Society, Bulletin. Brooklyn, New York.
- Bur. Am. Ethnology Bull.**  
Bureau of American Ethnology, Bulletin. Washington, D. C.
- Calif. Univ. Dept. Geol. Sci. Bull.**  
California University, Department of Geological Sciences, Bulletin. San Francisco.
- Canadian Naturalist.**  
Canadian Naturalist. Montreal.
- Carnegie Inst. Wash. Pub.; Year Book.**  
Carnegie Institute of Washington, Publications; Year Book.
- Carnegie Mus. Annals.**  
Carnegie Museum, Annals. Pittsburgh, Pennsylvania.
- Chem. Industries.**  
Chemical Industries.
- Chicago Univ. Walker Museum Contr.**  
University of Chicago, Walker Museum Contributions.
- Chimie et Industrie.**  
Chimie et industrie.
- Cin. Soc. Nat. Hist. Jour.**  
Cincinnati Society of Natural History, Journal. Cincinnati, Ohio.
- Colo. Mus. Nat. Hist. Proc.**  
Colorado Museum of Natural History, Proceedings. Denver.
- \*[Colo.] **School of Mines Quarterly.**  
Colorado School of Mines, Quarterly. Golden, Colorado.
- Colo. Sci. Soc. Bull.; Proc.**  
Colorado Scientific Society, Bulletin; Proceedings. Denver.
- Colo. Univ. Studies.**  
Colorado University, Studies. Boulder, Colorado.
- Condor.**  
Condor. Santa Clara, California.
- Denison Univ. Sci. Lab. Bull.**  
Denison University, Scientific Laboratories, Bulletin. Granville, Ohio.
- Ecology.**  
Ecology. Brooklyn, New York.

- \*Econ. Geology.**  
 Economic Geology. Urbana, Illinois.
- Edinburgh New Philosophical Jour.**  
 Edinburgh New Philosophical Journal. Edinburgh, Scotland.
- El Paso Min. Jour.**  
 El Paso Mining Journal. El Paso, Texas. No longer published.
- \*Eng. and Min. Jour.**  
 Engineering and Mining Journal. New York City.
- Eng. Magazine.**  
 Engineering Magazine. New York City.
- Eng. News.**  
 See Engineering News-Record.
- Eng. News-Record.**  
 Engineering News-Record. New York City.
- Field Mus. Pub. Geol. Ser.**  
 Field Museum, Publication, geological series. Chicago, Illinois.
- Geographische Gesellschaft in München, Jahresbericht.**  
 Geographische Gesellschaft in München, Jahresbericht.
- Geog. Review.**  
 Geographical Review. New York City.
- Geog. Soc. Chicago Bull.**  
 Geographic Society of Chicago, Bulletin.
- \*Geol. Soc. America Bull.**  
 Geological Society of America, Bulletin. Washington, D. C.
- George Washington Univ. Bull.**  
 George Washington University, Bulletin. Washington, D. C.
- Indiana Acad. Sci. Proc.**  
 Indiana Academy of Science, Proceedings. Indianapolis.
- Indust. and Eng. Chem.**  
 Industrial and Engineering Chemistry. Washington, D. C.
- Internat. Cong. Applied Chem.**  
 International Congress of Applied Chemistry. Washington, D. C.
- Internat. Geol. Cong. Comptes Rendus; Guidebook.**  
 International Geological Congress, Comptes rendus; Guidebook. Washington, D. C.
- Internat. Mining Cong. Proc.**  
 International Mining Congress Proceedings. Later, American Mining Congress.
- Iowa Acad. Sci. Proc.**  
 Iowa Academy of Sciences, Proceedings. Des Moines, Iowa.
- Jour. Geography.**  
 Journal of Geography. Chicago, Illinois.
- \*Jour. Geology.**  
 Journal of Geology. University of Chicago, Chicago, Illinois.
- \*Jour. Geomorphology.**  
 Journal of Geomorphology. New York City. (Suspended publication December, 1942, on account of the war.)
- \*Jour. Paleontology.**  
 Journal of Paleontology. Menasha, Wisconsin.
- \*Jour. Sedimentary Petrology.**  
 Journal of Sedimentary Petrology. Menasha, Wisconsin.
- Jour. Zool. Paris.**  
 Journal de Zoologie. Paris.
- Kaiserlich-Königliche Naturhist. Hofmuseum Annalen.**  
 Kaiserlich-königliche Naturhistorische Hofmuseum, Annalen. Vienna.
- Kansas Acad. Sci. Trans.**  
 Kansas Academy of Science, Transactions. Topeka.
- Kansas City Review of Science.**  
 Kansas City Review of Science and Industry. Kansas City, Missouri.

- Kansas Geol. Soc. Guidebook; Proc.**  
Kansas Geological Society, Guidebook; Proceedings. Wichita.
- Kansas Univ. Sci. Bull.**  
Kansas University, Science Bulletin. Lawrence.
- Kolloid-Zs.**  
Kolloid Zeitschrift. Dresden-Blasewitz, Germany.
- Le Genie, Civil.**  
Le Genie, Civil.
- Los Angeles Mus. Pub.**  
Los Angeles Museum, Publications. Los Angeles, California.
- Mich. Acad. Sci. Rept.**  
Michigan Academy of Science, Report. Lansing.
- Mineral Collector.**  
Mineral Collector. Place of publication unknown.
- Mineralogical Magazine.**  
Mineralogical Magazine and Journal of the Mineralogical Society,  
London, England.
- Mines and Methods.**  
Mines and Methods. No longer published.
- Mines and Minerals.**  
Mines and Minerals. Name changed to Colliery Engineer in 1913.  
Apparently no longer published.
- Mines Magazine.**  
Mines Magazine. Colorado School of Mines. Published in Denver,  
Colorado.
- Min. and Eng. World.**  
Mining and Engineering World.
- Min. and Met.**  
Mining and Metallurgy. New York City.
- Min. and Sci. Press.**  
Mining and Scientific Press. Consolidated with Engineering and Min-  
ing Journal, q. v., in 1922.
- Mining Cong. Jour.**  
Mining Congress Journal. Washington, D. C.
- \*Mining Jour.**  
Mining Journal. Phoenix, Arizona. Formerly Arizona Mining Journal.
- Mining Magazine.**  
Mining Magazine (United States). No longer published.
- Mining Science.**  
Mining Science. Apparently no longer published.
- Mining World.**  
Mining World. No longer published.
- Nat. Acad. Sci. Proc.**  
National Academy of Sciences, Proceedings. Washington, D. C.
- Nat. Geog. Magazine.**  
National Geographic Magazine. Washington, D. C.
- Nat. History.**  
Natural History, The Journal of the American Museum of Natural  
History. New York City.
- Nat. Research Council.**  
Nat. Research Council. Washington, D. C.
- Nat. Res. Commission.**  
National Resources Commission. Washington, D. C.
- Nat. Res. Planning Board.**  
National Resources Planning Board. Washington, D. C.
- Nature.**  
Nature. London, England.
- Nautilus.**  
Nautilus. Boston, Massachusetts.

- Neues Jahrb. für Min., Geol., und Palaont.**  
Neues Jahrbuch für Mineralogie, Geologie, und Palaontologie. Stuttgart, Germany.
- New England Zool. Club Proc.**  
New England Zoological Club, Proceedings. Harvard College, Cambridge, Massachusetts.
- N. Mex. Bur. Immigration.**  
New Mexico Bureau of Immigration. Santa Fe.
- N. Mex. College Agr. and Mechanic Arts, Exper. Sta. Bull.**  
New Mexico College of Agriculture and Mechanic Arts, Experiment Station Bulletin. State College.
- \*New Mexico Magazine.**  
New Mexico Magazine. Santa Fe.
- N. Mex. Mining Record.**  
New Mexico Mining Record. No longer published.
- N. Mex. School of Mines, Min. Res. Survey Bull.**  
New Mexico School of Mines, Mineral Resources Survey Bulletin. Socorro.
- \*N. Mex. School of Mines, State Bur. Mines and Min. Res. Bull.; Circ.**  
New Mexico School of Mines, State Bureau of Mines and Mineral Resources, Bulletin; Circular. Socorro.
- \*N. Mex. State Engineer, Bienn. Rept.**  
New Mexico State Engineer, Biennial Report. Santa Fe.
- N. Mex. State Tax Commission.**  
New Mexico State Tax Commission. Santa Fe.
- \*N. Mex. Univ. Bull., Anthrop. Ser.; Chem. Ser.; Geol. Ser.**  
New Mexico University, Bulletin, anthropological series; chemical series; geological series. Albuquerque.
- New York Acad. Sci. Annals; Trans.**  
New York Academy of Sciences, Annals; Transactions. New York City.
- \*Oil and Gas Jour.**  
Oil and Gas Journal. Tulsa, Oklahoma.
- \*Oil Weekly.**  
Oil Weekly. Houston, Texas.
- Oklahoma Univ. Bull.**  
Oklahoma University Bulletin. Norman.
- Paleont. Bull.**  
Paleontological Bulletins (Cope). Philadelphia.
- Pan-Am. Geologist.**  
Pan-American Geologist. Des Moines, Iowa. Publication discontinued June 1942.
- Pan-Am. Sci. Cong.**  
Pan-American Scientific Congress. Washington, D. C.
- Philos. Soc. Wash. Bull.**  
Philosophical Society of Washington [D. C.], Bulletin.
- Popular Astronomy.**  
Popular Astronomy. Northfield, Minnesota.
- Popular Science Monthly.**  
Popular Science Monthly. New York City.
- Preuss. Geol. Landesanstalt Jahrb.**  
Preussische geologische Landesanstalt Jahrbuch.
- Republic.**  
Republic. Washington, D. C.
- Revue Universelle des Mines.**  
Revue universelle des Mines. . . Liège and Paris.
- Rocks and Minerals.**  
Rocks and Minerals. Peekskill, New York.
- R. Soc. Sci. Upsaliensis.**  
Royal Society of Science. Upsala, Sweden.

**School of Mines Quarterly.**

School of Mines Quarterly. Columbia University, New York City.

**Schweizer Min. und Petrogr. Mitt.**

Schweizer mineralogische und petrographische Mitteilungen.

**Science; \*Science, new ser.**

Science; Science, new series. New York City.

**Scientific American; Scientific American Supplement.**

Scientific American; Scientific American Supplement. New York City.

**Scientific Monthly.**

Scientific Monthly. New York City.

**Seismol. Soc. America Bull.**

Seismological Society of America, Bulletin. Stanford University, California.

**Smithsonian Inst. Ann. Rept.; Explorations and Field Work; Misc. Coll.**

Smithsonian Institution, Annual Report; Explorations and Field Work; Miscellaneous Collections. Washington, D. C.

**Soc. Geol. de France, Bull.**

Société Géologique de France, Bulletin. Paris.

**Soc. Research on Meteorites Contr.**

Society for Research on Meteorites, Contributions. Los Angeles, California.

**Southern Calif. Acad. Sci. Bull.**

Southern California Academy of Sciences, Bulletin. Los Angeles.

**Southwestern Assoc. Petroleum Geologists Bull.**

Southwestern Association of Petroleum Geologists, Bulletin. (Continued as American Association of Petroleum Geologists, Bulletin, q. v.).

**\*South-Western Mines.**

South-Western Mines. Albuquerque, New Mexico. 'No longer published.

**Stone.**

Stone. Chicago, Illinois.

**Technology Quarterly.**

Technology Quarterly and Proceedings of the Society of Arts. Earlier, Technology Quarterly. Massachusetts Institute of Technology, Boston.

**Texas Archeol. and Paleont. Soc. Bull.**

Texas Archeological and Paleontological Society, Bulletin. Abilene, Texas.

**Texas Geol. Survey Ann. Rept.**

Texas Geological Survey, Annual Report. Austin.

**Texas Univ. Bull.; Min. Survey Bull.; Pub.**

Texas University Bulletin; Mineral Survey Bulletin; Publications. Austin.

**The Explosives Engineer.**

The Explosives Engineer. Wilmington, Delaware.

**Torreyia.**

Torreyia. Lancaster, Pennsylvania.

**Tufts College Studies.**

Tufts College Studies. Tufts College, Massachusetts.

**Tulsa Geol. Soc. Digest.**

Tulsa Geological Society, Digest. Tulsa, Oklahoma.

**U. S. and Mexican Boundary Survey (Emory).**

Report on the United States and Mexican Boundary Surveys . . . (in charge of W. H. Emory).

**\*U. S. Bur. Mines Bull.; Info. Circ.; Min. Res.; Rept. Inv.; Tech. Paper; War Minerals Rept.**

United States Bureau of Mines, Bulletin; Information Circular; Mineral Resources of the United States; Report of Investigations; Technical Paper; War Minerals Report. Washington, D. C.

- U. S. Bur. Soils Bull.; Circ.; Field Operations.**  
United States Bureau of Soils, Bulletin; Circular; Field Operations. Washington, D. C.
- (U. S.)—Cong., —Sess., S. Ex. Doc.; H. Ex. Doc.**  
(United States) —Congress, —Session, Senate Executive Document No.—; House of Representatives Executive Document No.—.
- U. S. Dept. Agr., Exper. Sta.**  
United States Department of Agriculture, Experiment Station. Washington, D. C.
- U. S. Dept. Interior Press Mem.**  
United States Department of the Interior, Press Memoranda. Washington, D. C.
- U. S. Geog. and Geol. Survey Rocky Mt. Region (Powell).**  
United States Geographical and Geological Surveys of the Rocky Mountain Region (in charge of J. W. Powell).
- U. S. Geog. Survey West of the 100th Meridian (Wheeler).**  
United States Geographical Surveys West of the 100th Meridian (in charge of Lieut. George M. Wheeler).
- U. S. Geol. and Geog. Survey Terr. (Hayden).**  
United States Geological and Geographical Surveys of the Territories (in charge of F. V. Hayden).
- \*U. S. Geol. Survey, Ann. Rept.; Bull.; Geol. Atlas; Min. Res.; Mon.; Prof. Paper; Topog. Atlas; Water-Supply Paper.**  
United States Geological Survey, Annual Report; Bulletin; Geologic Atlas; Mineral Resources of the United States; Monograph; Professional Paper; Topographic Atlas; Water-Supply Paper. Washington, D. C.
- U. S. Nat. Mus. Bull.; Proc.**  
United States National Museum, Bulletin; Proceedings. Washington, D. C.
- U. S. Pacific R. R. Expl.**  
United States (War Department), Pacific Railroad Explorations (U. S., 33d Congress, 1st session, House of Representatives Ex. Doc. 129, vol. 18, parts 1-4). Reports of explorations and surveys to ascertain the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean, made . . . in 1853-54 . . . (U. S., 33d Congress, 2d session, Senate Executive Document 78 and House Executive Document 91).
- U. S. Treasury Dept.**  
United States Treasury Department. Washington, D. C.
- U. S. [War Dept.] Chief Eng. Ann. Rept.**  
United States [War Department], Chief of Engineers, Annual Report. Washington, D. C.
- Univ. Calif. Pub. Geog.**  
University of California, Publications in Geography. Berkeley.
- Upsala Univ. Geol. Inst. Bull.**  
Upsala University Geological Institute, Bulletin. Upsala, Sweden.
- Utah Acad. Sci. Trans.**  
Utah Academy of Sciences, Transactions. Salt Lake City.
- Wash. Acad. Sci. Jour.; Proc.**  
Washington [D. C.] Academy of Sciences, Journal; Proceedings.
- World Petroleum.**  
World Petroleum. New York City.
- Yale Univ. Peabody Mus. Mem.**  
Yale University, Peabody Museum, Memoirs. New Haven, Connecticut.
- Zeitschr. Geomorphologie.**  
Zeitschrift für Geomorphologie. Leipzig.
- Zeitschr. Kryst.**  
Zeitschrift für Krystallographie und Mineralogie. Leipzig.

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[An asterisk (\*) indicates material reproduced by other means than ordinary printing.]

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#### Adams, John Emery.

1. Triassic of west Texas: Am. Assoc. Petroleum Geologists Bull., vol. 13, no. 8, pp. 1045-1055, 2 figs., August 1929.
2. Origin, migration, and accumulation of petroleum in limestone reservoirs in the western United States and Canada: *Problems of Petroleum Geology*, pp. 347-363, Am. Assoc. Petroleum Geologists, 1934.
3. (and others). Standard Permian section of North America: Am. Assoc. Petroleum Geologists Bull., vol. 23, no. 11, pp. 1673-1681, November 1939.
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## PART II. INDEX

### INTRODUCTORY NOTE <sup>1</sup>

The geologic literature of New Mexico is listed by subject under seven major heads, as follows:

**Mineralogy.** Papers giving mineral analyses, descriptions, and localities.

**Mining.** Papers dealing with mines and mining districts, substances, both metallic and non-metallic, and general mining geology.

**Paleontology.** Papers describing or interpreting the fossil remains of animals, both invertebrate and vertebrate, the fossil remains of plants, and the remains of early man.

**Petroleum.** Descriptions of oil and gas fields; papers on petroleum geology and statistics.

**Physical.** Geologic descriptions of areas; papers on geology of dam and reservoir sites, erosion and sedimentation, structural geology, physiography, meteorites, and general physical geology.

**Stratigraphy.** Papers covering the description, history, correlation or geographic extent of formations and other stratigraphic units.

**Underground water.** Descriptions of underground-water resources of areas; papers on springs, underground solution, etc.

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 Kelly mines, aurichalcite: Keyes, 11.  
 Magnesite, Dona Ana Co.: Taft, 1.

**Mineralogy (continued).**

- Meteorites:  
 Analyses: Henderson, E. P., 2.  
 Grants: Henderson, E. P., 1.  
 Pasamonte: Foshag, 2.  
 Roy: Heineman, 1.  
 Santa Fe: Henderson, E. P., 1.  
 Mexican boundary:  
 Chemical analyses: Easter, 1.  
 Petrographic report: Lord, 1.  
 Microlith in spodumene pegmatite  
 at Embudo: Hirschi, 1.  
 Mimetite: Bowman, 1; Paul, 1.  
 Minerals associated with copper:  
 Stone, G. H., 3.  
 Monazite, Glorieta: Muench, 1.  
 Muscovite: Schaller, 2.  
 Nickel arsenide, Grant Co.: Waller,  
 1.  
 Onyx marbles: Merrill, 2.  
 Organ batholith, diopside crystals:  
 Dunham, 2.  
 Organ Mtns.:  
 Calamine: Ford, 1.  
 Pentatite: Hunt, W. F., 1.  
 Pasamonte meteorite: Foshag, 2.  
 Pentatite, Organ Mtns.: Hunt, W.  
 F., 1.  
 Petaca, samarskite: Hess, 5.  
 Potash minerals: Schaller, 3, 4, 5, 6.  
 Pseudobrookite, Black Range:  
 Fries, 2.  
 Pseudocubic quartz crystals, Ar-  
 tesia: Tarr, W. A., 2.  
 Pseudomorphs of native copper  
 after azurite, Grant Co.:  
 Yeates, 1.  
 Pyrolusite, DeBaca Co.: Allen, K., 1.  
 Pyromorphite: Bowman, 1.  
 Quartz:  
 In basalts: Iddings, 1.  
 In gypsum: Tarr, W. A., 1.  
 Pseudocubic crystals, Artesia:  
 Tarr, W. A., 2.  
 Red River provenance: Sidwell, 4.  
 "Ribbon rock," beryllium-bearing  
 tactite from Iron Mtn.: Jahns,  
 4.  
 Roy meteorite: Heineman, 1.  
 Samarskite, Petaca: Hess, 5.  
 Santa Fe meteorite: Henderson, E.  
 P., 1.  
 Santa Rosa sandstone: Sidwell, 2.  
 Selenite near Fort Stanton: Hills,  
 R. C., 1.  
 Sesquisulfate of iron: Pearce, 1.  
 Sierra Co., galena: Chisolm, 1.  
 Silver City: Wuestner, 1.  
 Tellurium: Ballmer, 1.  
 Ultramarine: Packard, 1.

**Mineralogy (continued).**

- Smithsonite, cadmium in: Schaller, 7.  
Spectrograph, use of: Strock, 1.  
Sylvite, Carlsbad: Pierce, R. A., 1.  
Tactite, Iron Mtn.: Jahns, 4.  
Taos Co., iceland spar: Johnson, J. H., 3.  
Tellurium: Crawford, 1.  
Near Silver City: Ballmer, 1.  
Tests for helvite: Gruner, 2.  
Tetradymite: Short, 1.  
Thulite: Northrop, 4.  
Tremolite in limestone, Capitan quadrangle: Patton, 1.  
Turquoise: Clark, 2.  
Chalchihuitl of ancient Mexicans: Blake, 2.  
Composition: Penfield, 3.  
New localities: Hidden, 1.  
Origin of, in Burro Mtns.: Paige, 5.  
Ultramarine, Silver City: Packard, 1.  
Vanadates, Lake Valley: Genth, 2, 3.  
Vanadinite: Bowman, 1; Paul, 1.  
Crystallized: Penfield, 1.  
Elephant Butte: Keyes, 74.  
White Sands, heavy minerals: Needham, 8.  
Willemite: Lindgren, 4; Penfield, 2.  
Wulfenite:  
Hemimorphic crystals: Ingersoll, 1.  
Zeolites: Needham, 4.

**Mining.**

- Appraisal of mining properties: Finlay, 2.  
Azure turquoise mine, Grant Co.: Dinsmore, 2.  
Coal fields: Judd, E. K., 1; Lakes, 2; Lee, 16; Parker, E. W., 1; Ritter, 1.  
Carthage, Socorro Co.: Gardner, J. H., 6.  
Cerrillos, Santa Fe Co.: Lakes, 1; Lee, 19; Stevenson, J. J., 12.  
Chacra Mesa, McKinley Co.: Dane, 2.  
Dawson, Colfax Co.: Sheridan, 1.  
Durango, Colo.-Monero, N. Mex.: Gardner, J. H., 3.  
Durango-Gallup: Schrader, 1; Shaler, 2, 3.  
Engle, Sierra Co.: Lee, 3.  
Fort Stanton, Lincoln Co.: Campbell, 3.  
Gallina-Raton Spring, Rio Arriba Co.: Gardner, J. H., 2.

**Mining (continued).**

- Coal fields (continued).  
Gallup: Harrington, E. R., 23.  
Gallup-Mt. Taylor: Sears, 2.  
Gallup-San Mateo: Gardner, J. H., 4.  
Gallup-Zuni basin: Sears, 1.  
Hagan, Sandoval Co.: Keyes, 10.  
Jemez, Sandoval Co.: Reagan, 3.  
La Ventana-Chacra Mesa, McKinley and Sandoval cos.: Dane, 2.  
Mescal Canyon: Keyes, 35.  
Midget field of America: Keyes, 71.  
Mount Taylor: Hunt, C. B., 2.  
Northern N. Mex.: Judd, E. W., 1.  
O'Mara: Keyes, 71.  
Raton, Colfax Co.: Lakes, 4; Lee, 10, 12, 13, 14, 31.  
Rio Pecos, San Miguel Co.: Gardner, J. H., 8.  
Rocky Mountain: Storrs, 1.  
San Mateo-Cuba, McKinley and Sandoval cos.: Gardner, J. H., 7.  
Santa Fe and San Miguel cos.: Gardner, J. H., 5.  
Sierra Blanca, Lincoln and Otero cos.: Wegemann, 1.  
Stag Canon Fuel Co., Dawson, Colfax Co.: Sheridan, 1.  
Structural features: Kirk, C. T., 2.  
Tijeras, Bernalillo Co.: Lee, 15.  
Una del Gato, Sandoval Co.: Campbell, 2.  
White Mtn. region: Fisher, 1; Wegemann, 1.  
Chino Enterprise: Richard, 1.  
Chino mines: Clifford, 2.  
Contact-metamorphic iron deposit: Smythe, 2.  
Convergence of roof and floor in potash mine: Pierce, C. A., 1.  
Dialytic role of selvages: Keyes, 70.  
Differentiation and ore deposition: Lindgren, 8.  
Districts: Birnie, 1; Butler, B. S., 1; Cazin, 1; Finlay, 2; Hill, J. M., 1; Lasky, 3; Stevenson, J. J., 4.  
Apache, Sierra Co.: Wade, 3.  
Apache Canyon placers: Keyes, 4.  
Aztec mine, Baldy, Colfax Co.: Chase, 1; Lee, 22.  
Baldy, Colfax Co.:  
Aztec mine: Chase, 1; Lee, 22.  
Bayard area, Grant Co.: Lasky, 6.  
Black Hawk, Grant Co.:  
Silver-cobalt: Leach, A. A., 1.

**Mining (continued).**

## Districts (continued).

- Black Range, Catron and Sierra cos.: Fishback, 1; Wright, J. W., 1.  
 Geology: Gordon, 1.  
 Rhyolite: Fries, 2.  
 Tin: Fries, 1; Harrington, E. R., 19; Naething, 1.  
 Bland, Sandoval Co.:  
 Gold: Harrington, E. R., 11.  
 Boston Hill, Grant Co.:  
 Manganiferous iron ores: Entwistle, 1, 2.  
 Bullard's Peak, Grant Co.:  
 Silver: Krieger, 2.  
 Burro Mtns., Grant Co.: Lang, S. S., 1; Paige, 3; Somers, 1; Stauber, 1.  
 Azure turquoise mine: Dinsmore, 2.  
 Copper: Reid, G. D., 1; Somers, 1; Wade, 1.  
 Phelps-Dodge: Bush, 1.  
 Porphyry copper: Bush, 7.  
 Turquoise: Dinsmore, 2; Paige, 5; Zalinski, 1, 2; Anon., 7.  
 Caballo Mtns.: Keyes, 20.  
 Copper and lead: Herrick, C. L., 6.  
 Vanadium: Allen, C. A., 1; Hess, 1; Larsh, 1.  
 Catron Co.:  
 Fluorspar: Anon., 22.  
 Slayback lode: Henrich, 2.  
 Central, Grant Co.: Schmitt, 1, 4.  
 Bayard area: Lasky, 6.  
 Ground Hog mine: Lasky, 1, 12.  
 Central N. Mex.:  
 Silver pipe: Keyes, 3.  
 Cerrillos, Santa Fe Co.:  
 Ortiz gold mine: Harrington, E. R., 6.  
 Turquoise: Harrington, E. R., 5.  
 Chino property, Grant Co.: Dinsmore, 2; Thorne, 1.  
 Chloride, Sierra Co.: Baumhauer, 1.  
 Chupadera Mesa, Socorro Co.:  
 Iron deposits: Keyes, 9, 67, 99.  
 Cochiti (Bland), Sandoval Co.:  
 Barbour, 1; Jenks, 3; Statz, 6; Wynkoop, 1.  
 Colfax Co.: Anon., 13.  
 Cooney, Catron Co.: Anderson, 1; Graham, 1; Weatherby, 1.  
 Copper Glance mine, Grant Co.:  
 Snow, 1.  
 Deming vicinity: Darton, 5.  
 Fairview: Smythe, 2.  
 Elephant Butte, Sierra Co.:  
 Vanadinite: Keyes, 74.

**Mining (continued).**

## Districts (continued).

- Embudo:  
 Lepidolite: Roos, 1.  
 Fierro, Grant Co.:  
 Metamorphism and ore deposition: Landon, 1.  
 Geographical distribution in U. S.: Raymond, 5.  
 Gila River alum deposits: Hayes, 1.  
 Grant Co.:  
 Meerscham: Michel, 1.  
 Nickel arsenide: Waller, 1.  
 Grants, Valencia Co.:  
 Fluorspar: Kutnewsky, 2.  
 Pumice: Kutnewsky, 2.  
 Ground Hog mine, Grant Co.:  
 Lasky, 1, 12.  
 Guadalupe Co. copper deposit:  
 Stauber, 2.  
 Guadalupe Mtns.:  
 "Lost mines": Rickard, 2.  
 Hamilton mine, San Miguel Co.:  
 Lindgren, 2.  
 Hanover, Grant Co.: Paige, 10.  
 Iron ores: Birkinbine, 1; Paige, 1.  
 Metamorphism and ore deposition: Landon, 1.  
 Pewabic mine: Schmitt, 5.  
 Hell Canyon, Bernalillo Co.:  
 Statz, 5.  
 Iron Mtn., Sierra Co.: Jahns, 2, 4; Strock, 1, 2; Anon., 19.  
 Jemez-Albuquerque region: Reagan, 5.  
 Jemez Canyon, Sandoval Co.:  
 Sulphur: Mansfield, 1, 2.  
 Jones Camp, Socorro Co.: Emmons, 1.  
 Kelly, Socorro Co.: Brinsmade, 2; Herrick, C. L., 2; Johnson, W. McA., 1; Anon., 12.  
 Lake Valley, Sierra Co.:  
 Age: Silliman, 5.  
 Geology: Cope, 26, 40.  
 Invertebrate fossils: Cope, 34.  
 Manganese: Harrington, E. R., 14.  
 Silver: Clark, E., 1; Keyes, 36; MacDonald, B., 1.  
 Las Vegas, San Miguel Co.: Bush, 8.  
 Little Florida Mtns., Luna Co.:  
 Manganese: Lasky, 11.  
 Little Hatchet Mtns., Grant and Hidalgo cos.: Lasky, 10.  
 Lordsburg, Hidalgo Co.: Fry, 1; Jones, F. A., 4; Lasky, 4, 8; Wells, J. L., 1.

**Mining (continued).**

## Districts (continued).

Lucky Bill mine, Grant Co.:  
Larsh, 3.

Magdalena, Socorro Co.: Statz,  
1; Tuttle, 1.

Geology: Gordon, 5; Loughlin,  
1; Statz, 7.

Ore deposits: Argall, 1;  
Loughlin, 1.

Zinc: Haddon, 1; Keyes, 19.

Malone mines, Grant Co.: Leach,  
A. A., 3.

Mesa del Oro, placers: Leather-  
bee, 3.

Mogollon, Catron Co.: Andersen,  
1; Bush, 3; Ferguson, 1, 2;  
Henrich, 2; Kidder, 1; Scott,  
D. B., 1; Spillsbury, 1;  
Weatherby, 1.

Mora Co.: Austin, 1; Anon., 14.

Moreno, Colfax Co.: Jones, F. A.,  
13.

Northeastern N. Mex.: Harley, 2;  
Sternberg, 1.

Northwestern N. Mex.:

Clay: Shaler, 2.

Gypsum: Shaler, 1.

Organ Mtns.: Bond, 1; Dunham,  
1, 2; Welsh, 1.

Oro Grande mine, Grant Co.:  
Pickard, 1.

Orogrande, Otero Co.: Leech, 1.

Oscura Mtns.:

Copper: Peters, 1; Turner, H.  
W., 1.

Otero Basin: Free, 1.

Pecos, San Miguel Co.:

Geology: Scott, C. E., 1.

Zinc-lead: Krieger, 1.

Pewabic mine: Schmitt, 5.

Pinos Altos, Grant Co.: Blood, 1;  
Bush, 2; Paige, 2; Wade, 4;  
Wright, I. L., 1.

Potosi mine, Grant Co.: Snow, 2.

Questa, Taos Co.: Butler, B. S.,  
2; Carman, 1; Sundberg, 1;  
Vanderwilt, 2, 3.

R and S mine, Taos Co.: Larsen,  
E. S., 1.

Raton, Colfax Co.:

Graphite: Lakes, 4.

Red River, Taos Co.: Bush, 4;  
Fain, 1; Kelly, R. P., 1.

Rio Grande auriferous gravels:  
Silliman, 1.

Rosedale, Socorro Co.: Statz, 3;  
Anon., 6.

Salt plains of N. Mex.: Gibbs, 1.

San Andres Mtns.:

Copper and lead: Herrick, C.  
L., 6.

**Mining (continued).**

## Districts (continued).

San Pedro, Santa Fe Co.: Berry-  
man, 1; Brinsmade, 3; Hen-  
rich, 1; Herrick, C. L., 5;  
McCaffery, 1; Statz, 2.

Santa Fe Co.:

Placers: Jones, F. A., 3; Statz,  
4.

Santa Rita, Grant Co.: Paige, 10;  
Rickard, 1; Spencer, 1.

Copper: Paige, 11.

Geologic and structural rela-  
tions: Paige, 6.

Metamorphism and ore deposi-  
tion: Landon, 1.

Mining practice at Chino  
Mines: Thorne, 1.

Prospecting and mining: Mac-  
Donald, D. F., 1.

Secondary enrichment: Bagg,  
1.

Sierra Co.: Harley, 1.

United States mine: Anon., 20.

Vanadium: Leatherbee, 1.

Sierra del Oro: Keyes, 64.

Silver City vicinity: Brinsmade,  
4; Entwistle, 2; Umpleby, 1;  
Wuestner, 1.

Slayback lode, Catron Co.: Hen-  
rich, 2.

Socorro Co.: Lasky, 2.

Socorro region:

So-called tripoli: Herrick, C. L.,  
1.

Southeastern N. Mex.:

Potash: Smith, H. L., 1, 2.

Southern N. Mex.: Endlich, 1;  
Silliman, 4.

Apache Canyon placers: Keyes,  
4.

Southwestern N. Mex.: Blake, 6;  
Furman, 1; Lusk, 1; Snow, 1;  
Winchell, 1.

Stauber mine, Guadalupe Co.:  
Anon., 21.

Steeple Rock, Grant Co.: Bush, 5;  
Anon., 11.

Sylvanite, Hidalgo Co.: Dinsmore,  
1; Jones, F. A., 6, 7, 9; Mar-  
tin, 1; Anon., 8.

Taylor Creek, Catron and Sierra  
cos.:

Tin deposits: Hill, J. M., 2.

Torpedo copper mine: Anon., 17.

Tres Hermanas, Luna Co.: Lind-  
gren, 5; Wade, 2.

Tyrone, Grant Co.:

Copper: Paige, 9, 11.

United States mine, Sierra Co.:  
Anon., 20.

**Mining (continued).**

- Districts (continued).  
 Virginia, Hidalgo Co.:  
   Hydrothermal leaching: Lasky, 7.  
   Igneous assimilation: Lasky, 5.  
   White Oaks, Lincoln Co.: Smith, E. P., 1.  
 White Signal, Grant Co.:  
   Radium ores: Leach, F. I., 1.  
 Zuni, McKinley Co.: Darton, 1, 2, 31.  
 Zuni Mtns.:  
   Copper: Schrader, 2.  
   Fluorspar: Kutnewsky, 4.  
 Dry placers: Heikes, 1; Stone, G. H., 2.  
 Earth resistivity in potash exploration: Spicer, 1.  
 Electrical prospecting for molybdenite: Sundberg, 1.  
 Fluorine in sericitization: Paige, 8.  
 General: Ellis, 4; Emmons, W. H., 1; Endlich, 1; Fleming, 1; Frazer, 1; Harrington, E. R., 15; Herrick, C. L., 7, 12, 13; Hewett, J. V., 1; Hill, J. M., 1; Jones, F. A., 1, 5, 8, 15; Keyes, 58, 73; Lasky, 3; Lindgren, 1, 6; Loew, 1, 2; Needham, 10; Newhouse, 1; Owen, R. E., 1; Ransome, 1; Schmitt, 2, 6; Schrader, 3; Talmage, 5; To-vote, 2; U. S. Bureau of Mines, 1; U. S. Geological Survey, 1; Wells, E. H., 3, 5, 6; Anon., 2, 3, 4.  
 Geologic and structural relations, Santa Rita, Grant Co.: Paige, 6.  
 Ghost town manganese: Harrington, E. R., 14.  
 History: Henderson, C. W., 1.  
 Juratrias copper: Jenks, 1.  
 Hydrothermal leaching, Virginia, Hidalgo Co.: Lasky, 7.  
 Hypothermal deposits: McLaughlin, 1.  
 Igneous assimilation, Virginia, Hidalgo Co.: Lasky, 5.  
 Laws: Fowler, 1, 2.  
 "Lost mines": Rickard, 2.  
 Mesothermal deposits:  
   Copper: Hart, 1.  
   Silver-lead-zinc: McKnight, 1.  
 Metamorphism, contact, Virginia district: Lasky, 5.  
 Mineral resources, general: Browne, 1, 2; U. S. Bureau of Mines, 1; U. S. Geological Survey, 1.  
 Metallic: Lasky, 3.  
 Non-metallic: Talmage, 5.

**Mining (continued).**

- Mining districts, see Districts.  
 Pegmatites: Hess, 6.  
 Taos and Rio Arriba cos.: Jahns, 3; Just, 2.  
 Placers: Pardee, 1.  
 Apache Canyon: Keyes, 4.  
 Dry: Heikes, 1; Stone, G. H., 2.  
 Mesa del Oro: Leatherbee, 3.  
 Santa Fe Co.: Jones, F. A., 3; Statz, 4.  
 Upper Rio Grande: Silliman, 1.  
 Prehistoric mining: Harrington, E. R., 13.  
 Production estimate, Organ Mtns.: Bond, 1.  
 Pyrometamorphic deposits: Knopf, 1, 2.  
 Iron Mtn., Sierra Co.: Jahns, 2.  
 Redbed formations: Bains, 1.  
 Replacements, mesothermal copper: Hart, 1.  
 Resources for defense: Kutnewsky, 1.  
 Secondary enrichment: Emmons, W. H., 1.  
 Santa Rita district: Bagg, 1.  
 Sedimentary metalliferous deposits: Finch, 1, 2.  
 Selvages, dialytic role of: Keyes, 70.  
 Sericitization, fluorine in: Paige, 8.  
 Silver pipe, central N. Mex.: Keyes, 3.  
 Slayback lode, Catron Co.: Henrich, 2.  
 Statistics of mines and mining: Raymond, 1, 2, 3, 4, 7, 8.  
 Structural features of ore deposits: Billingsley, 1; Newhouse, 1, 2.  
 Substances: Blake, 3; Butler, B. S., 1; Lasky, 3.  
 Alum, Gila River: Hayes, 1.  
 Alunogen: Blake, 5.  
 Anthracite: see Coal.  
 Bauxite: Blake, 5.  
 Beryllium: Jahns, 2, 3, 4; MacFarlane, A., 1; Strock, 1, 2; Anon., 19.  
 Brass ore in nature: Keyes, 70.  
 Carbon dioxide: Talmage, 6; Wells, E. H., 10; Wendland, 1.  
 In geologic structures: Miller, J. C., 1.  
 Occurrence and origin: Germann, 1.  
 Cement: Eckel, 1.  
 Cerargyritic ores: Keyes, 32.  
 Clay: Shaler, 2.  
 Coal: Ashburner, 1; Campbell, 5, 6; Ellis, 7; Griffith, 1; Lakes, 2; Parker, E. W., 1.

**Mining (continued).****Substances (continued).****Coal (continued).**

- Analyses: Campbell, 4; Anon., 15.  
 Anthracite: Griffith, 1; Lakes, 1; Raymond, 6.  
 Basins, of Rocky Mtns.: Ritter, 1.  
 Bibliography: Bates, 3.  
 Carbon ratios: Storm, 1.  
 Coal Measures forest: Herrick, C. L., 14.  
 Cretaceous: Leconte, 2.  
 Fields, see Coal fields.  
 Ohio Coal Measures horizon in N. Mex.: Herrick, C. L., 8.  
 Copper: Cazin, 1, 2; Harrington, E. R., 18; Tovote, 1; Weed, 1; Wendt, 1; Winchell, 1.  
 Associated minerals: Stone, G. H., 3.  
 Burro Mtns., Grant Co.: Bush, 1, 7; Lang, S. S., 1; Reid, G. D., 1; Somers, 1; Wade, 1.  
 Chino property, Grant Co.: Dinsmore, 2.  
 Chloride, Sierra Co.: Baumhauer, 1.  
 Copper Glance and Potosi mines, Grant Co.: Snow, 2.  
 Disseminated: Locke, 1.  
 Garnet contact deposits: Keyes, 43.  
 In sandstone: Jenks, 2; Stauber, 2.  
 Juratrias: Jenks, 1.  
 Lordsburg, Hidalgo Co.: Lasky, 4.  
 Mesothermal veins and replacements: Hart, 1.  
 Minor districts: Koschmann, 3.  
 Mora Co.: Austin, 1, 2.  
 Oscura Mtns.: Peters, 1; Turner, H. W., 1.  
 Redbeds: Emmons, S. F., 4; Finch, 2; Rogers, 1; Turner, H. W., 2.  
 San Andres and Caballo Mtns.: Herrick, C. L., 6.  
 San Pedro Mine, Santa Fe Co.: Henrich, 1.  
 Santa Rita, Grant Co.: MacDonald, D. F., 1.  
 Sedimentary deposits: Finch, 2.  
 Stauber mine, Guadalupe Co.: Anon., 21.  
 Torpedo mine: Anon., 17.  
 Tyrone, Grant Co.: Paige, 9.  
 Zuni Mtns.: Schrader, 2.

**Mining (continued).****Substances (continued).**

- Fluorspar: Burchard, 1, 2; Johnston, 1.  
 Catron Co.: Anon., 22.  
 Grants, Valencia Co.: Kutnewsky, 2.  
 Near Deming: Darton, 5.  
 United States mine, Sierra Co.: Anon., 20.  
 Zuni Mtns.: Kutnewsky, 4.  
 Gems: Kay, 1.  
 Gold: Blake, 3; Jones, F. A., 2; Wells, E. H., 7.  
 Aztec mine, Baldy, Colfax Co.: Chase, 1; Lee, 22.  
 Bland, Sandoval Co.: Harrington, E. R., 11.  
 Gravels: Carruth, 1; Silliman, 1; Stone, G. H., 2.  
 Ortiz mine, near Cerrillos: Harrington, E. R., 6.  
 Placers: Stone, G. H., 2.  
 San Pedro, Santa Fe Co.: Statz, 1.  
 Sierra del Oro: Keyes, 64.  
 Sylvanite camp: Dinsmore, 1; Jones, F. A., 6, 7, 9; Anon., 8.  
 Graphite:  
 Raton, Colfax Co.: Lakes, 4; Lee, 12, 18.  
 Gypsum: Darton, 19; Herrick, H. N., 1; Santmyers, 1.  
 Northwestern N. Mex.: Shaler, 1.  
 Iceland spar: Kelley, 1; Van Amringe, 1.  
 Properties and uses: Johnson, J. H., 4.  
 Taos Co.: Johnson, J. H., 3, 4.  
 Iron:  
 Chupadera Mesa, Socorro Co.: Keyes, 9, 67, 99.  
 Contact metamorphic, near Fairview: Smythe, 2.  
 Hanover, Grant Co.: Birkinbine, 1; Paige, 1.  
 Jones camp, Socorro Co.: Emmons, 1.  
 Manganiferous, near Silver City: Entwistle, 1, 2; Umpleby, 1.  
 Meteoric: Eakins, 1.  
 Sesquisulfate: Pearce, 1.  
 Kaolin: Richard, 1.  
 Lead:  
 Pecos, San Miguel Co.: Krieger, 1.  
 Lepidolite near Embudo: Roos, 1.  
 Lithium: Chambers, 1; Jahns, 3.  
 Magnesium: Anon., 24.

**Mining (continued).**

## Substances (continued).

Manganese: Harder, 1; Hewett, D. F., 1; Jones, E. L., 1; Wells, E. H., 1; Anon., 16.

Bibliography: Healey, 1.

Lake Valley, Sierra Co.: Harrington, E. R., 14.

Little Florida Mtns., Luna Co.: Lasky, 11.

Production, 1927; Furness, 1.

Pyrolusite, DeBaca Co.: Allen, K., 1.

Manganiferous iron ores: Entwistle, 1, 2; Umpleby, 1.

Meerscham: Bush, 6; Michel, 1; Sterrett, 1, 2.

Mica: Holmes, 1; Sterrett, 6, 7; Anon., 14.

Molybdenum: Vanderwilt, 1.

Electrical prospecting for: Sundberg, 1.

Questa, Taos Co.: Butler, B. S., 2; Carman, 1; Sundberg, 1; Vanderwilt, 2, 3.

R and S mine, Taos Co.: Larsen, E. S., 1.

Bent, Otero Co.: Ball, 1.

Romero mine near Las Vegas: Bush, 8.

Nickel arsenide, Grant Co.: Waller, 1.

Nitrate deposits: Gale, 1.

Portland cement: Eckel, 1.

Potash: Delacote, 1; Hance, 1; Hoots, 1; Mansfield, 3, 4, 5; Smith, H. L., 1, 2; Woods, A. F., 1; Anon., 18.

Castile formation: Kroenlein, 1.

Commercial possibilities:

Wroth, 1, 2.

Convergence of roof and floor: Pierce, C. A., 1.

Earth resistivity in exploration: Spicer, 1.

Magnesium metal from: Anon., 24.

Mineralogy: Schaller, 3, 4, 5, 6.

Otero Basin: Free, 1.

Potash Co. of America: Pierce, R. A., 1.

Salt occurrences: Ageton, 1.

Pumice:

Grants, Valencia Co.: Kutnewsky, 2.

Pyrolusite:

DeBaca Co.: Allen, K., 1.

Radium ores: Leach, A. A., 2.

White Signal, Grant Co.: Leach, F. I., 1.

Rare metals: Keyes, 70.

**Mining (continued).**

## Substances (continued).

Salt: Darton, 20; Phalen, 1.

Plains: Gibbs, 1.

Southeastern N. Mex. Hoots, 1; Kroenlein, 1.

Zuni lake: Darton, 1, 2, 31.

Silver: Jones, F. A., 2; Winchell, 1.

Bullard's Peak, Grant Co.: Krieger, 2.

Lake Valley, Sierra Co.: Clark, E., 1; Keyes, 36; MacDonald, B., 1.

Silver-cobalt ores:

Black Hawk, Grant Co.: Leach, A. A., 1.

Silver-lead-zinc deposits: McKnight, 1.

Sodium sulfate: Lang, W. T. B., 6; Wells, R. C., 1.

Stone: Burchard, 3.

Sulphur:

Jemez Canyon, Sandoval Co.: Mansfield, 1, 2.

Tantalum: Jahns, 3.

Tellurium: Ballmer, 1.

Tin:

Black Range, Catron and Sierra cos.: Fries, 1; Harrington, E. R., 19; Naething, 1.

Tripoli: Herrick, C. L., 1.

Tungsten: Hess, 2, 3.

Turquoise: Cowan, 1; Fenderson, 1; Jones, F. A., 10, 14; Kunz, 5; Lakes, 3; Silliman, 2, 3; Sterrett, 3, 4, 5.

America's first mines: Harrington, E. R., 5.

Azure mine: Dinsmore, 2.

Burro Mtns.: Zalinski, 1, 2; Anon., 7.

New localities: Hidden, 1.

Origin of, in Burro Mtns.: Paige, 5.

Southwestern N. Mex.: Snow, 1.

Vanadium: Carrera, 1; Edwards, 1; Johnson, E. D., 1; Leatherbee, 2.

Caballo Mtns.: Allen, C. A., 1; Clifford, 1; Hess, 1; Larsh, 1.

Elephant Butte, Sierra Co.: Keyes, 74.

In old silver mines: Larsh, 2.

Lucky Bill mine, Grant Co.: Larsh, 3.

Sierra Co.: Leatherbee, 1.

Zinc: Brinsmade, 1; Kutnewsky, 3.

Kelly, Socorro Co.: Brinsmade, 2.

Magdalena Range: Haddon, 1; Keyes, 19.



**Mining (continued).**

Substances (continued).

Zinc (continued).

Minerals: Demaret, 1.

Pecos, San Miguel Co.: Krieger, 1.

Southwestern N. Mex.: Blake, 6; Huttl, 1.

Tectonics: Billingsley, 1.

Veins:

Fissure: Henrich, 2.

Mesothermal copper: Hart, 1.

Ojo Caliente: Lindgren, 3.

Pipe: Keyes, 65.

**Paleontology.**

Antiquity of man: Cook, 1, 2; Stock, 4.

Archeology, San Jon district: Roberts, 1.

Artifacts:

Agate: McCann, 2.

And fossil vertebrates: Hay 6; Howard, E. B., 1.

Of andesite: Bryan, K., 26.

*Ashmunella*: Cockerell, 1.

Bone-cavern: Bryan, W. A., 1.

Carboniferous faunas: Keyes, 13; Newberry, 5.

Clovis excavations: Antevs, 1; Clark, W. T., 1; Cotter, 1, 2; Howard, E. B., 2; Patrick, 1; Stock, 5.

Coprolite: Eames, 1.

Cretaceous: Brown, B., 1; Conrad, 1; Cope, 2, 5; Meek, 2.

Cultures:

Association with extinct fauna: Howard, E. B., 1, 3.

Folsom: Brown, B., 3.

Devonian faunas: Kindle, 1; Stainbrook, 1.

Early man: Howard, E. B., 4.

Eddy, N. Mex., shells collected near: Sterki, 1.

*Eryops*, *Eryopsoides*: Douthitt, 1.

Fauna of Tucumcari: Hyatt, 1.

Flints and extinct animals: Antevs, 1; Clark, W. T., 1; Cotter, 1, 2; Howard, E. B., 2; Patrick, 1; Stock, 5.

Flora, see Paleobotany.

Folsom culture: Brown, B., 3.

Folsom, N. Mex.: Hay, 6.

Folsom-Yuma problems: Ray, L. L., 3.

Fossil hunting in N. Mex.: Gilmore, 5.

Fossil vertebrates and human artifacts: Hay, 6.

Fossils collected near 35th parallel: Hall, J., 1.

**Paleontology (continued).**

Fossils from the redbeds: Lee, 9.

General: Bailey, 1; Bridge, 1; Hall, J., 1; Meek, 1; Musgrave, 1.

Glacial-age man: Cook, 2.

Guadalupe Mtns.:

Permian: Shumard, B. F., 3.

Human remains in Conkling Cavern: Stock, 2.

Invertebrate: White, C. A., 1, 3.

Abo sandstone: Böse, 1.

Algae: Johnson, J. H., 1, 2, 5, 6; Ruedemann, 1.

Ammonoids: Böse, 1; Haas, O., 1.

Blaine formation: Clifton, 1.

Blastoids: Cline, 1.

Brachiopoda: Young, 1.

Bryozoa:

New species: Prout, H. A., 1.

Upper Devonian: Fritz, M. A., 1, 2.

*Caninia* from Lower Carboniferous: Jeffords, 1.

Carboniferous: White, C. A., 4.

*Caninia*: Jeffords, 1.

Gastropods: Girty, 3, 4.

Cephalopods:

Cretaceous, Trinity group: Scott, G., 1, 2.

Eagle sandstone: Reeside, 3.

Pennsylvanian: Miller, A. K., 1; Young, 2.

Colorado formation: Stanton, 1.

Cretaceous:

Cephalopods from Trinity group: Scott, G., 1, 2.

Nonmarine: Stanton, 5.

Ostreidae of Gulf region: Stephenson, 1.

*Pinna*: White, C. A., 5.

Crinoids: Springer, F., 2.

Dakota formation: White, C. A., 19.

Devonian:

Bryozoa: Fritz, M. A., 1, 2.

Diatoms: Lohman, 1; Patrick, 1.

Dog Creek formation: Clifton, 1.

Eagle sandstone: Reeside, 3.

Ecologic distribution of algae: Johnson, J. H., 2.

Eocene:

Faunal horizons: Granger, 1, 2.

Mollusca: White, C. A., 8, 11.

*Forbesiocrinus*: Springer, F., 2.

Fusulinids: Needham, 3; Thompson, M. L., 1.

Gastropods:

Carboniferous: Girty, 3, 4.

*Girvanella*: Johnson, 1.*Gryphaea pitcheri*: Marcou, 8.

Guadalupe Mtns.:

Coraline algae: Ruedemann, 1.

**Paleontology (continued).**

- Invertebrate (continued).  
 Guadalupian fauna: Beede, 2;  
 Girty, 2.  
 Insects: Brues, 1; Cockerell, 5.  
 Jurassic:  
 Fresh-water invertebrates:  
 White, C. A., 10.  
 Insect larva: Cockerell, 5.  
 Lake Valley district: Cope, 34.  
 Laramie group molluscan fauna:  
 White, C. A., 7, 11.  
 Las Vegas, snails: Springer, A., 1.  
 Leonard series: Clifton, 1.  
 Miocene mollusca: White, C. A., 8.  
 Mississippian: Cline, 1.  
*Mizzia*: Johnson, J. H., 5.  
 Mollusks: Clark, W. T., 1; Cockerell, 3, 4; White, C. A., 7, 8, 11, 19.  
 Morrison formation: Stanton, 4.  
 Multituberculata: Granger, 3.  
 Nautiloids: Miller, A. K., 2.  
 Nonmarine Cretaceous: Stanton, 5.  
*Nubecularia* and *Girvanella*:  
 Johnson, J. H., 1.  
 Osage group: Cline, 1.  
 Ostreidae: Stephenson, 1.  
 Pennsylvanian:  
 Brachiopoda: Young, 1.  
 Cephalopoda: Miller, A. K., 1;  
 Young, 2.  
*Nubecularia* and *Girvanella*:  
 Johnson, J. H., 1.  
 Scaphopoda: Young, 2.  
 Permian:  
 Algae: Johnson, J. H., 2, 5, 6.  
 Blaine and Dog Creek formations: Clifton, 1.  
 Guadalupian fauna: Beede, 2;  
 Girty, 2.  
 Nautiloids: Miller, A. K., 2.  
 Redbeds: Beede, 1.  
 Reef trend: Hills, J. M., 1;  
 Johnson, J. H., 2.  
*Pinna*: White, C. A., 5.  
 Plateau province: White, C. A., 2.  
*Prionocyclus*: Haas, O., 1.  
 Pleistocene: Clark, W. T., 1;  
 Cockerell, 2.  
 Quaternary diatoms: Lohman, 1.  
*Sagenocrinus*: Springer, F., 2.  
 San Juan Basin:  
 Nonmarine Cretaceous: Stanton, 5.  
 Scaphopoda: Young, 2.  
 Shells from dry salt lake: Sterki, 1.  
 Snails: Cockerell, 2; Springer, A., 1.  
*Spirifer organensis*: Greger, 1.

**Paleontology (continued).**

- Invertebrate (continued).  
 Tertiary:  
 Mollusca: Cockerell, 3, 4.  
 Trinity group, cephalopods: Scott, G., 1, 2.  
 Lake Valley district: Cope, 34;  
 White, C. A., 6.  
 Subcarboniferous fossils: Miller, S. A., 1.  
 Laramie group: Newberry, 8.  
 Lime Creek fauna: Keyes, 30.  
 Man:  
 Antiquity of: Cook, 1, 2; Stock, 4.  
 Early: Howard, E. B., 4.  
 Glacial-age: Cook, 2.  
 New World: Figgins, 1.  
 Manzano fauna: Keyes, 113.  
 Mesozoic fossil types in Texas Permian: White, C. A., 17.  
 Mexican boundary: Hall, J., 2.  
 New World man: Figgins, 1.  
 Ouray limestone: Kindle, 1.  
 Paleobotany: Newberry, 2; Wieland, 2.  
 Animas formation: Knowlton, 8.  
*Chara*: Knowlton, 2.  
 Carpathian-Black Hills cycadeoid parallel: Wieland, 3.  
 Coal formation: Lesquereux, 2.  
 Coal Measures forest: Herrick, C. L., 14.  
 Cretaceous: Lesquereux, 3.  
 Cycadeoids: Wieland, 1, 3.  
 Dakota formation: Gress, 1.  
 Dicotyledonous flora, Morrison formation: Knowlton, 7.  
 Fossil plants:  
 Of coal formation: Lesquereux, 2.  
 Of Cretaceous and Tertiary: Lesquereux, 3, 4.  
 Of lignite beds: Lesquereux, 1, 6, 8.  
 Tertiary: Newberry, 6.  
 Fossil wood:  
 Insect activity: Brues, 1.  
 New species: Knowlton, 1.  
 Fruitland formation: Knowlton, 5.  
 Kirtland formation: Knowlton, 5.  
 Laramie group: Newberry, 8.  
 Lignite beds: Lesquereux, 1, 6, 8.  
 Mesaverde cycadeoids: Wieland, 1.  
 Morrison formation: Berry, 1; Knowlton, 7.  
 Petrified forest near Cerrillos: Harrington, E. R., 3.  
 Plant remains:  
 Dakota formation: Gress, 1.  
 Shelter Cave: Fosberg, 1.  
 Triassic: Fontaine, 1.

**Paleontology (continued).**

- Paleobotany (continued).  
 Raton formation: Knowlton, 6.  
 Raton Mesa region:  
 Coal-bearing rocks: Knowlton, 3.  
 Tertiary: Lesquereux, 3, 4, 5; Newberry, 6.  
 Triassic: Daugherty, 1; Fontaine, 1.  
 Vermejo formation: Knowlton, 6.  
 Paleocene:  
 Faunas: Cooper, C. F., 1.  
 Mammal horizons: Granger, 2.  
 Percha shale: Kindle, 1.  
 Permian: King, R. E., 1; Shumard, B. F., 2, 3, 4, 5.  
 Prehistoric mining: Harrington, E. R., 13.  
 Prehistoric quarries: Byran, K., 24.  
 Pueblo Bonito: Bryan, K., 7.  
 Redbeds, fossils from: Lee, 9.  
 Sacramento Mtns., Devonian fauna: Stainbrook, 1.  
 Sandia Cave deposits: Bryan, K., 27; Hibben, 1, 2.  
 Sandia man: Hibben, 1, 2.  
 San Jon district, archeology: Roberts, 1.  
 San Juan Basin: Cooper, C. F., 1.  
 San Juan County: Knowlton, 5.  
 Stone cultures: Bryan, K., 25.  
 Subcarboniferous fossils, Lake Valley district: Miller, S. A., 1.  
 Tertiary: Cockerell, 3, 4; Conrad, 1.  
 Fossils: Conrad, 1.  
 Mollusca: Cockerell, 3, 4.  
 Multituberculata: Granger, 3.  
 Triassic: Newberry, 5.  
 Tucumcari fauna: Hyatt, 1; Marcou, 12.  
 Vertebrate: Camp, 1; Cope, 1, 20; Dean, 1.  
*Agriocharis ocellata*: Shufeldt, 1.  
*Allognathosuchus mooki*: Simpson, G. G., 2.  
*Animasaurus carinatus*: Case, 2.  
 Antelope: Cope, 10; Stock, 1, 3.  
 Associated with human artifacts: Hay, 6; Howard, E. B., 1, 3.  
 Batrachia: Cope, 8.  
 Belodon: Cope, 27.  
 Bibliography: Hay, 1.  
 Birds: Cope, 13, 18; Howard, H., 1, 2, 3; Wetmore, 1, 2.  
 Bison: Howard, E. B., 1.  
 Burnet Cave, Guadalupe Mtns.: Schultz, 1.  
*Camarasaurus*, dorsal vertebrae: Mook, 1.  
 Carnivora: Cope, 17.

**Paleontology (continued).**

- Vertebrate (continued).  
 Catalogue: Hay, 1.  
 Cavern finds:  
 Artifacts: Hibben, 1.  
 Bird remains: Howard, H., 1, 3; Wetmore, 1, 2.  
 Bone-cavern find, Bishops Cap: Bryan, W. A., 1.  
 Early occupation, Sandia Cave: Hibben, 2.  
 Extinct icterid, Shelter Cave: Miller, A. H., 1.  
 Fauna of Burnet Cave: Schultz, 1.  
 Human remains, Conkling Cavern: Stock, 2.  
 Owl bones, Carlsbad Caverns: Wetmore, 1.  
 Plant remains, Shelter Cave: Fosberg, 1.  
 Quaternary antelope remains: Stock, 1, 3.  
 Sandia Cave deposits and glacial chronology: Bryan, K., 27.  
 Shelter Cave: Stock, 3; Fosberg, 1; Miller, A. H., 1.  
 Cenozoic: Needham, 2; Osborn, 3.  
 Ceratopsia: Wiman, 1.  
*Chirox*: Cope, 59.  
*Coelophysis*: Cope, 62.  
*Conchochelys admirabilis*: Hay, 2.  
 Coprolite of ground-sloth: Eames, 1.  
*Coryphodon radians*: Osborn, 2.  
 Cotylosaur mandible: Welles, 2.  
 Creodont: Cope, 23.  
 Cretaceous: Brown, B., 1; Cope, 5; Gilmore, 1, 2, 3, 4, 6; Russell, L. S., 1; Wiman, 1, 2, 3, 4.  
 Crocodiles: Mook, 5; Simpson, G. G., 2.  
*Cryptoglaux funera*: Howard, H., 2.  
 Deer: Cope, 10.  
*Diadectes lentus*: Case, 2.  
 Dinosaurs: Cope, 62; Gilmore, 3, 4; Mook, 4; Reeside, 1; Russell, L. S., 1.  
 Edentata: Wortman, 2.  
 Eocene: Cope, 3, 6, 17, 18, 19, 22, 24, 25, 29, 30, 31, 36, 37, 39, 41, 44, 46, 55; Matthew, 3, 5; Wortman, 3.  
 Fishes:  
 Jurassic: Koerner, 1.  
 Paleozoic: Newberry, 7.  
 Fossil hunting in N. Mex.: Gilmore, 5.  
 "Frisco" River mastodon: Jones, F. A., 11.

**Paleontology (continued).**

## Vertebrate (continued).

Fruitland formation: Gilmore, 1.  
*Goniopholis kirtlandicus*: Wiman, 3.

*Hemiganus*: Cope, 54.

*Hyracops socialis*: Thorpe, 1.

*Hyracotherium*: Wortman, 1.

Icterid from Shelter Cave: Miller, A. H., 1.

## Insectivores:

Basal Eocene: Matthew, 3.

Lower Paleocene: Reynolds, 1, 2.

## Jurassic:

Fishes: Koerner, 1.

Kirtland formation: Gilmore, 1, 6.

Laramie: Cope, 24.

Lemuroids: Cope, 52.

*Limnoscelis*: Williston, 3.

Llano Estacado: Cope, 64.

Mammals: Cope, 22, 25, 29, 44, 45, 53, 54; Gazin, 1; Hay, 5; Matthew, 7; Osborn, 1, 3; Simpson, G. G., 4, 5; Wortman, 3.

Mammoths: Howard, E. B., 1.

Mandible of cotylosaur: Welles, 2.

Marmots: Stearns, 1.

Marsupials: Cope, 37, 55, 59.

Mastodons: Cope, 9, 16; Frick, 1; Jones, F. A., 11; Leidy, 1.

*Meniscotherium robustum*:

Thorpe, 1.

## Morrison formation:

Sauropoda and stegosauria: Lull, 1.

## Navajo country:

Fossil mammals: Gazin, 1.

Ojo Alamo formation: Gilmore, 1, 4.

Osteology: Williston, 5.

Owl bones: Wetmore, 1.

Paleocene fauna: Matthew, 4, 7, 8; Reynolds, 1, 2; Simpson, G. G., 3, 5.

Paleozoic fishes: Newberry, 7.

*Parasaurolophus tubicen*: Wiman, 2.

*Pentaceratops sternbergii*:

Osborn, 5.

Perissodactyls: Wortman, 1.

Permian: Case, 1, 4, 5, 6; Cope, 21; Williston, 1, 2, 5, 6.

Permo-Carboniferous: Welles, 1; Williston, 7, 8.

*Phythonomorpha*: Cope, 2.

Phytosaurs: Mehl, 3; Stovall, 1.

Plægiulacidae: Cope, 57.

Plants, see Paleobotany.

Pleistocene: Gidley, 1.

**Paleontology (continued).**

## Vertebrate (continued).

Pliocene: Cope, 3.

*Psittacotherium*: Wortman, 2.

Puerto fauna: Cope, 31, 36, 37, 39, 41, 43, 44, 45, 46, 49, 52, 57, 58, 60, 61; Earle, 1; Gilmore, 2; Hay, 2; Matthew, 1; Osborn, 1; Simpson, G. G., 2, 3.

## Quaternary:

Antelope remains: Stock, 1, 3.

Near Clovis: Stock, 5.

Reptiles: Cope, 1, 8, 21, 24, 62; Gilmore, 2, 3, 4, 6; Huene, 2; Marsh, 1; Mehl, 1, 2; Romer, 1; Williston, 2, 3, 6, 8.

Rhinoceri: Cope, 50.

Road-runner: Howard, H., 1.

Rodents: Cope, 9; Wood, A. E., 1.

Ruminants: Gidley, 1.

## San Juan Basin:

Paleocene faunas: Matthew, 8.

Santa Fe marls: Cope, 4, 10, 15.

Sauropods: Lull, 1.

Sloths: Eames, 1; Lull, 2, 3.

*Sphenocodon*: Williston, 8.

Stegosaurians: Lull, 1.

Taeniodonta: Cope, 38, 58.

## Teeth:

Creodont: Cope, 23.

Mastodons: Frick, 1.

*Nothodectes*: Matthew, 6.

Tertiary: Cope, 47, 53; Osborn, 3; Wood, A. E., 1.

Tetrapoda: Williston, 7.

Texas: Cope, 63.

Tillodonts: Cope, 32, 42.

Torreion formation: Gilmore, 2; Mook, 5.

Triassic: Cope, 62; Huene, 2, 3; Mehl, 1, 2, 3.

Turkeys: Shufeldt, 1.

Turtles: Gilmore, 6; Hay, 3, 4; Wiman, 4.

Ungulata: Cope, 11; Earle, 1.

Union Co., phytosaur: Stovall, 1.

## Vertebrae:

Dorsal, of *Camarasaurus*:

Mook, 1.

Wasatch fauna: Matthew, 5; Wortman, 1.

Wind River fauna: Matthew, 5; Wortman, 1.

Wingate fossil horizons: Mehl, 2.

**Petroleum.**

## Accumulation:

And structure: Davies, 1; Dobbin, 2; Nowels, 1; Willis, 2.

In limestone reservoirs: Adams, 2.

**Petroleum (continued).**

Carbon dioxide: Talmage, 6; Wells, E. H., 10; Wendland, 1.

In geologic structures: Miller, J. C., 1.

Occurrence and origin: Germann, 1.

Carbon ratios: Dobbin, 1; Storm, 1.

Crude oils of N. Mex.: Lane, E. C., 1.

Development:

General:

1923: Ellis, 3.

1931: Lang, W. T. B., 2.

1933: Shoenfelt, 1.

1934: Shoenfelt, 2.

1935, 1936, 1937: Wells, E. H., 8, 9, 11.

1934-38: Miser, 1.

1938, 1939, 1940: Andreas, 1, 2, 3.

1941, 1942, 1943: Kelly, J. M., 1, 2, 3.

Rocky Mtn. region:

1925: Wood, F. E., 1.

1926: Wood, F. E., 2.

1927: Grinsfelder, 1.

1928: Winchester, 3.

1929: Hintze, 1.

1930: Coffin, 1.

1932: Johnson, C. D., 1.

1942: Larsen, R. M., 1.

1943: Larsen, R. M., 2.

Southeastern N. Mex.: Folger, 2.

1928: Denison, A. R., 1.

1929: Rettger, 1.

1932: Vietti, 1.

1936, 1937, 1938: Bybee, 1, 2, 3.

1939: Secor, 1.

1940: Cole, 1.

1941: Ray, B. A., 1.

1942: Dickey, 3.

1943: Winter, 1.

Discoveries, trend of: Owen, E. W., 1.

Eastern N. Mex.:

Granite in wells: Lee, 27.

Economics, Rocky Mtn. area: Uren, 1.

Gas, see Natural gas.

General: Bates, 2; Bentz, 1; DeFord, 3, 5; Dow, 1; Ellis, 1; Frolich, 1; King, H. H., 1; Knox, 1, 2; Lahee, 1; Lloyd, 2; Miser, 1; Uren, 1; Winchester, 5.

Geologic sections: Cartwright, 1; Dickey, 1, 2; Folger, 1; Fritz, W. C., 1; Keyes, 27; Thompson, W. C., 1; Woods, E. H., 1.

Geology of Alamosa Creek Valley, Socorro Co.: Winchester, 2.

**Petroleum (continued).**

Geothermal gradient curve: Lane, A. C., 1; Lang, W. T. B., 1.

Geophysics: Williams, N., 1.

Granite in wells: Lee, 27.

Gravities: Bartram, 1; Dobbin, 1.

Laws: Fowler, 2.

Migration: Lahee, 2.

Naming subsurface formations: DeFord, 2.

Natural gas:

Colorado, northern N. Mex., and Utah: Winchester, 6.

West Texas and southeast N. Mex.: Rettger, 2, 3.

Nitrogen gas: Lang, W. T. B., 8.

Oil fields: Bates, 2; Oil Weekly Staff, 1.

Artesia: Davis, M. J., 1.

Dayton: Richardson, 4.

Eunice: Anderson, C. C., 1.

Hobbs: DeFord, 1; Winchester, 4; Zavoico, 1.

Monument: Anderson, W. D., 1.

Northwestern N. Mex.: Krampert, 1.

Pecos Valley: Dinsmore, 3.

Raton, Colfax Co.: Lakes, 4.

"Sand belt" area: Denham, 1.

Tectonic classification:

Ver Wiebe, 1.

Origin: Adams, 2.

Permian Basin:

Geophysical results: Williams, N., 1.

Nitrogen gas: Lang, W. T. B., 8.

Temperature gradient: Lang, W. T. B., 1.

Possible future oil provinces:

Rocky Mtn. region: Rocky Mtn. Association of Petroleum Geologists, 1.

West Texas and southeastern N. Mex.: West Texas Geological Society, 1.

Possibilities of Puertecito district.

Socorro and Valencia cos.: Wells, E. H., 2.

Production, see Development.

Puertecito district, possibilities: Wells, E. H., 2.

Reserves: Owen, E. W., 1.

Reservoirs: Adams, 2; Anderson, C. C., 1; Coffin, 2.

Resources, general: Bates, 2; Winchester, 5.

"Sand belt" area: Denham, 1.

Shiprock district: Nowels, 1.

Southeastern N. Mex.:

Geology: Rich, A., 1.

Natural gas: Rettger, 2, 3.

**Petroleum (continued).**

- Structural relations:  
 Rocky Mtn. district: Davies, 1;  
     Dobbin, 2.  
 Shiprock district: Nowels, 1.  
 Texas Permian: Willis, 2.  
 Structures:  
 Western Chaves Co.: Merritt, 1.  
 Waters: Coffin, 2.

**Physical.**

- Aerial photographs: Loel, 1.  
 Afton craters: Lee, 7.  
 Ancestral Rocky Mtns.: Melton, 1.  
 Areas described:  
 Abiquiu quadrangle: Smith, H. T. U., 2.  
 Alamogordo desert: MacBride, 1.  
 Alamosa Creek Valley, Socorro Co.: Winchester, 2.  
 Albuquerque region: Bryan, K., 1; Gilbert, 2; Herrick, C. L., 3, 5, 10; Reagan, 1, 4.  
 Animas Valley:  
     Drying cracks: Lang, W. T. B., 9.  
 Bernalillo Co.: Anon., 5.  
 Brilliant quadrangle: Lee, 29; Mertie, 2.  
 Canadian River: Hill, R. T., 1.  
 Canjilon divide, Rio Arriba Co.: Smith, H. T. U., 1.  
 Canyon del Agua land grant: Anon., 1.  
 Capitan quadrangle:  
     Tremolite-bearing limestone: Patton, 1.  
 Carrizozo lava flow: Just, 1.  
 Central N. Mex.:  
     Saline basins: Johnson, D. W., 1.  
 Cerrillos Hills: Johnson, D. W., 3.  
 Chaco Canyon: Bryan, K., 13; Dodge, 1.  
 Chama Valley: Smith, H. T. U., 3.  
 Chiricahua area: Sauer, 1.  
 Cimarron Range: Smith, J. F., 2, 3.  
 Cimarron Valley:  
     Clastic plugs and dikes: Parker, B. H., 1, 2.  
 Deming quadrangle: Darton, 15.  
 Dona Ana Co.: Dunham, 1.  
 Eagle Draw: Reed, 1.  
 Eastern N. Mex.: Turley, 1.  
 Espanola Valley: Denny, 3.  
 Estancia Valley: Meinzer, 2.  
 Florida Mtns.: Becker, 1.  
 Four corners country: Harrington, E. R., 21.  
 Gadsden corner: Harrington, E. R., 22.

**Physical (continued).**

- Areas described (continued).  
 Galisteo Creek: Stevenson, J. J., 3.  
 Gallina quadrangle: Case, 3.  
 Gallup Basin: Kirk, C. T., 1.  
 Gallup-Zuni area: McCann, 1; Sears, 1.  
 Gila region:  
     Pyroxenic rock: Merrill, 1.  
     Upper: Blake, 5.  
 Granite Gap: Bryan, K., 20.  
 Guadalupe Mtns.: Baker, C. L., 3; Tarr, R. S., 3.  
 High country: Harrington, E. R., 9.  
 High Plains: Johnson, W. D., 1; Van Tuyl, 1.  
 Hueco desert, gypsum dunes: Keyes, 98.  
 Indian Territory: Stevenson, J. J., 11.  
 Jemez-Albuquerque region: Reagan, 1.  
 Jemez Mtns.: Church, 1.  
 Jornada del Muerto: Keyes, 14, 22.  
 Koehler quadrangle: Lee, 29; Mertie, 2.  
 La Bajada: Harrington, E. R., 12.  
 Laguna Grande de la Sal: Robinson, T. W., 1.  
 Llano Estacado: Baker, C. L., 1; Cummins, 1; Harrington, E. R., 24; Price, 1.  
 Los Pinos Mtns.: Stark, 1, 2.  
 Luna Co.: Darton, 6, 12.  
 Magdalena district:  
     Dissected pediments: Koschmann, 1.  
     Geology: Loughlin, 1.  
     Volcanic history: Koschmann 2.  
 Mesilla Valley:  
     Soil survey: Nelson, J. W., 2.  
     Mexican boundary: Hall, J., 2.  
 Moreno Valley, Colfax Co.: Ray, L. L., 1, 2; Smith, J. F., 1.  
 Mount Taylor region: Dutton, 2; Harrington, E. R., 1, 2, 4; Johnson, D. W., 6.  
 Navajo country: Gregorv, 1, 2.  
 Northeastern N. Mex.: Baldwin, 1; Garrett, 1; Harley, 2; St. John, 1; Sternberg, 1; Ver Wiebe, 2.  
 Buried mountain range: Rich, J. L., 4.  
 Canyons: Lee, 2.  
 Deep wells: Daniels, 1, 2.  
 Extrusive rocks: Collins, 1.  
 Volcanoes: Lee, 17.

## Physical (continued).

## Areas described (continued).

- Northern N. Mex.: Stevenson, J. J., 5.  
 Northwestern N. Mex.: Cope, 7; Darton, 3, 4; Harrington, E. R., 21; Simpson, J. H., 1.  
 Tertiary structural history: Hunt, C. B., 1.  
 Ojo Caliente hot springs: Lindgren, 7.  
 Organ Mtns.: Dunham, 1, 2.  
 Ortiz Mtns.:  
   Conoplain: Ogilvie, 2.  
   Igneous rocks: Ogilvie, 3.  
 Pecos Valley: Morgan, 3; Shumard, G. G., 1; Theis, 10.  
 Laguna Grande de la Sal: Robinson, T. W., 1.  
 Soil survey: Means, 1.  
 Solution: Morgan, 2, 4.  
 Tertiary intrusives: Semmes, 1.  
 Penasco River: Reed, 1; Renick, 2.  
 Purgatory Canyon:  
 "Natural coke": Riggs, R. B., 1.  
 Raton Mesa region: Lee, 23, 28; Mertie, 1.  
 Raton quadrangle: Lee, 29; Mertie, 2.  
 Rio Arriba Co.: Harrington, E. R., 9; Just, 2.  
 Rio Grande canyon: Bryan, K., 18.  
 Rio Grande region: Henderson, J., 1.  
   Carbonic province: Keyes, 66.  
   Clinoplain: Herrick, C. L., 15.  
   Soil survey: Nelson, J. W., 1.  
 Rio Grande Valley: Shumard, G. G., 1.  
   Sedimentation: Rittenhouse, 1, 2.  
 Rio Penasco: Renick, 2.  
 Rio Puerco: Bryan, K., 21, 22; Renick, 1.  
 Roswell region: Brown, R. H., 1; Fiedler, 6; Fisher, 2; Morgan, 1.  
 San Acacia area: Denny, 2, 4.  
 San Andres Mtns.: Baker, C. L., 7.  
 San Augustin plains, volcanic rocks: Powers, 2.  
 Sandia Mtns.: Ellis, 2; Harrington, E. R., 16.  
 Sandoval Co.: Renick, 3; Anon., 10.  
 Sangre de Cristo Mtns.: Cabot, 1.  
 San Jon district: Roberts, 1.  
 San Jose Valley: Nichols, 1; Renick, 1.

## Physical (continued).

## Areas described (continued).

- San Juan Basin: Dane, 2; Hunt, C. B., 2; Sears, 2.  
 San Luis valley: Atwood, 1.  
 San Pedro land grant: Anon., 1.  
 Santa Fe Co.: Anon., 10.  
 Santa Rita, Grant Co.: Paige, 6, 10, 11.  
 Santa Rosa, Guadalupe Co., schist near: Prout, F. S., 1.  
 Ship Rock, aerial photos: Loel, 1.  
 Sierra Co.: Harley, 1.  
 Sierra Cuchillo: Jahns, 1.  
 Silver City area:  
   Aerial photos: Loel, 1.  
   Gravel as resistant rock: Paige, 4; Rich, J. L., 1.  
 Silver City quadrangle: Paige, 4, 7, 10.  
 Socorro area: Bryan, K., 19; Herrick, C. L., 9.  
 South-central N. Mex.:  
   Cretaceous geology: Hansen, 1.  
 Southeastern N. Mex.: Darton, 29; DeFord, 3, 5; Rich, A., 1.  
   Lake Otero: Herrick, C. L., 16.  
   Salt and potash: Hoots, 1.  
   Sink-hole patterns: Melton, 3.  
 Southern N. Mex.:  
   Afton craters: Lee, 7.  
 Southwestern N. Mex.: Harrington, E. R., 22; Webster, 1.  
   Chiricahua area: Sauer, 1.  
   Stream trenching: Rich, J. L., 2.  
 South Permian Basin: King, R. E., 2.  
 Staked Plains: Harrington, E. R., 24.  
 Taos Co., pegmatites: Jahns, 3; Just, 2.  
 Taos Range: Gruner, 1.  
 Tewan Mtns.: Iddings, 1.  
 Trans-Pecos Texas: Richardson, 1.  
 Tucumcari region: Cummins, 2, 3; Hill, R. T., 1, 8; Keyes, 84; Marcou, 10, 11.  
 Tularosa valley: Harrington, E. R., 7; Meinzer, 3; Powell, W. C., 1; Talmage, 1, 3.  
 Valencia Co.: Herrick, C. L., 9; Johnson, D. W., 2.  
 Valles Mtn. volcanic center: Ross, 2, 4.  
 Valley of the sands: Harrington, E. R., 7.  
 Western Texas: Hoots, 1; Jenney, 1; Richardson, 1; Shumard, G. G., 3.

**Physical (continued).**

- Areas described (continued).  
 White Sands: Botkin, 1; Brady, F. W., 2; Harrington, E. R., 7; Herrick, C. L., 11.  
 Zuni:  
 Plateau: Dutton, 2.  
 Uplift: Keyes, 78.  
 Watershed: Bryan, K., 10.  
 Arid monadnocks: Keyes, 39.  
 Atlantic and Pacific Railroad: Dutton, 4.  
 Bajada belts, terracing: Keyes, 59.  
 Basalt:  
 Fields: Dutton, 1, 3; Keyes, 88.  
 Flow units: Nichols, 2.  
 McCartys flow: Nichols, 7.  
 Squeeze-ups: Nichols, 3.  
 Surficial banding: Nichols, 5.  
 (See also Lava.)  
 Basin features:  
 High plateau region: Keyes, 12.  
 Lake San Augustin: Powers, 1.  
 Bibliography: Wootton, 1.  
 Of eolian geology: Stuntz, 1.  
 Bicycle geology: Harrington, E. R., 16.  
 Bisection of mountain blocks: Keyes, 21.  
 Bolson plains: Tight, 1.  
 Caliche karst: Price, 1.  
 Camptonite: Ogilvie, 1.  
 Canyons, northeastern N. Mex.: Lee, 2.  
 Catalog and index of early surveys: Schmeckebeier, 1.  
 Caverns:  
 Bat cave: Brady, F. W., 1.  
 Carlsbad Caverns: Darton, 29; Haas, W. H., 1; Hess, 4; Lee, 32, 35, 36.  
 Guadalupe Mtns.: Baker, C. L., 3; Burnet, 1; Nymeyer, 1.  
 Sandia Cave deposits and glacial chronology: Bryan, K., 27.  
 Vadose and phreatic features: Bretz, 1.  
 Cimarron landslide: Cross, 1.  
 Clastic plugs and dikes: Parker, B. H., 1, 2.  
 Climate:  
 In arid America: Huntington, 1.  
 Jurassic-Cretaceous: Leopold, 1.  
 Significance of fossil marmot: Stearns, 1.  
 Clinoplains of Rio Grande: Herrick, C. L., 15.  
 Columnar and buttress structures: Branson, 1.  
 Columnar joints: Hunt, C. B., 4.  
 Concretions: Gardner, J. H., 1.  
 Conoplain, Ortiz Mtns.: Ogilvie, 2.

**Physical (continued).**

- Craters:  
 Afton: Lee, 7.  
 Explosion: Darton, 13.  
 Volcanic: Keyes, 31.  
 Crystalline rocks of the plains: Gould, 1.  
 Dam and reservoir sites: Bryan, K., 15.  
 Cactus Flat: Nye, 1.  
 Conchas, San Miguel Co.: Crosby, 1.  
 El Vado, Rio Arriba Co.: Wells, E. H., 4.  
 No. 3 reservoir site, Carlsbad irrigation project: Meinzer, 4.  
 Red River: Powell, W. C., 2.  
 State line: Bryan, K., 11.  
 Zuni: Anon., 9.  
 Desert ice box: Harrington, E. R., 8.  
 Devil towers: Harrington, E. R., 1.  
 Drainage systems in N. Mex.: Tarr, R. S., 1.  
 Drying cracks, Animas Valley: Lang, W. T. B., 9.  
 Dunes, gypsum, in Hueco desert: Keyes, 98.  
 Earthquakes: Bagg, 2; Reid, H. F., 1; Thomas, 1.  
 Earth-tides: Robinson, T. W., 2.  
 Eastern N. Mex.:  
 San Jon district: Roberts, 1.  
 Engineering geology: Crosby, 1.  
 Erosion: Keyes, 47.  
 Ancient surface, Gallup-Zuni area: McCann, 1.  
 And fill: Lee, 33.  
 Arid: Keyes, 47, 56.  
 Arroyo cutting, see Channel trenching.  
 Arroyos, meandering: Leighly, 1.  
 Base-level, aeolian: Keyes, 44.  
 By solution and fill: Lee, 34.  
 Channel trenching: Bryan, K., 4, 9, 10; Rich, J. L., 2; Stevenson, J. J., 7.  
 Deflation: Keyes, 47, 49.  
 Desert mountains: Keyes, 82.  
 Eolian:  
 Base-level: Keyes, 44.  
 Bibliography: Stuntz, 1.  
 Exhumed surface, Jemez Mtns.: Church, 1.  
 Gravel as resistant rock: Paige, 4.  
 Origin of Great Basin ranges: Keyes, 42.  
 Rio Puerco: Bryan, K., 12.  
 Re-eroded channel way: Stevenson, J. J., 7.  
 Southwestern N. Mex.:



**Physical (continued).**

- Erosion (continued).  
 Southwestern N. Mex. (cont.).  
 Stream trenching: Rich, J. L., 2.  
 Stream trenching, see Channel trenching.  
 Surfaces:  
 Ancient, Gallup-Zuni area: McCann, 1.  
 Exhumed, Jemez Mtns.: Church, 1.  
 Wind abrasion: Blackwelder, 1; Bryan, K., 28; Needham, 1.  
 Zuni watershed: Bryan, K., 10.  
 Explosion craters: Darton, 13.  
 Extrusive rocks: Collins, 1.  
 Fluorine in sericitization: Paige, 8.  
 General: Abert, 1; Antisell, 1; Blake, 1, 4; Conkling, 1, 2, 3; Cope, 12, 15; Dana, 1; Darton, 10, 28, 30; Davis, W. M., 1; Emmons, S. F., 1, 2, 3; Emory, 1, 2, 3; Germann, 2; Gilbert, 1, 2; Gordon, 4; Griffin, 1; Hayden, 1, 2, 3, 4; Herrick, C. L., 4, 17; Hill, R. T., 2, 3, 4; Howell, 1; Jewett, 1; Johnson, D. W., 5; Jones, F. A., 12; Keyes, 16, 29, 41, 52, 54, 62, 123; Leconte, 1, 3; Loew, 1, 3; Long, 1; MacFarlane, J., 1; Marcou, 1, 2, 3, 4, 5; Marcy, 1; Newberry, 1, 3, 4; Otero, 1; Parry, 1; Powell, J. W., 1; Schmitt, 2; Shumard, G. G., 3; Stevenson, J. J., 1; Wheeler, G. M., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11; Wislizenus, 1.  
 Geologic sections, see under Stratigraphy.  
 Geothermal gradient curve: Lane, A. C., 1; Lang, W. T. B., 1.  
 Glaciers: Ellis, 6; Stone, G. H., 4.  
 Chronology: Bryan, K., 27; Hibben, 2.  
 Las Animas: Stone, G. H., 1.  
 Moreno: Ellis, 5.  
 Periglacial topography: Smith, H. T. U., 1.  
 Southernmost glaciated peak: Smith, H. T. U., 4.  
 Gravel:  
 As resistant rock: Paige, 4; Rich, J. L., 1.  
 Large boulders in: Rich, J. L., 3.  
 Great Plains:  
 Correlation: Gould, 2.  
 Crystalline rocks: Gould, 1.  
 Gypsum sands, origin: Potter, 1; Talmage, 1, 2.  
 Hayden survey, catalog and index: Schmeckeber, 1.

**Physical (continued).**

- High plateau region: Keyes, 12.  
 Hydrothermal leaching, Virginia district, Hidalgo Co.: Lasky, 7.  
 Ice Caves: Harrington, E. R., 8; Harrison, 1; Lee, 37.  
 Ice under lava: MacClary, 1.  
 Igneous assimilation, Virginia district, Hidalgo Co.: Lasky, 5.  
 Igneous geology, Mt. Taylor volcanic field: Hunt, C. B., 3.  
 Igneous rocks:  
 Analcite-bearing camptonite: Ogilvie, 1.  
 Ortiz Mtns.: Ogilvie, 3.  
 Raton-Brilliant-Koehler quadrangles: Mertie, 2.  
 Raton Mesa region: Mertie, 1.  
 Intermont plains, rock-floor: Keyes, 37.  
 Intrusions, lower Pecos Valley: Semmes, 1.  
 Kilbourne Hole: Reiche, 2.  
 King survey, catalog and index: Schmeckeber, 1.  
 La Bajada: Harrington, E. R., 12.  
 Laccoliths: Keyes, 63.  
 Lake Otero, southeastern N. Mex.: Herrick, C. L., 16.  
 Lake San Augustin, basin and shore features: Powers, 1.  
 Lakes:  
 Ephemeral: Keyes, 2.  
 Origin of basins: Keyes, 40.  
 Otero: Herrick, C. L., 16.  
 San Augustin: Powers, 1.  
 Landslides: Cross, 1; Dodge, 1; Smith, H. T. U., 1.  
 Lava:  
 Age: Reagan, 2.  
 Carrizozo flow: Just, 1.  
 Fields: Dutton, 3.  
 Grooved: Nichols, 4.  
 Pressure-ridges, McCartys flow: Nichols, 7.  
 Recent flow: Tarr, R. S., 2.  
 Squeeze-ups: Nichols, 3.  
 Surficial banding: Nichols, 5.  
 Viscosity: Nichols, 6; Ross, 3.  
 (See also Basalt.)  
 Literature of N. Mex.: Wootton, 1.  
 Lost rivers: Harrington, M. W., 1.  
 Marble: Merrill, 2.  
 Moreno glacier: Ellis, 5.  
 Maxwell coulee: Keyes, 48.  
 Meandering arroyos: Leighly, 1.  
 Metamorphism:  
 Contact, in Virginia district, Hidalgo Co.: Lasky, 5.  
 Igneous, in Santa Rita-Hanover-Fierro area, Grant Co.: Landon, 1.

**Physical (continued).**

- Meteorites: Cohen, 1, 2; Genth, 1; Nininger, 3.  
 Beenham aerolite: Leard, 1.  
 Coahuila: Shepard, 1.  
 Costilla, Taos Co.: Hills, R. C., 2.  
 El Capitan: Howell, 2.  
 Four corners, San Juan Co.: Merrill, 3.  
 Glorieta, Santa Fe Co.: Hills, R. C., 4; Kunz, 1, 2, 3, 4; Nininger, 8.  
 Harding Co.: Wylie, 1.  
 Impact scars: Turley, 2.  
 Kingston, Sierra Co.: Hovey, 1.  
 Luis Lopez, Socorro Co.: Preston, 1.  
 Melrose, Curry Co.: Nininger, 4.  
 Meteoric iron: Eakins, 1; Kunz, 1, 2; Merrill, 3; Shepard, 1.  
 Oscuro Mtn.: Hills, R. C., 3.  
 Pasamonte, Union Co.: Foshag, 2; Nininger, 6.  
 Pinon, Otero Co.: Nininger, 7.  
 Pojoaque, Santa Fe Co.: Brady, L. F., 1; Nininger, 2.  
 Roy, Harding Co.: Heineman, 1; Nininger, 5.  
 Sacramento Mtns.: Foote, 1.  
 Sandia Mtns.: Nininger, 1.  
 Mexican boundary: Marcou, 6.  
 Mountains:  
 Bisection of blocks: Keyes, 21.  
 Buried range: Rich, J. L., 4.  
 Structure, see under Structural geology.  
 Movement of soil by wind: Stuntz, 1.  
 Mud and lava deposits: Cope, 33.  
 "Natural coke": Riggs, R. B., 1.  
 Oolites, Carlsbad Caverns: Hess, 4.  
 Origin of Great Basin ranges: Keyes, 42.  
 Origin of gypsum sands: Potter, 1.  
 Outliers of Comanche series: Hill, R. T., 9.  
 Pecos, river of romance: Harrington, E. R., 17.  
 Pedestal rocks: Bryan, K., 2, 3, 8.  
 Pediments:  
 Granite Gap: Bryan, K., 20.  
 Magdalena district: Koschmann, 1.  
 Rio Puerco: Bryan, K., 21.  
 Socorro area: Bryan, K., 19.  
 Pegmatites: Hess, 6.  
 Beryllium-tantalum-lithium: Jahns, 3.  
 Effect of structure on intrusion: Landes, 1.  
 Spodumene: Hirschi, 1.  
 Taos and Rio Arriba cos.: Just, 2.

**Physical (continued).**

- Peneplains:  
 Santa Fe: Campbell, 1.  
 Tertiary, of plateau district: Robinson, H. H., 1.  
 Permian buried mountain range: Rich, J. L., 4.  
 Physiography: Fairbanks, 1; Hill, R. T., 3; Jewett, 1; Keyes, 29, 76.  
 Aggraded terraces of Rio Grande: Keyes, 33.  
 Arid monadnocks: Keyes, 39.  
 Bolson plains: Tight, 1.  
 Caliche karst: Price, 1.  
 Canjilon divide, Rio Arriba Co.: Smith, H. T. U., 1.  
 Ghama Valley: Smith, H. T. U., 3.  
 Chiricahua area: Sauer, 1.  
 Clinopains of Rio Grande: Herrick, C. L., 15.  
 Conoplain, Ortiz Mtns.: Ogilvie, 2.  
 Early Mesozoic: Lee, 24.  
 Earth patterns, eastern N. Mex.: Turley, 1.  
 Eastern N. Mex.: Turley, 1.  
 Gravel as resistant rock: Paige, 4; Rich, J. L., 1.  
 Llano Estacado: Cummins, 1.  
 Meteoritic impact scars: Turley, 2.  
 Moreno Valley, Colfax Co.: Ray, L. L., 1, 2.  
 Peneplains: Campbell, 1; Robinson, H. H., 1.  
 Rio Grande region: Henderson, J., 1.  
 Silver City area: Paige, 4; Rich, J. L., 1.  
 Tertiary history of High Plains: Van Tuyl, 1.  
 Pisolites in spring deposit: Northrop, 1, 2.  
 Powell survey, catalog and index: Schmeckebier, 1.  
 Pre-Cambrian rocks: Keyes, 53.  
 Precedent in cubist projection technique: Keyes, 78.  
 Pyroxenic rock from middle Gila: Merrill, 1.  
 Quaternary geology:  
 Abiquiu quadrangle: Smith, H. T. U., 2.  
 Near Clovis: Stock, 5.  
 San Jose Valley: Nichols, 1.  
 Rhythm of Permian seas: Hills, J. M., 2.  
 "Ribbon rock," beryllium-bearing tactite: Jahns, 4.

**Physical (continued).**

- Rio Grande depression: Bryan, K., 23.  
 Rio Mora, diversion: Keyes, 48.  
 Roadside geology: Harrington, E. R., 2.  
 Rock-floor of intermont plains: Keyes, 37.  
 Saline basins, central N. Mex.: Johnson, D. W., 1.  
 Schist east of Santa Rosa, Guadalupe Co.: Prout, F. S., 1.  
 Sedimentation:  
 Alluvial deposits, middle Rio Grande valley: Happ, 1.  
 Bibliography of eolian geology: Stuntz, 1.  
 Boulders in gravel deposits: Rich, J. L., 3.  
 Eolic gradation: Keyes, 51.  
 Heavy minerals: Rittenhouse, 1.  
 Lake silting: Bryan, K., 16; Robinson, H. F., 1, 2.  
 Mesaverde formation: Hendricks, 1.  
 Pecos River: Sidwell, 3.  
 Red River mineral provenance: Sidwell, 4.  
 Rio Grande Valley:  
 Heavy minerals: Rittenhouse, 1.  
 Sources of sands: Rittenhouse, 2.  
 Silting, see Lake silting.  
 South Canadian River: Sidwell, 1.  
 Zuni Reservoir: Robinson, H. F., 1.  
 Zuni watershed: Bryan, K., 10.  
 Sericitization, fluorine in: Paige, 8.  
 Soil surveys:  
 Mesilla Valley: Nelson, J. W., 2.  
 Middle Rio Grande Valley: Nelson, J. W., 1.  
 Pecos Valley: Means, 1.  
 Solution:  
 In Pecos Valley: Morgan, 2, 4.  
 Of limestone pebbles: Bryan, K., 17.  
 Stream measurements: Newell, 2.  
 Structural geology: Darton, 22, 23, 26, 32; Keyes, 16.  
 Basin ranges: Keyes, 15.  
 Block mountains: Johnson, D. W., 4; Keyes, 6.  
 Bolson plains: Keyes, 1, 7, 22.  
 Carbon dioxide in structures: Miller, J. C., 1.  
 Chaves Co.: Merritt, 1.  
 Chupadera beds, folding: Talmage, 4.  
 Coal fields: Kirk, C. T., 2.

**Physical (continued).**

- Structural geology (continued).  
 Colorado Plateau: Moore, 1.  
 Diastrophics, northern Mexican tableland: Keyes, 61.  
 Earth-tides: Robinson, T. W., 2.  
 Effect on pegmatite intrusion: Landes, 1.  
 Estancia plains: Keyes, 38.  
 Fault blocks: Stark, 2.  
 Fault scarps:  
 Organ Mtns.: Reiche, 1.  
 Tularosa Valley: Talmage, 3.  
 Faults:  
 Postbolson: Dake, 2.  
 Recent, Organ Mtns.: Reiche, 1.  
 Scarps in Tularosa Valley: Talmage, 3.  
 Southwest of Los Pinos Mtns.: Stark, 2.  
 Southwestern N. Mex.: Darton, 8.  
 Folding:  
 Chupadera beds near Lincoln: Talmage, 4.  
 Coal Measures in northeast N. Mex.: Van Diest, 2.  
 Geotectonics, Estancia plains: Keyes, 38.  
 Jornada del Muerto: Keyes, 22; Shumard, G. G., 2.  
 Los Pinos Mtns.: Stark, 1, 2.  
 Moreno Valley: Smith, J. F., 1.  
 Mount Taylor volcanic field: Hunt, C. B., 3.  
 Mountains: Darton, 18, 21.  
 Bisection of mountain blocks: Keyes, 21.  
 Block: Johnson, D. W., 4; Keyes, 6.  
 Building of southern Rockies: Lee, 30.  
 Laws of formation: Herrick, C. L., 17.  
 Los Pinos: Stark, 1, 2.  
 Profiles and geologic structures: Keyes, 46.  
 Northeastern N. Mex.: Garrett, 1; Van Diest, 2.  
 Northwestern N. Mex.: Hunt, C. B., 1.  
 Of oil and gas accumulation:  
 Rocky Mtn. district: Davies, 1; Dobbin, 2.  
 Shiprock district: Nowels, 1.  
 Texas Permian: Willis, 2.  
 Ore deposits: Newhouse, 1, 2; Schmitt, 3.  
 Ore districts: Billingsley, 1.  
 Organ Mtns.: Dunham, 1.  
 Fault scarps: Reiche, 1.

**Physical (continued).**

- Structural geology (continued):  
 Orographic movements: Emmons, S. F., 2.  
 Profiles and geologic structures of desert ranges: Keyes, 46.  
 Relation of Cretaceous formations to Rocky Mtns.: Lee, 20.  
 Rio Grande depression: Needham, 7.  
 San Andres Mtns.: Baker, C. L., 7.  
 Sandia Mtns.: Keyes, 96.  
 Sangre de Cristo Mtns.: Cabot, 1.  
 Sierra del Oro: Keyes, 60.  
 Sierra Madre Oriente system: Hill, R. T., 11.  
 Southeastern N. Mex.: Blanchard, 1.  
 Tectonics:  
 Classification of oil fields: Ver Weibe, 1.  
 Position of ore districts: Billingsley, 1.  
 Toyalane and Lucero: Keyes, 50.  
 Western Chaves Co.: Merritt, 1.  
 Terraces:  
 Bajada belts: Keyes, 59.  
 Rio Grande: Keyes, 33.  
 Tertiary:  
 Geology of Abiquiu quadrangle: Smith, H. T. U., 2.  
 Intrusives: Semmes, 1.  
 Peneplain: Robinson, H. H., 1.  
 Ventifacts: Needham, 1.  
 Volcanic craters: Keyes, 31.  
 Volcanic history, Magdalena district: Koschmann, 2.  
 Volcanic necks: Harrington, E. R., 1; Hunt, C. B., 4; Johnson, D. W., 6.  
 Volcanic rocks:  
 San Augustin plains: Powers, 2.  
 Tewan Mtns.: Iddings, 1.  
 Volcanoes: Harrington, E. R., 4; Hill, R. T., 10; Martou, 13.  
 Cerro Colorado: Wright, H. E., 1.  
 Extinct, northeast N. Mex.: Lee, 17.  
 Mt. Taylor: Hunt, C. B., 3.  
 Pliocene, of Navajo-Hopi country: Williams, H., 1.  
 Valles Mtns.: Ross, 2, 4.  
 Wells, deep: Daniels, 1, 2.  
 White Sands, Otero Co.: Gould, 3; Needham, 8; Potter, 1; Talmage, 1, 2.  
 Xenoliths, Organ batholith: Dunham, 2.

**Stratigraphy.**

- Algonkian correlation: Van Hise, 1.  
 Animas sandstone: Keyes, 95.  
 Archean correlation: Van Hise, 1.  
 Barberian series: Keyes, 126.  
 Berenda limestone: Keyes, 111.  
 Beartooth sandstone: Keyes, 120.  
 Bernalillo shales: Keyes, 101, 109.  
 Bridger formation, petrographic analysis: Johannsen, 1.  
 Burlington limestone: Springer, F., 1.  
 Caballos novaculite: Baker, C. L., 6.  
 Cambrian:  
 Anomalies: Keyes, 121.  
 Correlation: Walcott, 1.  
 Cambro-Ordovician: Wheeler, R. R., 1.  
 Capitan limestone: Keyes, 103; Lloyd, 1.  
 Carboniferous: Keyes, 24.  
 Coal Measures: Keyes, 28.  
 Correlation: Williams, H. S., 1.  
 Mississippian formations: Gordon, 2.  
 Rio Grande region: Keyes, 45.  
 Trans-Pecos Texas: King, P. B., 1.  
 West Texas and southeast N. Mex.: Richardson, 3.  
 Carthage-Tokay district: Needham, 5.  
 Castile formation: Kroenlein, 1; Udden, 1.  
 Ceja Glorieta sandstone: Keyes, 89.  
 Cenozoic, mammal horizons: Osborn, 3.  
 Central N. Mex., Lower Paleozoics: Lee, 8.  
 Chupadera formation: Keyes, 90.  
 Chaco River valley: Bauer, 1.  
 Cimarron term usage: Keyes, 97.  
 Clovis lake clays: Antevs, 1.  
 Coal fields, north central N. Mex.: Lee, 16.  
 Coal Measures: Keyes, 28.  
 Alamito: Keyes, 81.  
 Forest near Socorro: Herrick, C. L., 14.  
 Navajo: Keyes, 127.  
 Ohio horizon: Herrick, C. L., 8.  
 Coal, Rocky Mtn., age: Lee, 7.  
 Colorado group, see under Cretaceous.  
 Comanche series, see under Cretaceous.  
 Conspectus of geologic formations: Keyes, 55.  
 Correlation: Wilmarth, 1.  
 Algonkian: Van Hise, 1.  
 Archean: Van Hise, 1.  
 Cambrian: Walcott, 1.

**Stratigraphy (continued).**

- Correlation (continued).  
 Carboniferous: Williams, H. S., 1.  
 Cretaceous: White, C. A., 18.  
 Cretaceous-Eocene: Brown, B., 2.  
 Devonian: Williams, H. S., 1.  
 Foundations: Keyes, 57.  
 Jurassic: Baker, A. A., 2; Schuchert, 2.  
 Neocene: Dall, 1.  
 Newark system: Russell, I. C., 1.  
 Pennsylvanian: Moore, 2; Needham, 6, 9.  
 Permian: Baker, A. A., 1; Willis, 1.  
 Permo-Carboniferous redbeds: Melton, 2.  
 Silurian: Swartz, 1.  
 Southern Great Plains: Gould, 2.  
 Triassic: Russell, I. C., 1.  
 Cretaceous: Harris, G. W., 1; Keyes, 87; White, C. A., 14.  
 Barberian series: Keyes, 126.  
 Beartooth sandstone: Keyes, 120.  
 Climate: Leopold, 1.  
 Close: Osborn, 4.  
 Colorado group: Rankin, 1; Stanton, 1; Stevenson, J. J., 10.  
 Comanche series: Hill, R. T., 9; Stanton, 2.  
 Correlation: Brown, B., 2; White, C. A., 18.  
 Dakota sandstone: Stanton, 2.  
 Dakotan series: Keyes, 26.  
 Galisteo formation: Cope, 14.  
 Interrelations of formations: Pike, 1.  
 Laramian:  
 Navajo coal measures: Keyes, 127.  
 Laramie:  
 And Puerco: Cope, 56.  
 And Shoshone group: Cross, 3.  
 Group: Newberry, 8; Stevenson, J. J., 2, 6, 8; White, C. A., 7.  
 San Juan Basin: Sinclair, 2.  
 Unconformity in: Lee, 10, 13, 14.  
 Mesa Verde, terranal title: Keyes, 86.  
 Morrison formation as introductory Cretaceous: Lee, 21.  
 Navajo Coal Measures: Keyes, 127.  
 Northern Mexico: White, C. A., 16.  
 Ojo Alamo beds: Brown, B., 1.  
 Relation of formations to Rocky Mtns.: Lee, 20.  
 Revuelto formation: Keyes, 124.

**Stratigraphy (continued).**

- Cretaceous (continued).  
 San Carlos Mtns.: White, C. A., 15.  
 South-central N. Mex.: Hansen, 1.  
 Transgressive and regressive deposits, San Juan Basin: Sears, 3.  
 San Juan Basin: Reeside, 2; Sears, 3.  
 Trinity group: Lasky, 9.  
 Tucumcarian series: Keyes, 122.  
 Unconformity at base: Keyes, 8.  
 Western N. Mex.: Winchester, 1.  
 Cretaceous-Tertiary boundary: Knowlton, 4; Matthew, 4; Stanton, 3.  
 Cross sections, see Geologic sections.  
 Dakota formation: Stanton, 2.  
 Dakotan series: Keyes, 26.  
 Delaware Basin:  
 Upper Permian formation: Lang, W. T. B., 3.  
 Upper Permian Ochoa series: Adams, 4.  
 Delaware formation: Keyes, 77.  
 Devonian: Marcou, 7; Stevenson, F. V., 4.  
 Correlation: Cooper, G. A., 1; Williams, H. S., 1.  
 Franklin Mtns.: Darton, 27.  
 Onondagan equivalent: Stevenson, F. V., 2.  
 Ouray limestone: Keyes, 118.  
 Percha shale: Keyes, 83, 110.  
 Sly Gap formation: Stevenson, F. V., 1.  
 Dockum conglomerates, origin: Roth, 2.  
 Eastern N. Mex.: Baker, C. L., 2; Rich, J. L., 5.  
 El Paso limestone: Kirk, E., 1.  
 Eocene: Smith, J. H., 1.  
 Animas sandstone: Keyes, 95.  
 Correlation: Brown, B., 2; Clark, W. B., 1.  
 Faunal horizons: Granger, 1, 2.  
 Opening: Osborn, 4.  
 Petrographic analyses: Johannsen, 1.  
 Fletcher potash core test: Lang, W. T. B., 7.  
 Fusselman limestone: Keyes, 105.  
 Galisteo formation: Stearns, 2.  
 General: DeFord, 3, 5; Harrington, E. R., 10; Keyes, 5, 55; Schmitt, 2.  
 Geologic sections: Cartwright, 1; Dickey, 1, 2; Folger, 1; Fritz, W. C., 1; Keyes, 27; Thompson, W. C., 1; Woods, E. H., 1.

**Stratigraphy (continued).**

- Glacial chronology: Bryan, K., 27.  
 Glorieta sandstone: Keyes, 89.  
 Guadalupan reef theory: Keyes, 75.  
 Guadalupe group: Beede, 3; Darton, 24; Keyes, 91.  
 Guadalupe Mtns.:  
 Permian: Shumard, B. F., 1.  
 Gym limestone: Keyes, 115.  
 Hueco vs. Magdalena: Keyes, 83.  
 Jurassic: Broadhead, 1; Hyatt, 2; Keyes, 17; White, C. A., 9.  
 And Cerro Tucumcari: Keyes, 84.  
 Climate: Leopold, 1.  
 Correlation: Baker, A. A., 2; Schuchert, 2.  
 Navajo sandstone: Keyes, 93.  
 Rio Arriba Co.: Huene, 1.  
 Lake Valley limestone: Keyes, 23, 100, 102, 106; Laudon, 1.  
 Lake Valley mines: Cope, 40.  
 La Plata sandstone: Goldman, 1.  
 Laramian hiatus: Keyes, 72.  
 Laramie, see under Cretaceous.  
 Lateral gradation: Bates, 1.  
 Loup Fork formation: Cope, 48, 51.  
 Madera limestone: Keyes, 117.  
 Magdalena group: Keyes, 116.  
 Mammal horizons: Granger, 2.  
 Manzano group: Keyes, 77, 112, 113, 119; Lee, 11, 26.  
 Mesa Verde terranal title: Keyes, 86.  
 Mesozoic: Marcou, 9; Stevenson, J. J., 9; White, C. A., 13.  
 Mimbres limestone: Keyes, 114.  
 Mississippian:  
 Burlington limestone: Springer, F., 1.  
 Caballos novaculite: Baker, C. L., 6.  
 Lake Valley limestone: Keyes, 23, 100, 102, 106; Laudon, 1.  
 Rio Grande valley: Gordon, 2.  
 Sacramento Mtns.: Laudon, 2, 3.  
 Modoc limestone of Ariz.: Keyes, 83.  
 Morrison formation: Lee, 1; Mook, 3.  
 And related deposits: Stokes, 1.  
 Extension into N. Mex.: Darton, 11.  
 Origin and distribution: Mook, 2.  
 Regarded as Cretaceous: Lee, 21.  
 Relations with Comanche series: Stanton, 2.  
 Type section: Lee, 25.  
 Mount Taylor region: Shimer, 1.  
 Nacimientto group: Gardner, J. H., 9; Keyes, 79.  
 Naming subsurface formations: DeFord, 2.  
 Navajo sandstone: Keyes, 93.

**Stratigraphy (continued).**

- Neocene correlation: Dall, 1.  
 Newark system: Russell, I. C., 1.  
 Northeastern N. Mex.: Garrett, 1.  
 Stratigraphic sections: Miller, B. F., 1.  
 Triassic: Drake, 1.  
 Northern N. Mex.:  
 Laramie group: Stevenson, J. J., 2, 8.  
 Mesozoic rocks: Stevenson, J. J., 9.  
 Morrison shales: Lee, 1.  
 Permo-Carboniferous: Williston, 4.  
 Northwestern N. Mex.:  
 Navajo Coal Measures: Keyes, 127.  
 Upper Cretaceous formations: Pike, 1.  
 Onondagan equivalent: Stevenson, F. V., 2.  
 Ordovician:  
 Anomaly: Keyes, 85.  
 El Paso limestone: Kirk, E., 1.  
 Ouray limestone: Keyes, 118.  
 Paleocene:  
 Mammal horizons: Granger, 2.  
 San Juan Basin: Sinclair, 1.  
 Paleogeography: Case, 9; Hills, J. M., 2; Lee, 24; Schuchert, 1.  
 Paleozoic: Gordon, 1; Keyes, 68.  
 Central N. Mex.: Lee, 8.  
 Rio Grande: Keyes, 69.  
 Southern N. Mex.: Darton, 16, 17.  
 Trans-Pecos Texas: Richardson, 2.  
 Pennsylvanian: Hollingsworth, 1; Stevenson, F. V., 3; Thompson, M. L., 2.  
 Correlation: Moore, 2; Needham, 6, 9.  
 Madera limestone: Keyes, 117.  
 Magdalena group: Keyes, 116.  
 Rio Grande Valley: Gordon, 3.  
 Sandia formation: Keyes, 80, 125.  
 Percha shale: Keyes, 83, 110.  
 Permian: Adams, 3; Archiac, 1; Baker, C. L., 4; Cope, 28; Darton, 25; Finlay, 1; Lewis, 1; Willis, 3.  
 Capitan limestone: Keyes, 103; Lloyd, 1.  
 Castile formation: Kroenlein, 1; Udden, 1.  
 Central N. Mex., type sections: Needham, 11.  
 Chupadera formation: Keyes, 90.  
 Cimarron:  
 Redbeds: Keyes, 128.  
 Term usage: Keyes, 97.

**Stratigraphy (continued).**

## Permian (continued).

- Correlation: Baker, A. A., 1; Willis, 1.
  - Delaware Basin:
    - Upper Permian formation: Lang, W. T. B., 3.
  - Delaware formation: Keyes, 77.
  - Glorieta sandstone: Keyes, 89.
  - Guadalupan reef theory: Keyes, 75.
  - Guadalupe Mtns.: Shumard, B. F., 1.
  - Guadalupe series: Beede, 3; Darton, 24; Keyes, 91.
  - Manzano group: Keyes, 77; Lee, 11, 26.
  - Northwestern N. Mex.: Baker, A. A., 1.
  - Ochoa series: Adams, 4.
  - Pecos Valley: Lang, W. T. B., 4.
  - Redbeds and saline residues: Baker, C. L., 5.
  - Revolution: Finlay, 1.
  - Rhythm of Permian seas: Hills, J. M., 2.
  - Rio Arriba Co.: Huene, 1.
  - Rustler Springs formation: Udden, 1.
  - Salado formation: Lang, W. T. B., 5, 7.
  - Salt deposits: Darton, 20.
  - Salt, etc., in Castile formation: Kroenlein, 1.
  - Seven Rivers formation: Bates, 1.
  - South Permian Basin: King, R. E., 2.
  - Southeastern N. Mex.: Blanchard, 1; Crandall, 1; King, P. B., 2; Lewis, 1, 2.
  - Tansill formation: DeFord, 4.
  - Texas Permian: Wrather, 1.
    - And Mesozoic fossils: White, C. A., 17.
  - Trans-Pecos Texas: King, P. B., 1; King, R. E., 1.
  - Type sections, central N. Mex.: Needham, 11.
  - West Texas: Girty, 1; King, P. B., 2; Lewis, 1, 2.
  - Yeso formation: Keyes, 77.
- Permian Basin:
- Salado formation: Lang, W. T. B., 5, 7.
  - South: King, R. E., 2.
  - Temperature gradients: Lang, W. T. B., 1.
- Permo-Carboniferous: Melton, 2; Williston, 4.
- Pliocene: Cope, 3.
- Pre-Cambrian: Keyes, 53.
- Granite in wells: Lee, 27.

**Stratigraphy (continued).**

- Protozoic clastics, Tijeras Canyon: Keyes, 104.
- Puerco deposits: Cope, 56; Dane, 1; Gardner, J. H., 9; Sinclair, 2.
- Quaternary:
  - San Acacia area: Denny, 4.
  - San Jose Valley: Nichols, 1.
- Raton, Laramie group near: Stevenson, J. J., 8.
- Recent:
  - Chaco Canyon: Bryan, K., 7.
- Redbeds: Darton, 9, 28; Keyes, 108.
  - Age: Case, 7.
  - Bernalillo shales: Keyes, 101, 109.
  - Cimarron: Keyes, 128.
  - Copper: Emmons, S. F., 4.
  - Correlation: Cross, 2; Melton, 2.
  - Depositional history: Baker, C. L., 5.
  - Metalliferous deposits: Finch, 1.
  - Rio Grande region: Lee, 6.
  - Tertiary: Upson, 1.
  - Vertebrate fauna: Case, 5, 6.
- Revelto formation: Keyes, 124.
- Rio Grande region:
  - Carbonic column: Keyes, 45.
  - Redbeds: Lee, 6.
  - Superior Paleozoics: Keyes, 69.
- Rio Grande Valley:
  - Manzano group: Lee, 11.
  - Redbeds: Case, 7.
- Rocky Arroyo: Bates, 1.
- Rustler Springs formation: Udden, 1.
- Sacramento Mtns.:
  - Mississippian: Laudon, 2, 3.
- Salado formation: Lang, W. T. B., 5, 7.
- San Andres group: Lewis, 2.
- Sandia formation: Keyes, 80, 125.
- San Juan Basin:
  - Cretaceous and Tertiary: Reeside, 2.
  - "Laramie?," Puerco and Torrey: Sinclair, 2.
  - Paleocene: Sinclair, 1.
- San Juan Co.: Reeside, 1, 2.
- Santa Fe formation: Cope, 4; Denny, 1, 3; Simpson, G. G., 1.
- Sections, see Geologic sections; Stratigraphic sections.
- Shandon quartzite: Keyes, 107.
- Shinarump basiliium: Keyes, 92.
- Shoshone group: Cross, 3.
- Sierra Madre:
  - Beartooth sandstone: Keyes, 120.
- Silurian:
  - Correlation: Swartz, 1.
  - Fusselman limestone: Keyes, 105.

**Stratigraphy (continued).**

- Sly Gap formation: Stevenson, F. V., 1.
- Southeastern N. Mex.:  
San Andres group: Lewis, 2.  
Upper and middle Permian:  
Lewis, 1.  
Upper Carboniferous: Richardson, 3.
- Southern N. Mex.: Darton, 14.
- Laramie group: Stevenson, J. J., 6.
- Paleozoic: Darton, 16, 17.
- Southwestern N. Mex.: Lasky, 9.
- Stratigraphic sections:  
Northeastern N. Mex.: Miller, B. F., 1.
- Pre-Dakota (?), San Juan Basin: Sears, 2.
- See also Geologic sections.
- Tansill formation: DeFord, 4.
- Tertiary: Cope, 35; Dall, 2; Keyes, 34; Matthew, 2; Stanton, 3.
- Basilium of northwestern N. Mex.: Keyes, 94.
- Galisteo formation: Stearns, 2.
- Redbeds: Upson, 1.
- San Acacia area: Denny, 2.
- San Juan Basin: Reeside, 2.
- Vallejo formation: Upson, 1.
- Tijeras Canyon, Protozoic clastics: Keyes, 104.
- Torrejon formation: Dane, 1; Gardner, J. H., 9; Sinclair, 2.
- Transgressive and regressive Cretaceous deposits: Sears, 3.
- Trans-Pecos Texas:  
Carboniferous and Permian:  
King, P. B., 1.  
Paleozoic formations: Richardson, 2.
- Triassic: Broadhead, 1; Huene, 3; Hyatt, 2; Keyes, 18.
- Dockum conglomerates: Roth, 2.
- Newark system: Russell, I. C., 1.
- Northeastern N. Mex.: Drake, 1.
- Rio Arriba Co.: Huene, 1.
- Santa Rosa sandstone: Sidwell, 2.
- West Texas: Adams, 1.
- Trinity age: Lasky, 9.
- Tucumcarian series: Keyes, 122.
- Unconformities:  
In Laramie of Raton coal field: Lee, 10, 13, 14.  
Laramian hiatus: Keyes, 72.  
Of Cretaceous on older rocks: Keyes, 8.  
Orotaxial significance: Keyes, 25.  
Pre-Moenkopi: Duke, 1.
- Union Co.: Stovall, 1.
- Vallejo formation: Upson, 1.

**Stratigraphy (continued).**

- Washakie formation, petrographic analysis: Johannsen, 1.
- West Texas:  
Barred basin: Roth, 1.  
Middle Permian: Lewis, 1.  
Paleozoic formations: Richardson, 2.  
San Andres group: Lewis, 2.  
Triassic: Adams, 1.  
Upper Carboniferous: Richardson, 3.  
Upper Permian: Girty, 1; Lewis, 1.
- West Texas-New Mexico symposium: DeFord, 3, 5.
- Wheeler surveys, catalog and index: Schmeckebier, 1.
- Yeso formation: Keyes, 77.

**Underground Water.**

- Analyses: Clarke, 1, 4; Goss, 1.
- Mineral springs: Peale, 1.
- Animas Basin: Schwennesen, 1.
- Artesian water: Cummins, 4; Hill, R. T., 7; Meinzer, 6.
- Canadian River investigation: Yeo, 1.
- Composition: Hare, 1.
- Curry Co.: Theis, 1.
- DeBaca Co.: Bryan, K., 6.
- Eagle Draw: Reed, 1.
- Effect on plants: Bryan, K., 14.
- Estancia Valley: Meinzer, 1, 2.
- Fluctuation during earthquakes: Thomas, 1.
- Fluorine, in drinking water: Clark, J. D., 2.
- General: Carpenter, 1; Hare, 1; Hill, R. T., 5, 6, 7; Piper, 1, 2; Van Diest, 1.
- Gila River Valley: Turner, S. F., 1.
- Gypsum beds and water storage, Pecos Valley: Lee, 4.
- Hachita Basin: Schwennesen, 1.
- High Plains: Theis, 2, 3.
- Hot springs, Ojo Caliente: Lindgren, 7.
- Hot Springs artesian basin: Powell, W. C., 3.
- Hydrography of arid regions: Newell, 1.
- Hypsometric map of N. Mex.: Northrop, 3.
- In oil sands: Coffin, 2.
- Irrigation: Sullivan, 1.
- Jemez Plateau: Kelly, C., 1.
- Jornada del Muerto: Keyes, 14.
- Laguna Grande de la Sal: Robinson, T. W., 1.
- Lea County: Nye, 2, 3; Theis, 6.



**Underground Water (cont.).**

- Llano Estacado: Baker, C. L., 1; Theis, 3.  
 Lost rivers: Harrington, M. W., 1.  
 Luna Co.: Darton, 7, 12; Fiedler, 3.  
 Major Johnson Springs: Theis, 8.  
 Mesilla Valley: Barker, 1.  
 Mimbres Valley: Fiedler, 3; Theis, 7; White, W. N., 1, 2.  
 Northwestern N. Mex.: Waring, 1.  
 Ogallala formation: Theis, 3.  
 Pecos Valley: Theis, 10, 11.  
   Ground-water solution: Morgan, 2, 4.  
   Gypsum beds and water storage: Lee, 4.  
   Laguna Grande de la Sal: Robinson, T. W., 1.  
 Penasco River: Reed, 1; Renick, 2.  
 Playas Basin: Schwennesen, 1.  
 Portales Valley: Theis, 5.  
 Rate of movement: Slichter, 1.  
 Rio Grande depression: Bryan, K., 23.  
 Rio Grande Valley: Lee, 5; Slichter, 2; Theis, 4, 9.

**Underground Water (cont.).**

- Rio Penasco: Renick, 2.  
 Roosevelt Co.: Theis, 1, 5.  
 Roswell region: Brown, R. H., 1; Fiedler, 1, 2, 4, 5, 6; Fisher, 2; Morgan, 1.  
 Sandoval Co.: Renick, 1, 3.  
 San Jose-Rio Puerco Valley: Renick, 1.  
 San Luis Basin: Schwennesen, 1.  
 San Simon Valley: Schwennesen, 2.  
 Sink-hole patterns: Melton, 3.  
 Socorro Co.: Black, 1; Bryan, K., 5.  
 Springs: Meinzer, 5.  
   Jemez Plateau: Harrington, E. R., 20.  
   Major Johnson, near Carlsbad: Theis, 8.  
 Mineral lists and analyses: Peale, 1.  
 Pisolites: Northrop, 1, 2.  
 Saline, Rio Salado: Clark, J. D., 1.  
 Torrance Co.: Black, 1.  
 Tularosa Basin: Meinzer, 3; Powell, W. C., 1.  
 Water-level fluctuations in wells: Robinson, T. W., 2.

## PART III. MAPS

### INTRODUCTORY NOTE

Maps of New Mexico or of parts of the State are listed in this section. Maps published by private individuals or firms, and maps included as illustrations in reports, are not listed.

The maps are given under eight main heads, arranged alphabetically according to the type of map. Subdivisions on the basis of area covered are made under some of the main heads.

**Base maps** show the works of man (roads, towns, railroads, irrigation ditches, etc.); drainage; boundaries of counties, land grants, national forests, etc.; the township and range network; and other features depending on the scale and type of map. Base maps do not show geology or topography.

**Correlation charts** show, by means of vertical sections, the lateral change in character and thickness of sedimentary strata.

The **Geographic map**, in six colors, shows such features as land grants, Indian reservations, military reservations, reclamation projects, mountain ranges, drainage, and national monuments, parks and forests.

**Geologic maps** show, by means of colors, patterns, or symbols, the outcropping areas of various types and ages of rocks. Ordinarily these maps also show drainage, boundaries, and the works of man.

The **Oil and Gas map** shows oil and gas fields, known anticlines and domes, locations of dry holes, and pipe lines. This information is printed on a general base map.

The **Reconnaissance map**, printed in four colors, shows topographic features (by means of hachures), drainage, and benchmark elevations, all superimposed on a general base map.

**Structure maps** show, by means of contours drawn on one rock unit, the attitude of an area's sedimentary strata.

**Topographic maps** show, by means of contours, the shape and altitude of the land surface. Drainage and the works of man are also commonly shown.

### MAPS

[Unless otherwise indicated, each map in the lists below is on one sheet.]

#### BASE MAPS

**County maps.** Issued as ozalid prints by the New Mexico State Highway Department, Santa Fe. In the following list, the county name is followed by the scale and the date.

- Bernalillo. 1 in. to 1 mi.; 1939.
- Catron. 1 in. to 2 mi.; 1938. (2 sheets.)
- Chaves. 1 in. to 2 mi.; 1938. (2 sheets.)
- Colfax. 1 in. to 2 mi.; 1938.
- Curry. 1 in. to 2 mi.; 1937.

## BASE MAPS (continued)

## County maps (continued)

- DeBaca. 1 in. to 2 mi.; 1938.  
 Dona Ana. 1 in. to 2 mi.; 1937.  
 Eddy. 1 in. to 2 mi.; 1938.  
 Grant. 1 in. to 2 mi.; 1938.  
 Guadalupe. 1 in. to 2 mi.; 1938.  
 Harding. 1 in. to 2 mi.; 1938.  
 Hidalgo. 1 in. to 2 mi.; 1937.  
 Lea. 1 in. to 2 mi.; 1938.  
 Lincoln. 1 in. to 2 mi.; 1938.  
 Luna. 1 in. to 2 mi.; 1937.  
 McKinley. 1 in. to 2 mi.; 1938.  
 Mora. 1 in. to 2 mi.; 1938.  
 Otero. 1 in. to 2 mi.; 1938.  
 Quay. 1 in. to 2 mi.; 1937.  
 Rio Arriba. 1 in. to 2 mi.; 1938. (2 sheets.)  
 Roosevelt. 1 in. to 2 mi.; 1937.  
 Sandoval. 1 in. to 2 mi.; 1938.  
 San Juan. 1 in. to 2 mi.; 1938. (2 sheets.)  
 San Miguel. 1 in. to 2 mi.; 1938.  
 Santa Fe. 1 in. to 1 mi.; 1938.  
 Sierra. 1 in. to 2 mi.; 1938.  
 Socorro. 1 in. to 2 mi.; 1937. (2 sheets.)  
 Taos. 1 in. to 2 mi.; 1938.  
 Torrance. 1 in. to 2 mi.; 1938.  
 Union. 1 in. to 2 mi.; 1938.  
 Valencia. 1 in. to 2 mi.; 1938.

**National Forest maps.** Issued by the Forest Service, U. S. Department of Agriculture, Washington, D. C. Listed below are the map names, followed by scale and date.

- Carson. 1 in. to 4 mi.; 1941.  
 Cibola. 1 in. to 4 mi.; 1938.  
     Manzano division. 1 in. to 4 mi.; 1938.  
     Southern division. 1 in. to 4 mi.; 1934.  
     Western division. 1 in. to 4 mi.; 1934.  
 Gila. 1 in. to 4 mi.; 1938.  
 Lincoln. 1 in. to 4 mi.; 1941.  
     Sacramento division. 1 in. to 2 mi.; 1935.  
 Santa Fe. 1 in. to 4 mi.; 1941.

**State maps.**

- State of New Mexico. Scale 1:500,000 (about 1 in. to 8 mi.); 1922. (2 sheets.) U. S. Geological Survey, Washington, D. C.  
 New Mexico. Scale 1:1,000,000 (about 1 in. to 16 mi.). State Bureau of Mines and Mineral Resources, Socorro.

## CORRELATION CHARTS

Correlation of basal Permian and older rocks in southwestern Colorado, northwestern New Mexico, northeastern Arizona, and southeastern Utah, by N. W. Bass. 1944. Preliminary Chart 7, Oil and Gas Investigations. U. S. Geological Survey, Washington, D. C.

Stratigraphic distribution of the Pennsylvanian fusulinidae in a part of the Sierra Nacimiento of Sandoval and Rio Arriba counties, New Mexico, by Lloyd G. Henbest and others. 1944. Preliminary Chart 2, Oil and Gas Investigations. U. S. Geological Survey, Washington, D. C.

## GEOGRAPHIC MAP

State of New Mexico. 1 in. to 12 mi.; 1936. General Land Office, Washington, D. C.

## GEOLOGIC MAPS

## Area maps.

Geologic map and stratigraphic sections of Permian and Pennsylvanian rocks of parts of San Miguel, Santa Fe, Sandoval, Bernalillo, Torrance, and Valencia counties, north central New Mexico, by C. B. Read and others. 1 in. to 3 mi.; 1944. Preliminary Map 21, Oil and Gas Investigations. U. S. Geological Survey, Washington, D. C.

Geologic map of Black Range tin district, New Mexico, by Carl Fries, Jr., and Arthur P. Butler. 1 in. to 1 mi.; 1940. U. S. Geological Survey, Washington, D. C.

Geologic maps, northern and western New Mexico. 1 in. to 4 mi. and 1 in. to 8 mi.; 1876-79. (8 sheets.) U. S. Geological Survey, Washington, D. C. [Wheeler Survey. For limiting meridians and parallels, see U. S. Geological Survey Bull. 222, p. 63, 1904.]

Maps showing thickness and general character of the Cretaceous deposits in the western interior of the United States, by John B. Reeside, Jr. 1 in. to 225 mi.; 1944. Preliminary Map 10, Oil and Gas Investigations. U. S. Geological Survey, Washington, D. C.

The upper Pecos River and Rio Galisteo region, New Mexico, by C. B. Read and D. A. Andrews. 1 in. to 1.5 mi.; 1944. Preliminary Map 8, Oil and Gas Investigations. U. S. Geological Survey, Washington, D. C.

## State maps.

Geologic map of New Mexico, by N. H. Darton. Scale 1:500,000 (about 1 in. to 8 mi.); 1928. (2 sheets.) U. S. Geological Survey, Washington, D. C.

Geologic map of the State of New Mexico. 1 in. to 12 mi.; 1925. University of New Mexico, Albuquerque.

## OIL AND GAS MAP

Oil and gas map of New Mexico, by Dean E. Winchester. Scale 1:1,000,000 (about 1 in. to 16 mi.); 1931. Revised by A. Andreas to July 15, 1936; by Robert L. Bates to June 30, 1942. State Bureau of Mines and Mineral Resources, Socorro.

## RECONNAISSANCE MAP

A reconnaissance and elevation map of southeastern New Mexico, by Walter B. Lang. 1 in. to 4 mi.; 1943. U. S. Geological Survey, Washington, D. C.

## STRUCTURE MAPS

Preliminary map showing geologic structure of Bueyeros carbon dioxide area, Harding County, New Mexico, by J. Charles Miller and M. Q. Dannelte. 1 in. to 1 mi.; contour interval 25 ft.; 1938. U. S. Geological Survey, Washington, D. C.

Preliminary map showing geologic structure of part of Rio Arriba County, New Mexico, by C. H. Dane and R. P. Bryson. 1 in. to 1 mi.; contour interval 100 ft.; 1938. U. S. Geological Survey, Washington, D. C.

## TOPOGRAPHIC MAPS

## Grazing Service maps.

The Grazing Service of the U. S. Department of the Interior has issued 77 maps covering all grazing districts within the State. Average size of these maps is 8 townships long by 4 townships wide; scale, 1 in. to 1 mi. Surface contours are shown on all but 12 of the maps; contour interval, 100 ft. Roughly the south and west halves of New Mexico have been covered. A key map showing extent and numbering of individual maps may be obtained from the Regional Grazier, Grazing Service Region 7, Albuquerque. The individual maps, however, are not furnished by the Grazing Service but may be ordered through any Albuquerque commercial blueprint concern.

## TOPOGRAPHIC MAPS (continued)

**Miscellaneous maps.**

Topographic atlas sheets (hachure maps), entire State except southeastern and extreme eastern parts. 1 in. to 4 mi. and 1 in. to 8 mi.; 1876-79. (14 sheets.) U. S. Geological Survey, Washington, D. C. [Wheeler Survey. For limiting meridians and parallels, see U. S. Geological Survey Bull., 222, p. 62, 1904.]

**National Forest maps.** Issued by the Forest Service, U. S. Department of Agriculture, Washington, D. C. Listed below are the map names, followed by scale, contour interval, and date.

Cibola, Sandia division. 1 in. to 1 mi.; 100 ft.; 1936.

Lincoln, Sacramento division. 1 in. to 1 mi.; 100 ft.; 1940.

**Quadrangle maps.** Issued by the U. S. Geological Survey, Washington, D. C. The map name, with the county or counties in which the quadrangle lies, is followed by the scale, the contour interval, and the date. Scales are given in ratio form; most of the maps have a scale of 1:62,500 (about 1 in. to 1 mi.), 1:125,000 (about 1 in. to 2 mi.), or 1:250,000 (about 1 in. to 4 mi.).

Aden; Dona Ana Co. 1:62,500; 25 ft.; 1943.

Afton; Dona Ana Co. 1:62,500; 25 ft.; 1943.

Alamo National Forest (now part of Lincoln National Forest); Otero Co. 1:250,000; 200 ft.; 1914.

Alum Mountain; Grant and Catron cos. 1:125,000; 100 ft.; 1913.

Animas Peak; Hidalgo Co. 1:62,500; 25 ft.; 1920.

Antelope Wells; Hidalgo Co. 1:62,500; 25 ft.; 1919.

Arabela; Lincoln Co. 1:62,500; 40 ft.; 1942.

Bandanna Point; Eddy Co. 1:62,500; 50 ft.; 1943.

Bassett Lake; Eddy Co. 1:62,500; 25 ft.; 1943.

Bernal; Guadalupe, San Miguel, and Torrance cos. 1:125,000; 50 ft.; 1894.

Bernalillo; Bernalillo and Sandoval cos. 1:125,000; 50 ft.; 1893.

Big Hatchet Peak; Hidalgo Co. 1:62,500; 25 ft.; 1937.

Brilliant; Colfax Co. 1:62,500; 50 ft.; 1915.

Camel Mountain; Dona Ana and Luna cos. 1:62,500; 10 ft.; 1917.

Canutillo; Dona Ana Co., N. Mex., and El Paso Co., Texas. 1:62,500; 10 ft.; 1919.

Canyon de Chelly; San Juan Co., N. Mex., and Apache Co., Ariz. 1:250,000; 200 ft.; 1892.

Capitan; Lincoln Co. 1:62,500; 20 ft.; 1937.

Carlsbad; Eddy Co. 1:62,500; 10 ft.; 1943.

Carlsbad Caverns West; Eddy Co. 1:62,500; 50 ft.; 1943.

Carrizozo; Lincoln Co. 1:62,500; 20 ft.; 1943.

Chaco; San Juan Co. 1:250,000; 1892.

Chimney Rock; San Juan Co., N. Mex., and Montezuma Co., Colo. 1:62,500; 20 ft.; 1936.

Chiricahua; Hidalgo Co., N. Mex., and Cochise Co., Ariz. 1:125,000; 100 ft.; 1919.

Cienega Springs; Hidalgo Co. 1:62,500; 25 ft.; 1918.

Clayton Basin; Eddy and Lea cos. 1:62,500; 10 ft.; 1943.

Columbus; Luna Co. 1:62,500; 10 ft.; 1920.

Corazon; Guadalupe and San Miguel cos. 1:125,000; 50 ft.; 1894.

Corralitos Ranch; Dona Ana Co. 1:62,500; 25 ft.; 1943.

Cuba; Rio Arriba and Sandoval cos. 1:62,500; 50 ft.; 1943.

Deming; Luna Co. 1:125,000; 100 ft.; 1915.

Desert; Otero Co., N. Mex., and El Paso Co., Texas. 1:62,500; 25 ft.; 1943.

Dog Mountains; Hidalgo Co. 1:62,500; 20 ft.; 1918.

El Paso Gap; Otero Co. 1:62,500; 50 ft.; 1940.

For Bayard Special; Grand Co. 1:12,000 (about 1 in. to 0.2 mi.); 10 ft.; 1910.

## TOPOGRAPHIC MAPS (continued)

## Quadrangle maps (continued)

- Fort Defiance; McKinley Co., N. Mex., and Apache Co., Ariz.  
1:250,000; 200 ft.; 1892.
- Gallina; Rio Arriba and Sandoval cos. 1:125,000; 100 ft.; 1909.
- Hachita; Grant and Hidalgo cos. 1:62,500; 25 ft.; 1918.
- Hermanas; Luna Co. 1:62,500; 10 ft.; 1943.
- Hillsboro; Sierra and Grant cos. 1:62,500; 40 ft.; 1940.
- Jemez [15-minute]; Sandoval Co. 1:62,500; 50 ft.; 1943.
- Jemez [30-minute]; Sandoval Co. 1:125,000; 100 ft.; 1892.
- Kirtland; San Juan Co. 1:125,000; 50 ft.; 1932.
- Koehler; Colfax Co. 1:62,500; 50 ft.; 1917.
- La Mesa; Dona Ana Co., N. Mex., and El Paso Co., Texas. 1:62,500;  
25 ft.; 1943.
- Lamy; Santa Fe and San Miguel cos. 1:125,000; 50 and 100 ft.;  
1894.
- Largo; Rio Arriba, Sandoval and San Juan cos. 1:250,000; 200  
ft.; 1895.
- Las Cruces [15-minute]; Dona Ana Co. 1:62,500; 25 ft.; 1943.
- Las Cruces [30-minute]; Dona Ana Co. 1:125,000; 25 and 50 ft.;  
1893.
- Las Vegas; San Miguel and Mora cos. 1:125,000; 50 ft.; 1893.
- La Ventana; Sandoval Co. 1:62,500; 50 ft.; 1943.
- Lordsburg; Hidalgo Co. 1:62,500; 25 ft.; 1936.
- Magdalena District; Socorro Co. 1:12,000 (about 1 in. to 0.2 mi.);  
25 ft.; 1912.
- Mogollon; Catron and Grant cos. 1:125,000; 100 ft.; 1912.
- Morenci; Catron and Grant cos., N. Mex., and Greenlee Co., Ariz.  
1:125,000; 100 ft.; 1915.
- Mt. Riley; Dona Ana Co. 1:62,500; 10 ft.; 1929.
- Mt. Taylor; McKinley, Sandoval, Valencia and Bernalillo cos.  
1:250,000; 200 ft.; 1899.
- Nash Draw; Eddy Co. 1:62,500; 10 ft.; 1943.
- Newman; Otero and Dona Ana cos. 1:62,500; 20 ft.; 1943.
- Noria; Dona Ana Co. 1:62,500; 10 ft.; 1931.
- Oil City; Eddy Co. 1:62,500; 10 ft.; 1943.
- Organ Peak; Dona Ana Co. 1:62,500; 25 and 50 ft.; 1943.
- Orogrande; Otero Co. 1:62,500; 25 ft.; 1943.
- Parker Lake; Dona Ana and Otero cos. 1:62,500; 25 ft.; 1943.
- Pelona; Catron Co. 1:125,000; 100 ft.; 1918.
- Pendejo Wash; Otero Co. 1:62,500; 25 ft.; 1943.
- Perilla; Hidalgo Co., N. Mex., and Cochise Co., Ariz. 1:125,000;  
100 ft.; 1919.
- Playas; Hidalgo Co. 1:62,500; 25 ft.; 1919.
- Point of Sands; Dona Ana and Otero cos. 1:125,000; 50 ft.; 1916.
- Pratt; Hidalgo Co. 1:62,500; 25 ft.; 1919.
- Raton; Colfax Co. 1:62,500; 50 ft.; 1914.
- Rattlesnake; San Juan Co., N. Mex., and Montezuma Co., Colo.  
1:62,500; 20 ft.; 1937.
- Reserve; Catron Co. 1:125,000; 100 ft.; 1918.
- St. John's; Catron and Valencia cos., N. Mex., and Apache Co.,  
Ariz. 1:250,000; 200 ft.; 1892.
- San Pedro; Santa Fe, Sandoval, Bernalillo and Torraine cos.  
1:125,000; 50 and 100 ft.; 1892.
- San Simon; Hidalgo Co., N. Mex., and Cochise and Graham cos.,  
Ariz. 1:125,000; 100 ft.; 1917.
- San Ysidro; Sandoval Co. 1:62,500; 50 ft.; 1943.
- Santa Clara; Sandoval and Santa Fe cos. 1:125,000; 100 ft.; 1892.

## TOPOGRAPHIC MAPS (continued)

**Quadrangle maps (continued)**

- Santa Rita; Grant Co. 1:24,000 (about 1 in. to 0.4 mi.); 20 ft.; 1937.  
Santa Rita Special; Grant Co. 1:24,000 (about 1 in. to 0.4 mi.); 20 ft.; 1909.  
Ship Rock; San Juan Co. 1:62,500; 20 ft.; 1937.  
Silver City; Grant Co. 1:125,000; 100 ft.; 1909.  
Socorro; Socorro Co. 1:62,500; 50 ft.; 1906.  
Tucumcari; Harding, Quay, and San Miguel cos. 1:125,000; 50 ft.; 1930.  
Tularosa; Otero, Lincoln and Socorro cos. 1:125,000; 50 ft.; 1916.  
Tyrone District; Grant Co. 1:24,000 (about 1 in. to 0.4 mi.); 25 ft.; 1922.  
Victorio; Luna, Grant and Hidalgo cos. 1:62,500; 25 ft.; 1918.  
Walnut Wells; Hidalgo Co. 1:62,500; 25 ft.; 1918.  
Watrous; San Miguel and Mora cos. 1:125,000; 50 ft.; 1894.  
Wingate; McKinley and Valencia cos. 1:250,000; 200 ft.; 1892.

**State map.**

- Topographic map of New Mexico. Scale 1:500,000 (about 1 in. to 8 mi.); contour interval 100 meters (328 ft.); 1925. (2 sheets.)  
U. S. Geological Survey, Washington, D. C.

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18	The Oil and Gas Resources of New Mexico; compiled by Robert L. Bates (Second edition; supercedes Bulletin 9) -----	1942	2.50



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9	Carbon Dioxide in New Mexico; Sterling B. Talmage and A. Andreas (Reprinted from Bulletin 18) -----	1942	No charge

## OIL AND GAS MAP

Oil and Gas Map of New Mexico; Dean E. Winchester, 1931; revised by Robert L. Bates to July, 1942. Scale, about 16 miles to 1 inch. (This map is included in Bulletin 18.) -----	.75 (paper) 1.25 (cloth)
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	Geologic Map and Stratigraphic Sections of Permian and Pennsylvanian Rocks of Parts of San Miguel, Santa Fe, Sandoval, Bernalillo, Torraine, and Valencia Counties, North Central New Mexico; C. B. Read and others. Scale 3 miles to 1 inch. Preliminary Map 21, Oil and Gas Investigations ----	1944	.60
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