

NEW MEXICO SCHOOL OF MINES

**STATE BUREAU OF MINES AND
MINERAL RESOURCES**

E. H. WELLS

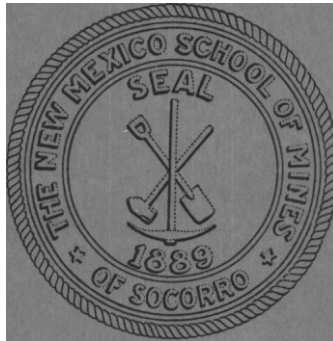
President and Director

BULLETIN NO. 5

**Geologic Literature of
New Mexico**

By

Thomas Peltier Wootton



SOCORRO, N. M.

1930

NEW MEXICO SCHOOL OF MINES

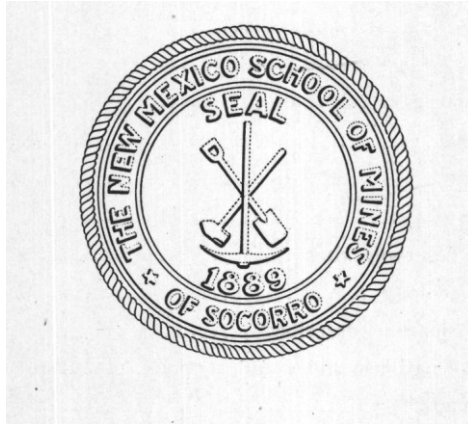
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CONTENTS

	Page
The New Mexico Bureau of Mines and Mineral Resources	3
Board of regents	4
Officers of the board	4
Publications	4
Introduction	5
Plan and scope of bibliography	5
Acknowledgments	5
How publications may be obtained	6
Abbreviations used	7
Serials	8
Part I. Bibliography	13
Part II. Index	85
Plan of index	85
Index	86
Areas described	86
Bibliography	86
Borings	87
Correlation	87
Dams and reservoir sites.....	88
Economic geology	88
Geologic formations described	96
Geologic formations, tables and sections	102
Geologic maps	104
Historical geology	105
Maps, general	116
Mineralogy	112
Paleontology	114
Petrology	119
Physical geology	120
Physiographic geology	122
Structural geology	123
Topographic maps	124
Underground water	125

THE NEW MEXICO BUREAU OF MINES AND MINERAL RESOURCES

The New Mexico Bureau of Mines and Mineral Resources was established by the New Mexico Legislature of 1927. It was made a department of the New Mexico School of Mines, and hence its activities are supervised by the board of regents of that institution. The chief objects and duties of the bureau, as provided for in the law, are as follows :

To collect, to compile and to publish statistics relative to New Mexico geology, mining, milling, metallurgy and oil and natural gas and the refining thereof.

To collect typical geological and mineral specimens and samples of products; to collect photographs, models and drawings of appliances used in the mines, mills, smelters, oil wells, natural gas wells and the refineries of oil and natural gas in New Mexico.

To collect a library and bibliography of literature pertaining to the progress of geology, mining, milling, smelting and the production of oil and natural gas and refining the same in New Mexico.

To study the geological formations of the State with special reference to their economic mineral resources, both metallic and non-metallic.

To examine the topography and physical features of the State with reference to their practical bearing upon the occupation of the people.

To study the mining, milling, smelting operations and oil and natural gas production and the refining of the same carried on in the State with special reference to their improvements.

To prepare and publish bulletins and reports with the necessary illustrations and maps, which shall embrace both a general and detailed description of the natural resources and geology, mines, mineral deposits, both metallic and non-metallic, oil wells, natural gas wells, reduction plants, smelters, mills, oil refineries and natural gas refineries.

To make qualitative examinations of rocks and mineral samples and specimens.

To assist in the education of miners and prospectors through lectures and publications.

To consider such other kindred, scientific and economic problems and questions as in the judgment of the Board shall be deemed of value to the people of the State.

To communicate special information on New Mexico geology, mining, both metallic and non-metallic, oil and natural gas and to serve as a Bureau of Exchange and Information on the mineral, oil and natural gas resources of New Mexico.

To co-operate with the University of New Mexico, with the State Mine Inspector and with other departments of State Government as may be mutually beneficial and to co-operate with the United States Geological Survey and with the United States Bureau of Mines in accordance with the regulations of those institutions.

The bureau began to function officially with the opening of the 16th fiscal year, July 1, 1927.

BOARD OF REGENTS

His EXCELLENCY, HONORABLE R. C. DILLON, *Governor of
New Mexico, ex-officio* ----- Santa Fe

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PUBLICATIONS¹

- Bulletin No. 1. The Mineral Resources of New Mexico, Fayette A. Jones, 1915.
- Bulletin No. 2. Manganese in New Mexico, E. H. Wells, 1918.
- Bulletin No. 3. Oil and Gas Possibilities of the Puertecito District, Socorro and Valencia Counties, New Mexico, E. H. Wells, 1919.
- Bulletin No. 4. Fluorspar in New Mexico, W. D. Johnston, Jr., 1928.
(Price 60 cents.)
- Bulletin No. 5. Geologic Literature of New Mexico, T. P. Wootton, 1930.
(Price 25 cents.)

¹Bulletins 1, 2 and 3 were issued by the Mineral Resources Survey of the New Mexico State School of Mines. They are no longer available for distribution.

Geologic Literature of New Mexico

By T. P. Wootton

INTRODUCTION

PLAN AND SCOPE OF BIBLIOGRAPHY

This bibliography of literature on New Mexico lists papers, reports, etc., dealing with the geology of the state. Under this head are included physical geology, structural geology, geologic formations, historical geology, physiographic geology, economic geology, mineralogy, petrography and paleontology. Topographic, geologic and geographic maps are given, and articles dealing with records of borings, dams and reservoir sites, and underground water are also included.

Part I, Bibliography, consists of a list of authors and publications. The authors are arranged alphabetically. Under each author's name is given a list of his writings arranged chronologically and numbered serially on that basis. Maps are listed under the individual in charge of the survey or under the publisher or source of issue.

The title of each writing is given in full. Below it is the name of the publication and other pertinent data, abbreviations being used where practicable. The series number of the publication is only used where two or more series have been issued ; when given it appears in parenthesis following the name of the publication. The volume number and inclusive pages, separated by a colon, come next ; and lastly the date of issue, enclosed in parenthesis, is given. For example, Amer. Jnl. Sci. (5) 19 : 337-350. (1930), should be read, American Journal of Science, 5th series, volume 19, pages 337 to 350 inclusive, published in 1930.

Part II, Index, is an index of the geologic literature of the state. It is given under 19 major heads, and these are further subdivided according to the nature of the material indexed. Maps are indexed under one or more of the following heads : Geologic maps ; maps, general ; and topographic maps. One paper may be indexed under several different heads. Additional details are given under "Plan of Index," page 85.

In the index the name of the author and the serial number of his paper as used in this bulletin follow the appropriate subheading. Using these data the titles of papers can be obtained in Part I.

The papers listed in this bulletin were taken largely from Bulletins 698, 731, 746, 747, 758, 784 and 802 of the U. S. Geological Survey by John M. Nickles. Additional titles were obtained by searching through the files of the Library of Congress, the U. S. Geological Survey, and the New Mexico School of Mines. This list is as nearly complete as it could be made, but undoubtedly some papers have been omitted.

ACKNOWLEDGMENTS

Special acknowledgments are due to Miss J. L. V. McCord, librarian, for permission to consult the publications on file in the U. S. Geological Survey library ; to Dr. A. C. Spencer for suggestions concerning arrangements of the index ; and to Mr. John M. Nickles for helpful

criticism and furnishing recent titles which appeared in publications not available to the writer.

HOW PUBLICATIONS MAY BE OBTAINED

Many of the government publications can be obtained by writing direct to the department or bureau of issue, Washington, D. C., some being distributed gratis and a charge made for others. The original stock of many of the publications of the U. S. Geological Survey, etc., is exhausted. Some of these can be purchased from the Superintendent of Documents, Washington, D. C. Publications no longer available at the government offices in Washington may be for sale in second-hand book stores.

Many of the publications listed in the bibliography may be obtained direct from the publisher. Wherever possible the publisher's address is given under "Serials," pages 8-12.

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 Normal University.

Santa Fe, State.

Silver City, New Mexico State Teachers College.

Socorro, New Mexico School of Mines and State Bureau of Mines.

State College, New Mexico College of Agriculture & Mechanic Arts.

The Engineering Societies Library, 29 West 39th St., New York City, has an unusually complete file of the geologic literature of the world. Photostat copies of printed articles can be obtained from this library at 25c for each negative (white lines on black background) and

50c for each positive. The maximum size, 11 by 14 inches, is large enough to take one large magazine page or two small pages.

Special efforts are being made by the State Bureau of Mines and Mineral Resources of the New Mexico School of Mines to obtain at least one copy of every publication containing any geologic information on the state. Photostat copies of papers not otherwise obtainable are being accumulated as rapidly as funds permit. This material is available to the public in the school library. Those who find it impossible to visit the library may borrow certain publications through correspondence, a suitable deposit being required in most cases.

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

The Bureau of Mines 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.

ABBREVIATIONS USED

Abst.	Abstract Miner.	Mineralogy
Acad.	Academy Misc.	Miscellaneous
Agr.	Agriculture Mo.	Monthly
Amer.	American Mon.	Monograph
An.	Annals, annual Mus.	Museum
Anon.	Anonymous N.	New, north, etc.
App.	Appendix N. Mex.	New Mexico
Ariz.	Arizona n. d.	no date of publication given
Asso.	Association Nat.	Natural
Bienn.	Biennial Natl.	National
Bull.	Bulletin n. p.	no place of publication given
Bur.	Bureau n. s.	new series
C. I.	Contour interval Phila.	Philadelphia
Chem.	Chemistry pp.	pages
Col.	Collection Proc.	Proceedings
Coll.	College Prof.	Professional
Colo.	Colorado Prel.	Preliminary
Cong.	Congress Pt.	Part
Contr.	Contributions Pub.	Publication
Dept.	Department Q.	Quarterly
Doc.	Document R. R.	Railroad
Ed.	Editor, edition Rp.	Report
Eng.	Engineering Res.	Resources
Engr.	Engineer rev. ed.	revised edition
Ex.	Executive Rv.	reviewed
Exper.	Experiment S. Ex. Doc. ..	Senate executive docu- ment
Expl.	Exploration	ment
Extr.	Extract Sch.	School
Geog.	Geographic Sci.	Science, scientific
Geol.	Geology, geologist s.	series
G. S.	Geological Survey sess.	session
g. s.	geological series Soc.	Society
H. Ex. Doc.	House executive document St.	Saint
Hist.	History Sta.	Station
il. ..	illustrated with figures of fossils	Suppl.
illus	illustrated with photographs, diagrams, etc.	Trans.
	U. S.	United States
Inst.	Institute U. S. G. S. ..	United States Geological
Int.	International	Survey
Jnl.	Journal Univ.	University
Kryst.	Krystallographie Vol.	Volume
Mag.	Magazine Wash.	Washington
Mem.	Memoirs Zool.	Zoology
Memo.	Memorandum Zs.	Zeitschrift
Min.	Mining, mineral	

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Academie des sciences, Paris, *Comptes rendus*.
- Acad. Sci. St. Louis, Trans.
Academy of Science of St. Louis, Transactions.
- Amer. Asso. Adv. Sci., Proc.
American Association for the Advancement of Science, Proceedings.
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American Institute of Mining Engineers, Transactions; Bulletin; Preprint; Technical Publication. 29 West 39th St., New York City.
(Since 1918 these publications have appeared under the name of American Institute of Mining & Metallurgical Engineers.)
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American Journal of Science. New Haven, Connecticut.
- Amer. Min. Cong., Jnl.; Proc.
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See also International Mining Congress.
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- Amer. Mus. Nat. Hist., Bull.; Jnl.
American Museum of Natural History, Bulletin; Journal. New York City.
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American Museum Novitates (American Museum of Natural History).
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Boston Society of Natural History, Proceedings. Boston, Mass.
- Bur. Amer. Ethnology, Bull.
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- Bur. of Immigration.
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- Carnegie Inst. Wash., Pub.
 Carnegie Institute of Washington (D. C.), Publications.
- Carnegie Mus., An.
 Carnegie Museum, Annals. Pittsburgh, Pa.
- Cin. Soc. Nat. Hist., Jnl,
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 General Land Office. Washington, D. C.
- Geog. Review.
 Geographical Review. New York City.
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 Geological Society of America, Bulletin. Florida Ave. and Eckington Place,
 Washington, D. C.
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 Indiana Academy of Science, Proceedings. Indianapolis, Indiana.
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 International Geological Congress, Comptes rendus.
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 International Mining Congress. Later, American Mining Congress.
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 Iowa Academy of Sciences, Proceedings. Des Moines, Iowa.
- Jab. Geol.**
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 Journal of Geography. Chicago, Illinois.

K-k Naturh. Hofmus, An.

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Kans. Acad. Sci., Trans.

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Pan-American Scientific Congress. Washington, D. C.
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Popular Science Monthly. New York City.
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4. The coal, graphite, and oil fields of Raton, New Mexico.
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Lang, W. B.

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Ariz. Min. Jnl. 10 : 3-4 (April 15, 1927).
3. The geology and history of the Malone Mines.
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Leatherbee, Brigham.

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Philadelphia : 76 pp., map (1868).
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12. On an occurrence of coal changed to coke and graphite in the Raton, New
Mexico, coal field; (*abst.*).
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13. Unconformity separating the coal-bearing rocks in the Raton field, New
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18. Graphite near Raton, New Mexico.
U. S. G. S., Bull. 530 : 371-374 (1913).
19. The Cerrillos coal field, Santa Fe county, New Mexico.
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Macfarlane, James.

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 3. Resume and field notes, with a translation by Wm. P. Blake (Whipple's-reconnaissance near the thirty-fifth parallel).
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16 pp., Zurich 1858, privately published.
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Marcou, Jules (Continued).

- 12. Cerro Tucumcari.
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- 13. The Tucumcari fossils.
Science 21 : 358-360 (1893).
- 14. Note on "the easternmost volcanoes of the United States."
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Marcy, R. B.

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Marsh, Othniel Charles.

- 1. Introduction and succession of vertebrate life in America.
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- 2. Notice of new fossil reptiles.
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Martin, Charles W.

- 1. Tucumcari oil field, Quay County, N. Mex.
Scale 1" to 6 miles, Tucumcari (1920).
(A similar map dated 1919 is for sale by J. C. Berry & Co., Amarillo, Texas.)

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United States Bureau of Mines.

1. Mineral resources of the United States, 1923-date.
U. S. Bur. Mines, Washington, D. C.

United States Bureau of Soils.

1. Soil map, Carlsbad sheet. Scale, 1" to 1 mile (1899). (Has several columns showing nature of soil to depth of 6 feet).
2. Soil map, Roswell sheet. Scale, 1" to 1 mile (1899). (Has several columns showing nature of soil to depth of 6 feet).
3. Underground water map, Carlsbad sheet.
Scale, 1" to 1 mile (1899).
4. Underground water map, Roswell sheet.
Scale, 1" to 1 mile (1899).

United States Forest Service:

The following maps are printed in black only, show roads, railroads, towns, Land Grants, and the sub-divisions of the Public Domain :

1. Apache National Forest; Catron, and Greenlee and Apache (Arizona) Counties ; 4 miles to 1 inch (approx.) (1924?).
2. Carson National Forest; Rio Arriba and Taos Counties; 4 miles to 1 inch (approx.) (1925).
3. Coronado National Forest; Hidalgo, and Cochise (Arizona) Counties ; 4 miles to 1 inch (approx.) (1922).
4. Datil National Forest ; Catron, Socorro, and Sierra Counties ; 4 miles to 1 inch (approx.) (1925).
5. Gila National Forest ; Catron and Grant Counties ; 4 miles to 1 inch (approx.) (1924).
6. Lincoln National Forest ; Lincoln, Otero, Chaves and Eddy Counties ; 4 miles to 1 inch (approx.) (1925).
7. Manzano National Forest ; Eastern Division, Bernalillo, Sandoval, Torrance, Valencia, Socorro and Lincoln Counties; 4 miles to 1 inch (approx.) (1925?).
8. Manzano National Forest; Western Division, McKinley, Valencia, and Sandoval Counties ; 4 miles to 1 inch (approx.) (1925?).
9. Santa Fe National Forest; Santa Fe, Rio Arriba, Sandoval, Taos, Mora, and San Miguel Counties; 4 miles to 1 inch (approx.) (1924).

United States Geological Survey.

1. Mineral resources of the United States, annual from 1882 to 1923.
U. S. G. S., Washington. D. C.
(Volumes for 1894-1899 were published in the Director's Annual Report.)
- The following topographic maps, nos. 2-59, of areas of New Mexico have been published by the U. S. G. S., Washington, D. C. The first figure given is the scale, the second figure is the contour interval, and the figure in parenthesis is the date of issue:
2. Topographic map of New Mexico, compiled by N. H. Darton; 1:500,000; 100 meters (1925).
 3. Albuquerque; Bernalillo and Sandoval Counties; 1:125,000; 50 feet (1893).
 4. Alamo National Forest (now part of Lincoln National Forest); Otero County; 1:250,000; 200 feet (1914).
 5. Alum Mountain; Grant and Catron Counties; 1:125,000; 100 feet (1913).
 6. Animas Peak; Hidalgo County; 1:62,500; 25 feet (1920).
 7. Antelope Wells; Hidalgo County; 1:62,500; 25 feet (1919).
 8. Bernal; Guadalupe, San Miguel, and Torrance Counties; 1:125,000; 50 feet (1894).
 9. Big Hatchet Peak; Hidalgo County; 1:62,500; 25 feet (1918).
 10. Brilliant; Colfax County; 1:62,500; 50 feet (1915).
 11. Camel Mountain; Dona Ana and Luna Counties; 1:62,500; 10 feet (1917).
 12. Canutillo; Dona Ana, and El Paso (Texas) Counties; 1:62,500; 10 feet (1919).
 13. Canyon de Chelly; San Juan, and Apache (Arizona) Counties; 1:250,000; 200 feet (1892).
 14. Chaco; San Juan County; 1:250,000; (1892).
 15. Chiricahua; Hidalgo, and Cochise (Arizona) Counties; 1:125,000; 100 feet (1919).
 16. Cienega Springs; Hidalgo County; 1:62,500; 25 feet (1918).
 17. Columbus; Luna County; 1:62,500; 10 feet (1920).
 18. Corazon; Guadalupe and San Miguel Counties; 1:125,000; 50 feet (1894).
 19. Deming; Luna County; 1:125,000; 100 feet (1915).
 20. Dog Mountains; Hidalgo County; 1:62,500; 25 feet (1918).
 21. Fort Bayard Special; Grant County; 1:12,000; 10 feet (1910).
 22. Fort Defiance; McKinley, and Apache (Arizona) Counties; 1:250,000; 200 feet (1892).
 23. Gallina; Rio Arriba and Sandoval Counties; 1:125,000; 100 feet (1909).
 24. Hachita; Grant and Hidalgo Counties; 1:62,500; 25 feet (1918).
 25. Hermanas; Luna County; 1:62,500; 10 feet (1918).
 26. Jemez; Sandoval County; 1:125,000; 100 feet (1892).
 27. Koehler; Colfax County; 1:62,500; 50 feet (1917).
 28. Lamy; Santa Fe and San Miguel Counties; 1:125,000; 50 and 100 feet (1894).
 29. Largo; Rio Arriba, Sandoval and San Juan Counties; 1:250,000; 200 feet (1895).
 30. Las Cruces; Dona Ana County; 1:125,000; 25 and 50 feet (1893).
 31. Las Vegas; San Miguel and Mora Counties; 1:125,000; 50 feet (1893).
 32. Magdalena Special; Socorro County; 1:12,000; 25 feet (1912).
 33. Mogollon; Catron and Grant Counties; 1:125,000; 100 feet (1912).
 34. Morenci; Catron, Grant, and Greenlee (Arizona) Counties; 1:125,000; 100 feet (1915).

United States Geological Survey (Continued).

35. Mt. Riley; Dona Ana County; 1 :62,500; 10 feet (1918).
36. Mt. Taylor; McKinley, Sandoval, Valencia and Bernalillo Counties; 1:250,000; 200 feet (1899).
37. Noria; Dona Ana County; 1:62,500; 10 feet (1918).
38. Pelona; Catron County; 1: 125,000; 100 feet (1918).
39. Perilla ; Hidalgo, and Cochise (Arizona) Counties; 1:125,000; 100 feet (1919).
40. Playas; Hidalgo County; 1: 62,500; 25 feet (1919).
41. Point of Sands; Dona Ana and Otero Counties; 1:125,000; 50 feet (1916).
42. Pratt; Hidalgo County; 1:62,500; 25 feet (1919).
43. Raton; Colfax County; 1:62,500; 50 feet (1914).
44. Reserve; Catron County; 1:125,500; 100 feet (1918).
45. St. John's; Catron, Valencia, and Apache (Arizona) Counties; 1 : 250,000 ; 200 feet (1892).
46. San Pedro ; Santa Fe, Sandoval, Bernalillo and Tarrant Counties; 1: 125,000; 50 and 100 feet (1892).
47. San Simon; Hidalgo, and Cochise and Graham (Arizona) Counties; 1:125,000; 100 feet (1917).
48. Santa Clara; Sandoval and Santa Fe Counties; 1 : 125,000; 100 feet (1892).
49. Santa Fe; Santa Fe, San Miguel and Mora Counties; 1 : 125,000 ; 100 feet (1894).
50. Santa Rita Special; Grant County; 1 : 24,000; 20 feet (1909).
51. Silver City; Grant County; 1 : 125,000; 100 feet (1909).
52. Socorro; Socorro County; 1:62,500; 50 feet (1906).
53. Tularosa; Otero, Lincoln and Socorro Counties; 1 :125,000; 50 feet (1916).
54. Tyrone District; Grant County; 1:24,000; 25 feet (1922).
55. Victorio; Luna, Grant and Hidalgo Counties; 1:62,500; 25 feet (1918).
56. Walnut Wells; Hidalgo County; 1:62,500; 25 feet (1918).
57. Watrous; San Miguel and Mora Counties; 1:125,000; 50 feet (1894).
58. Wingate; McKinley and Valencia Counties; 1:250,000; 200 feet (1892).
59. (Base Map) State of New Mexico.
Scale 1:500,000 (1922).

The following memoranda for the press, Nos. 60-67, deal with New Mexico.

60. Result of core drilling in New Mexico.
Interior Dept., Memo. for the Press (10994) : 2 pp., log of boring (1926).
61. First Government potash test encouraging.
Interior Dept., Memo. for the Press (17064) : 4 pp., log of boring. (1927).
62. Government strikes potash in New Mexico.
Interior Dept., Memo. for the Press (17450) :2 pp., log of boring (1927).
63. Third Government test strikes substantial bodies of potash.
Interior Dept., Memo. for the Press (20893) :4 pp., (1928).
64. Potash struck by four Government tests in Texas.
Interior Dept., Memo. for the Press (23657) :7 pp. (1928).
(Gives potash analyses from 20 wells in New Mexico).
65. Potash struck by three more Government tests in Texas.
Interior Dept., Memo. for the Press (30714) : 6 pp. (1929).
(Gives potash analysis from 21 wells in New Mexico).
66. (Eleventh and twelfth Government tests).
Interior Dept., Memo. for the Press (36351) :3 pp. (1929).
(Includes analyses of well cuttings from 12 New Mexico wells).

United States Geological Survey (Continued).

67. Potash found in Government test holes.

Interior Dept., Memo. for the Press (41542) : 5 pp. (1930).

(Results obtained in 13th and 14th test holes, Eddy and Lea Co.)

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U. S. G. S., Bull. 86: 549 pp., maps. (1892).

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2. Minerals of the Tres Hermanas district.

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1. The Mogollon Range ; a description of the region near Cooney, N. M.

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2. Oil and gas possibilities of the Puertecito district, Socorro and Valencia Counties, New Mexico.
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3. The mining industry and mineral resources of New Mexico.
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4. Geology of the El Vado dam site and reservoir, Rio Arriba County, New Mexico.
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PALT II. INDEX

PLAN OF INDEX¹

The index of the geologic literature of New Mexico is presented under 19 major heads. These are subdivided according to the nature of the material indexed. The major heads, with their most important features, are as follows :

Areas Described, page 86. Papers describing certain areas with a fair degree of completeness.

Bibliography, page 86. Papers which contain a tabulation of other papers relating to the same subject.

Borings, page 87. Papers containing descriptive or graphic records of borings for oil, gas, water, etc.

Correlation, page 87. Papers dealing with the correlation of geologic formations.

Dams and Reservoir Sites, page 88. Papers containing data on the geology and topography of dam and reservoir sites.

Economic Geology, page 88. Papers dealing with economic phases of New Mexico geology.

Geologic Formations Described, page 96. Papers which describe the various geologic formations.

Geologic Formations, Tables and Sections, page 102. Papers containing descriptive or graphic tables or sections of the various geologic formations.

Geologic Maps, page 104. Papers accompanied by geologic maps of the State or parts of the State.

Historical Geology, page 105. Papers containing data on the geologic history, stratigraphy, etc. of the State.

Maps, General, page 110. Papers containing maps, or independently published maps of a general nature and including Forest Service maps, claim maps, county maps, etc.

Mineralogy, page 112. Papers dealing with minerals occurring in certain areas or describing specific minerals from New Mexico. Analyses of minerals are indexed under this head.

Paleontology, page 114. Papers on the paleontology of the State or the past life as recorded in the rocks.

Petrology, page 119. Papers describing the igneous, sedimentary and metamorphic rocks of the State. Analyses of rocks are indexed under this head.

Physical Geology, page 120. Papers containing data on the physical geology of the State.

Physiographic Geology, page 122. Papers dealing with the present surface of the State, including land forms, erosion, climate, etc.

Structural Geology, page 123. Papers dealing with the geologic structure or the relations and positions of the various rock masses in certain regions of New Mexico, or describing specific structural features.

Topographic Maps, page 124. Papers containing maps, or independently published maps, depicting the topographic features of certain areas.

Underground Water, page 125. Papers containing data on underground water conditions of certain areas in the State. Springs and artesian wells are included and analyses of water are indexed under this head.

¹See "Plan and Scope of Bibliography," page 5.

Areas described.

Alamogordo desert : McBride, 1.
 Alamosa Creek valley, Socorro County: Winchester, 2.
 Brilliant quadrangle : Lee, 29.
 Burro Mts. copper district : Antisell, 1; Paige, 3; Somers, 1.
 Carlsbad irrigation project : Meinzer, 5.
 Cerrillos coal field: Lee, 19.
 Cerrillos Hills: Johnson, D. W., 4.
 Colorado-New Mexico state line: Bryan, 11.
 Colorado Plateau: Dake, 1.
 Deming quadrangle: Darton, 15.
 Eastern N. Mex.: Baker, C. L., 2; Case, 5; Cummins, 1.
 Engle coal field: Lee, 3.
 Eocene Plateau: Cope, 7.
 Estancia Valley : Meinzer, 2.
 Florida Mts.: Becker, 1.
 Foothills region : Conkling, 3.
 Gallina quadrangle: Case, 3.
 Gallina-Raton Spring coal field: Gardner, 2.
 Gallup-Zuni Basin : Kirk, 1; Sears, 1.
 General : Abert, 1; Blake, 1; Cope, 15; Darton, 29; Emmons, S. F., 1; Emory, 1; Hayden, 3, 4; Loew, 3; Marcou, 2; Marcy, 1; Simpson, J. H., 1; Wislizenus, 1.
 Gila region: Blake, 5.
 Hagan coal field: Keyes, 10.
 Hanover district : Paige, 1.
 Hidalgo County: Schwennesen, 1.
 High Plains : Johnson, W. D., 1.
 Koehler quadrangle : Lee, 29.
 Lake Valley: Clark, E., 1; Cope, 26; Endlich, 1.
 Luna County : Darton, 6, 12.
 Magdalena district : Argall, 1; Lindgren, 6.
 Mexican boundary region : Emory, 2, 3; Marcou, 6.
 Mogollon district : Ferguson, 1, 2; Graham, 1.
 Mogollon Range: Anderson, 2.
 Mt. Taylor : Dutton, 1, 2; Johnson, D. W., 7; Shimer, 1.
 Nacimiento Mts.: Cazin, 2.
 Northeastern : Baldwin, 1; Yeo, 1.
 Northern : Case, 4; Emmons, S. F., 1, 3.
 Northwestern : Dutton, 2.
 Puertecito district, Socorro and Valencia Counties : Wells, E. H., 2.
 Raton coal field: Lee, 31.

Areas described (Continued).

Raton Mesa region : Lee, 23.

Raton quadrangle : Lee, 29.
 Rio Penasco basin : Renick, 3.
 Roswell area : Fielder, 1, 2; Fisher, 2.
 Sandia Mts.: Ellis, 2.
 San Juan Basin: Bauer, 1, 2.
 San Pedro Mts.: Brinsmade, 3.
 Santa Rita district : Rickard, 1.
 Silver City region : Brinsmade, 4; Paige, 7.
 Socorro County : Black, 1.
 Southeastern : Hoots, 1.
 Southern : Antisell, 1; Darton, 16; Griffin, 1; Parry, 1.
 Staked Plains : Blake, 1; Cummins, 1; Drake, 1.
 Taos Range: Gruner, 1.
 Thirty-fifth parallel : Blake, 1.
 Thirty-second parallel : Antisell, 1.
 Tijeras coal field: Lee, 15.
 Torraine County : Black, 1.
 Tres Hermanas district : Lindgren, 5.
 Tucumcari Mts.: Cummins, 2; Marcou, 12.
 Tularosa Basin : Darton, 22; Meinzer, 3; Powell, 1.
 Tyrone district : Paige, 9.
 Valencia County : Johnson, D. W., 2.
 Zuni Plateau: Dutton, 2.

Bibliography.

Albuquerque region : Bryan, 1.
 Brachiopoda : Schuchert, 1.
 Cerrillos coal field : Lee, 16.
 Coal fields, stratigraphy : Lee, 16.
 Dam and reservoir sites : Bryan, 14.
 Eastern New Mexico : Gould, 2.
 Eolian geology : Stuntz, 1.
 Fossil vertebrata, North America : Hay, 1.
 Geologic formation names : Keyes, 55, 57; Weeks, 1.
 San Juan County : Bauer, 1.
 Great Plains, Permian of : Gould, 2.
 Manganese : Healey, 1.
 Mining districts : Hill, J. M., 1.
 Mogollon district : Ferguson, 2.
 Morrison fauna : Mook, 3.
 Morrison formation : Lee, 21; Mook, 3.
 Nacimiento group : Gardner, 9.
 Northwestern: Darton, 3.
 Paleontology, Vertebrata of North America: Hay, 1.

Bibliography (Continued).

- Permain of Great Plains : Baker, C. L., 5; Gould, 2.
 Raton Mesa region: Lee, 23.
 Rocky Mts., eastern slope: Cope, 7,
 San Juan Basin: Reeside, 2.
 Sierra and Socorro Counties : Lindgren, 6.
 Tularosa Basin: Meinzer, 3.
 Underground water : Carpenter, 1;
 Fuller, 2, 3; Meinzer, 4; Van
 Diest, 1.

Borings.

- Albuquerque: Bryan, 1.
 Andrews well, Carlsbad: Hoots, 1.
 Artesia : Fuller, 1.
 Bluebird well, Eddy County: Hoots,
 1.
 Carlsbad : Darton, 29; Lee, 34.
 Chaves County: Hoots, 1.
 Chupadera formation: Darton, 25.
 Curry County: Baker, C. L., 1.
 Dayton well, Eddy County: Hoots, 1.
 Eddy County: Hoots, 1.
 Artesia : Fuller, 1.
 Dunken: Renick, 3.
 Hope well: Renick, 3.
 Marland 1: Willis, 1, 3.
 Pope well: Cummins, 1.
 See also Carlsbad, page 87.
 El Vado dam site, Rio Arriba Coun-
 ty: Wells, E. H., 4.
 Estancia Valley: Meinzer, 2.
 Gallup Basin: Kirk, 1.
 Garcia : Darton, 3.
 General: Darton, 3, 22, 29; Ellis, 1:
 Phalen, 1.
 Hidalgo County: Schwennsen, 3.
 Jemez Government well : Reagan, 1.
 Lake Arthur well, Chaves County:
 Hoots, 1.
 Lea County, Maljamar : Pearsall, 1;
 Willis, 1, 3.
 Lucia well, Estancia Valley: Mein-
 zer, 2.
 Luna County: Darton, 12.
 Mountainair well, Estancia Valley:
 Meinzer, 2.
 Northwestern: Darton, 3.
 Orchard Park well, Chaves County:
 Hoots, 1.
 Potash: Hoots, 1; Mansfield, 3; U.
 S. G. S., 60, 61, 62.
 Quay County: Baker, C. L., 1.
 Raton coal field: Lee, 31.
 Rio Grande Valley: Lee, 5.
 Roosevelt County, Portales: Baker,
 C. L., 1.

Sandoval County: Yeo, 2. Borings
 (Continued).

- San Simon ranch well, Lea County:
 Hoots, 1.
 Santa Rosa: Prout, F. S., 1.
 Socorro and Sierra Counties: Lind-
 gren, 6.
 Southeastern, potash tests: See pot-
 ash, page 87.
 Torrance County: Fuller, 1.
 Tularosa Basin: Meinzer, 3.
 Valencia County: Darton, 3.
 Willard well, Estancia Valley: Mein-
 zer, 2.

Correlation.

- Animas formation, San Juan Basin:
 Reeside, 2.
 Archean and Algonkian: Van Hise,
 1.
 Cambrian of North America: Wal-
 cott, 1.
 Carboniferous : Gordon, 2; Keyes, 24.
 Chart showing: Wilmarth, 1.
 Coal beds, Rocky Mt. region: Lee, 16.
 Cretaceous: Lee, 20.
 North America: White, 7.
 Old and new names: Reeside, 2.
 Cretaceous-Eocene: Lee, 21.
 New Mexico, Montana, Wyoming:
 Brown, 2.
 North America and Europe: Mat-
 thew, 4.
 Devonian and Carboniferous:
 United States: Williams, H. S., 1.
 Eastern:
 Permian: Baker, C. L., 5; Gould, 2.
 Eocene:
 United States: Clark, W. B., 1.
 Wyoming and New Mexico: Gran-
 ger, 1.
 Eocene of North America: Smith,
 J. H., 1.
 General: Darton, 29; Wilmarth, 1.
 Guadalupian and Kansas sections:
 Beede, 2.
 Mesozoic:
 Arizona to Wyoming: Lee, 24.
 Neocene:
 North. America: Dall, 1.
 Newark: Russel, 1.
 Paleozoic: Gordon, 1.
 Southern: Darton, 16.
 Permian:
 Criteria: King, P. B., 1.
 Great Plains: Baker, C. L., 4, 5;
 Blanchard, 1; Crandall, 1; King,
 P. B., 1; King, R. E., 1; Lloyd,
 1; Willis, 1, 3.
 Northwestern: Baker, A. A., 1.

Correlation (Continued).

- Permo-Carboniferous : Case, 4.
 - Colorado and New Mexico: Melton, 2.
 - Texas and New Mexico: King, P. B., 1.
- Puerco and Torrejon formations: Cope, 55.
 - Montana and New Mexico: Gardner, 9.
 - San Juan Basin: Reeside, 2.
- Raton Mesa region: Lee, 23.
- Red beds: Case, 8; Darton, 29.
 - Colorado-New Mexico: Cross, 3.
 - Southern Great Plains: Case, 5, 7, 9; Gould, 2.
- San Juan Basin:
 - Cretaceous and Tertiary: Reeside, 2.
- Southeastern: Hoots, 1.
- Southern: Darton, 16.
- Tertiary: Brown, 2; Dall, 2; Gardner, 9.
 - Old and new names: Reeside, 2.
- Wasatch:
 - San Juan Basin: Reeside, 2.

Dam and reservoir sites.

- Angostura, San Miguel County (Bell ranch) : Yeo, 1.
- Antelope Lake, Eddy County: Reed, 1.
- Bell farm, San Miguel County: Yeo, 1.
- Bueyeros, Harding County: Yeo, 1.
- Cactus Flat, Eddy County: Nye, 1.
- Cady ranch, Chaves County: Reed, 1.
- Carlsbad irrigation project: Bryan, 14; Meinzer, 5.
- Conchas, San Miguel County (Bell ranch) : Yeo, 1.
- Dripping Springs, Quay County: Yeo, 1.
- Eagle Draw, Chaves County: Nye, 1; Reed, 1.
- Eddy County, Cactus Flat: Nye, 1.
- El Vado: Wells, E. H., 4.
- Engle (Elephant Butte) reservoir : Lee, 5.
- Espanola Valley: Lee, 5; Newell, 2.
- Gallegos, Harding County: Yeo, 1.
- Hondo reservoir, Eddy County: Bryan, 14.
- International reservoir site (4 miles north of El Paso) : Lee, 5.
 - Lucueva: Newell, 2.
- McMillan reservoir, Eddy County: Bryan, 14.
- Mesa Rica tunnel: Yeo, 1. **Dam and reservoir sites (Continued).**

- Pajarito, Quay County: Yeo, 1.
- Plaza Larga, Quay County: Yeo, 1.
- San Acacia: Lee, 5.
- San Felipe: Lee, 5; Newell, 2.
- Santa Fe Creek: Newell, 2.
- State line clam site, Taos County: Bryan, 11.
- Zuni dam, Black rock: Bryan, 14, 15; Eng. News, 1; Robinson, H. F., 1, 2.

Economic geology.

- Albuquerque region: Bryan, 1; Herrick, C. L., 6, 10; Reagan, 1, 5.
 - Alum:
 - Gila River, Grant County: Hayes, 1.
 - Alunogen:
 - Gila region: Blake, 5.
 - Anthracite: Griffith, 1; Johnson, D. W., 4; Lakes, 1; Le Conte, 1; Owen, 1; Raymond, 1, 6.
 - See also Coal, Cerrillos field, page 89.
 - Apache Canyon:
 - South-central: Keyes, 4.
 - Apache district: Wade, 3.
 - Artesia oil field: Davis, M. J., 1; Rich, A., 1.
 - Aztec mine: Chase, 1; Lee, 22; Raymond, 1.
 - Bauxite:
 - Gila region: Blake, 5.
 - Bentonite:
 - Rio Arriba County: Ross, 1.
 - Bernalillo County: Lindgren, 6; Anon., 7.
 - Fluorspar: Johnston, 1.
 - Black Range: Fishback, 1; Wright, J. W., 1.
 - History: Thompson, 1.
 - Manganese: Anon., 10.
 - Tin district: Hill, J. M., 2; Naething, 1.
 - Building stone: Antisell, 1; Jones, F. A., 1.
 - Luna County: Darton, 12.
 - Raton region: Lee, 29.
 - Burro Mountains: Bush, 1, 7; Lang, 1; Paige, 3, 7; Reid, G. D., 1; Somers, 1; Stauber, I; Wade, 1; Weed, 1.
 - Turquoise: Zalinski, 1, 2.
 - Brass ore in nature: Keyes, 70.
 - Caballos Mountains, ore deposits of: Keyes, 20.
 - Carbonaceous deposit, near Putnam: Foster, 1.

Economic geology (Continued).

Economic geology (Continued).

- Catron County (separated from Socorro County in 1921) :
 Fluorspar : Johnston, 1.
 Mogollon district : Anderson, 1, 2; Bush, 6; Ferguson, 1, 2; Henrich, 2; Scott, 1.
 Zuni salt deposits : Darton, 1, 2.
- Cement materials : Eckel, 1.
 Production : Min. Ind., 1.
- Central district : Birkenbine, 1; Lindgren, 6; Paige, 7; Weed, 1.
- Cerrillos Hills : Johnson, D. W., 4.
- Chloride Flat district: see Grant County.
- Chupadera Mesa :
 Iron deposits : Keyes, 67.
- Clay: Herrick, C. L., 12; Jones, F. A., 1; Shaler, 2.
 Analyses :
 Cretaceous clay from Capitan: Jones, 1.
 Cretaceous clay from Sandia Mountains : Jones, 1.
 Acequia clay from old Albuquerque: Jones, 1.
- Luna County: Darton, 12.
- Raton region: Lee, 29.
- Coal : Ashburner, 1; Campbell, 4, 6, 7; Finlay, 2; Fleming, 1; Griffith, 1; Jones, F. A., 1, 9; Judd, E. K., 1; Lakes, 2; Le Conte, 1; Macfarlane, 1; Parker, 1; Ritter, 1; Storrs, 1.
 Analyses : Campbell, 5; Jones, F. A., 1.
 Cerrillos field: Lee, 19; Stevenson, 2.
 Colfax County: Anon., 9.
 Gallup-Zuni Basin: Sears, 1.
 Lincoln County: Anon., 9.
 McKinley County : Campbell, 5; Anon., 9.
 Monero, Rio Arriba County Gardner, 3.
 Raton coal field : Lee, 18, 31.
 San Miguel County : Gardner, 5.
 Socorro County : Campbell, 5; Gardner, 6.
- Bernalillo County:
 Tijeras field: Lee, 15.
 Carboniferous : Gardner, 5, 8; Keyes, 28.
- Carbon ratios : Dobbin, 1; Storm, 1.
- Carthage field: Gardner, 6; Owen, 1.
- Cerrillos field, Santa Fe County Lee, 19; Johnson, D. W., 4; Lesquereux, 6; Stevenson, 11, 12

Coal (Continued).

- Colfax County :
 Dawson field: Sheridan, 1. Raton field: Judd, E. K., 1; Lee, 31; Stevenson, 8.
- Cretaceous : Le Conte, 2. Cretaceous, carbon ratios of : Storm, 1.
- Dawson field: Sheridan, 1. Durango-Gallup field : Schrader, 1; Shaler, 3.
- Durango-Monero field: Gardner, 3. Engle field, Socorro County: Lee, 3.
- Fort Stanton Reservation, Lincoln County : Campbell, 3. Gallina-Raton Spring field : Gardner, 2.
- Gallup Basin: Kirk, 1; Sears, 1.
- Gallup-San Mateo field: Gardner, 4.
 Hagan field, Sandoval County : Keyes, 10.
 Jemez field: Reagan, 3.
 Lincoln County : Campbell, 3; Wegemann, 1.
 McKinley County : Gardner, 4; Kirk, 1; Schrader, 1; Shaler, 3; San Mateo-Cuba field : Gardner, 7.
- Map of fields : Campbell, 4, 7. Maxwell land grant: Conkling, 2, 3. Mescal Canyon field : Keyes, 35. Monero, Rio Arriba County: Gardner, 3.
- Northeastern : Van Diest, 2. North central: Lee, 16.
 Northern : Judd, E. W., 1; St. John, 1.
 O'Mara field: Keyes, 71.
 O'Mara and Pecos River fields : Gardner, 5.
- Otero County: Wegemann, 1. Pecos River field: Gardner, 5. Production figures : Jones, F. A., 1; Mineral Industry, 1; U. S. Bur. Mines, 1; U. S. G. S., 1.
 Cerrillos field : Johnson, D. W., 4.
 Raton field : Lee, 31.
 Quantity, in Fruitland formation: Bauer, 2.
 Raton-Brilliant-Koehler area: Lee, 29.
 Raton field, Colfax County : Judd, E. K., 1; Lakes, 4; Lee, 31; Owen, 1; Stevenson, 8.
- Reserves : Finlay, 2.

Economic geology (Continued).

- Coal (Continued).
 Rio Arriba County:
 San Mateo-Cuba field: Gardner, 7.
 Rio Puerco: Owen, 1.
 Sandoval County: Campbell, 2.
 San Mateo-Cuba field: Gardner, 7.
 San Juan County: Bauer, 2.
 San Mateo-Cuba field: Gardner, 7.
 San Miguel County: Gardner, 8.
 Santa Fe County:
 Cerrillos field: Lee, 19; Raymond, 1, 6; Stevenson, 11.
 Sierra Blanca field: Wegemann, 1.
 Socorro County:
 Carthage field: Gardner, 6.
 Engle field: Lee, 3.
 Tijeras field, Bernalillo County: Lee, 15; Marcou, 2.
 Una del Gato field: Campbell, 2.
 Valencia County:
 San Mateo-Cuba field: Gardner, 7.
 White Mountain region: Fisher, C. A., 1.
 Wootton area: Le Conte, 1; Lee, 23.
 Cobalt:
 Grant County, Black Hawk: Leach, A. A., 1.
 Cochiti district: Barbour, 1; Otero, 1; Statz, 3; Wynkoop, 1.
 Colfax County: Lindgren, 6.
 Aztec mine: Chase, 1; Lee, 22; Raymond, 1; Stevenson, 4.
 Dawson coal field: Lee, 31; Sheridan, 1.
 Graphite: Lakes, 4; Lee, 18.
 Moreno district: Raymond, 1, 3; Stevenson, 4.
 Colorado Plateau: Butler, 3.
 Contact metamorphism: Lindgren, 6.
 Cooks Peak: Darton, 12, 15; Lindgren, 6; Wells, E. H., 1.
 Cooney district: See Mogollon district, page 93.
 Copper: Austin, 2; Cazin, 1; Lindgren, 6; Tovote, 2; Weed, 1, 2; Wendt, 1; Winchell, 1.
 Apache district: Wade, 3.
 Bent: Ball, S. H., 1.
 Black Range district: Wright, J. W., 1.
 Burro Mountain district: Bush, 1; Lang, 1; Paige, 3; Reid, G. D., 1; Somers, 1; Stauber, 1; Wade, 1.
 Catron County:
 Cooney district: Graham, 1.

Economic geology (Continued).

- Copper (Continued).
 Cooney district, Catron County:
 Graham, 1.
 See also Mogollon district, page 93.
 Depths at which formed: Keyes, 43.
 Dona Ana County: Anon., 11.
 Enrichment, Santa Rita: Bagg, 1.
 Estey City: Turner, 1.
 Grant County: Birnie, 1; Snow, 2.
 Pinos Altos district: Blood, 1; Paige, 2.
 Santa Rita district: Bagg, 1; McDonald, D. F., 1.
 Silver City: Brinsmade, 4.
 Tyrone district: Bush, 7; Paige, 9.
 See also Burro Mountains, page 88.
 Hell Canyon district: Statz, 2.
 Hidalgo County:
 Lordsburg region: Jones, F. A., 4.
 Lincoln County:
 Bent: Ball, S. H., 1.
 Lordsburg region: Jones, F. A., 4.
 Magdalena district: Argall, 1; Haddon, 1.
 Mogollon district: Ferguson, 1, 2; Scott, 1.
 Mora County: Austin, 1, 2.
 Nacimiento district: Rogers, 1.
 Oscura Mountains: Emmons, S. F., 4.
 Pinos Altos district: Paige, 2.
 Production: Mineral Industry, 1; U. S. Bur. Mines, 1; U. S. G. S., 1.
 Mogollon district: Scott, 1.
 Red beds: See Sandstone copper, page 94.
 San Andres and Caballos Mountains: Emmons, S. F., 4; Herrick, C. L., 4.
 San Pedro, Santa Fe County: Berryman, 1; Brinsmade, 3; Henrich, 1; Keyes, 43; McCaffery, 1.
 Santa Fe County:
 Montezuma: Jenkins, 1.
 San Pedro: Berryman, 1; Brinsmade, 3; Henrich, 1.
 Santa Rita: MacDonald, D. F., 1; Rickard, 1.
 Enrichment at: Bagg, 1.
 Sierra Oscura: Peters, 1; Rogers, 1; Turner, 1.
 Silver City: Brinsmade, 4.
 Tyrone district, Grant County:
 Bush, 1, 7; Paige, 9.

Economic geology (Continued).

- Copper (Continued).
 Valencia County:
 Zuni Mountains : Schrader, 2.
 Zuni Mountains : Schrader, 2.
 Deming quadrangle: Darton, 15.
 Dona Ana County: Lindgren, 6.
 Fluorspar : Johnston, 1.
 Manganese: Jones, E. L., 1;
 Wells, E. H., 1; Anon., 10.
 Organ Mountains : Grif fin, 1;
 Otero, 1.
 Sodium sulphate :
 Lake Lucero : Wells, R. C., 1.
 Epitome of economic geology: Jones,
 5.
 Eureka district: Birnie, 1.
 Fierro district: Birkenbine, 1; Lind-
 gren, 6; Paige, 1, 7; Wells, E.
 H., 1.
 Florida Mountains : Becker, 1; Dar-
 ton, 12, 15; Lindgren, 6; Wells,
 E. H., 1.
 Fluorine :
 in sericitization, Tyrone district:
 Paige, 8.
 Fluorspar : Johnston, 1; Ladoo, 1.
 Map showing distribution: John-
 ston, 1.
 Deming, Luna County: Burchard,
 1, 2, 3; Darton, 5, 12.
 Gallup Basin : Kirk, 1; Sears, 1.
 Fierro district, ores of : Birkenbine,
 1; Brinsmade, 4; Paige, 1;
 Schwartz, 1.
 Garnet :
 Luna County: Darton, 12.
 Production figures : Mineral In-
 dustry, 1.
 General: Browne, 1, 2; Finlay, 2;
 Frazer, 1; Hayden, 1; Herrick,
 C. L., 5, 7, 12, 13; Hewett, 1;
 Jones, F. A., 1, 5, 9; Lindgren,
 1, 6; Otero, 1; Owen, 1; Tovote,
 1; Wells, E. H., 3; Anon., 4, 5,
 6.
 Georgetown district: Larsh, 2; Lind-
 gren, 6; Paige, 7.
 Gold: Carruth, 1; Lindgren, 1, 6.
 Baldy, Colfax County: Chase, 1;
 Lee, 22; St. John, 1.
 Black Range: Fishback, 1; Wright,
 J. W., 1.
 Catron County:
 Cooney district: Graham, 1; Kid-
 der, 1.
 Cochiti district, Sandoval County:
 Barbour, 1.
 Colfax County, Baldy Mountains
 Chase, 1; Lee, 1.

Economic geology (Continued).

- Gold (Continued).
 Cooney district, Catron County:
 Graham, 1; Kidder, 1.
 Grant County : Birnie, 1; Pickard,
 1.
 Pinos Altos district: Bush, 2;
 Paige, 2; Wright, I. L., 1.
 Silver City region: Brinsmade, 4.
 Hidalgo County:
 Lordsburg region : Jones, F. A., 4.
 Sylvanite : Dinsmore, 1; Jones,
 F. A., 6, 7.
 Lordsburg region : Jones, F. A., 4.
 Mogollon district: Scott, 1; Fer-
 guson, 1, 2.
 Pinos Altos district : Bush, 2;
 Paige, 2; Wright, I. L., 1.
 Placers : Carruth, 1;
 in arid regions : Stone, G. H., 2.
 Production: Mineral Industry, 1;
 U. S. Bur. Mines, 1; 13. S. G. S.,
 1.
 Mogollon district: Scott, 1.
 Rio Arriba County: Silliman, 1.
 Sandoval County:
 Cochiti district: Barbour, 1.
 San Pedro Mountain : Brinsmade, 3.
 Santa Fe County: Jones, 3; Statz,
 1.
 San Pedro district: Brinsmade, 3.
 Santa Fe region : Blake, 3.
 Sierra County: Birnie, 1.
 Sierra del Oro : Keyes, 64.
 Socorro County :
 Magdalena district: Lindgren, 6.
 Rosedale district: Lindgren, 6.
 Silver City : Brinsmade, 4.
 Sylvanite : Dinsmore, 1; Jones, F.
 F. A., 6, 7.
 Taos County: Bush, 3; Silliman, 1.
 Grant County: Birnie, 1; Browne, 2;
 Lindgren, 6; Otero, 1; Raymond,
 1, 2, 3, 4, 7, 8, 9; Silliman, 3.
 Alunogen and bauxite : Blake, 5.
 Bremen mine: Furman, 1.
 Burro Mountains : Paige, 3.
 Chloride Flat district: Birnie, 1.
 Copper : Lindgren, 6; Snow, 2.
 See also Burro Mountain district,
 page 88; Tyrone district, page
 96; and Santa Rita district,
 page 95.
 Fluorspar : Johnston, 1.
 Georgetown mines : Furman, 1.
 Hanover district: Brinsmade, 4.
 Iron of : Birkenbine, 1; Paige, 1.
 Lone Mountain district: Birnie, 1;
 Lindgren, 6; Paige, 7; Ray-
 mond, 7.
 Malone mines : Leach, A. A., 3.

Economic geology (Continued).

Grant County (Continued).

- Manganese: Jones, E. L., 1; Wells, E. H., 1; Anon., 18.
 Mimbres district: Birnie, 1.
 Pinos Altos district: Birnie, 1;
 Pinos Altos district: Birnie, 1;
 Blood, Bush, 2; Paige, 2;
 Wade, 4.
 Radium: Leach, F. I., 1.
 Silver City: Brinsmade, 4.
 Turquoise: Dinsmore, 3.
 Tyrone district: Bush, 1, 7; Paige, 3.
 White Signal district: Leach, F. I., 1.
 Zinc ores: Blake, 6; Brinsmade, 4.
 Graphite:
 Raton, Colfax County: Lakes, 4;
 Lee, 12, 18, 29.
 Tijeras Canyon: Herrick, C. L., 12.
 Guano: Jones, F. A., 1.
 Luna County: Darton, 12.
 Socorro County: Brady, 2.
 Gypsum: Adams, G. I., 1; Blake, 1;
 Darton, 19; Herrick, C. L., 12;
 Herrick, H. N., 1; Jones, 1;
 Santmyers, 1; Stone, R. W., 1.
 Analyses:
 Ancho: Jones, F. A., 1.
 White sands: Jones, F. A., 1;
 Meinzer, 3; Otero, 1.
 Map showing mills: Burchard, 4;
 Stone, R. W., 2.
 Northwestern: Shaler, 1.
 Tularosa Basin: Meinzer, 3.
 White sands: Brady, 1; Gibbs, 1;
 Herrick, C. L., 11.
 Hachita district: Jones, F. A., 6, 7;
 Lindgren, 6; Martin, G. A., 1.
 Hamilton mine: Lindgren, 2.
 Hell Canyon: Otero, 1; Statz, 2.
 Hematite:
 Socorro County: Foshag, 1.
 Hidalgo County (separated from
 Grant County in 1920): Lind-
 gren, 6.
 Eureka district: Birnie, 1.
 Lordsburg district; Fry, 1;
 Jones, F. A., 4.
 Tungsten: Apache No. 2 district:
 Hess, 3.
 Hillsboro: Birnie, 1; Lindgren, 6;
 Otero, 1; Thompson, 1.
 Hot Springs: Lindgren, 7.
 See also Underground water,
 page 125.
 Iron: Jones, F. A., 1; Raymond, 1.
 Analyses: Jones, 1.
 Hanover district: Paige, 1.

Economic geology (Continued).

Iron (Continued).

- Analyses (Continued).
 Jones district, Emmens, 1;
 Jones, 1.
 Chupadera Mesa: Keyes, 9, 67.
 Fairview deposits: Smythe, 2.
 Hanover deposits: Birkenbine, 1;
 Brinsmade, 4; Paige, 1.
 Jones field: Emmens, 1.
 Map of fields: Harder, 1.
 Kelly Camp: Argall, 1; Brinsmade,
 2; Johnson, W. M., 1; Keyes, 70.
 Kingston district: Fishback, 1;
 Jones, E. L., 1; Lindgren, 6;
 Wells, E. H., 1; Wright, J. W.,
 1.
 History: Thompson, 1.
 Lake Valley: Clark, E., 1; Cope,
 39; Endlich, 1; Keyes, 32, 36;
 MacDonald, B., 1; Silliman, 4.
 Manganese: Anon., 18.
 Lead: Lindgren, 6.
 Grant County: Larsh, 3.
 Kelly mine: Johnson, W. M., 1.
 Lordsburg district: Fry, 1; Jones,
 F. A., 4.
 Magdalena district: Argall, 1;
 Haddon, 1; Herrick, C. L., 2;
 Tuttle, 1.
 Production: Min. Ind., 1; U. S.
 Bur. Mines, 1; U. S. G. S., 1.
 San Andreas and Caballos Moun-
 tains: Herrick, C. L., 4.
 San Pedro Mountain: Brinsmade,
 3.
 Silver City: Brinsmade, 4.
 Tres Hermanas district: Lindgren,
 5.
 Lepidolite:
 At Embudo: Roos, 1.
 Lignite: Lesquereux, 6.
 See also Coal, page 89.
 Limestone:
 Luna County: Darton, 12.
 Lincoln County: Lindgren, 6.
 Coal:
 Fort Stanton Reservation:
 Campbell, 3.
 Lone Mountain district: Lindgren,
 6; Paige, 7.
 Lordsburg district: Fry, 1 • Lind-
 gren, 6; Weed, 1; Wells, J. L., 1.
 Luna County: Darton, 1, 12; Lind-
 gren, 6.
 Fluorspar:
 Burchard, 2; Darton, 5, 12;
 Johnston, 1.
 Tres Hermanas: Lindgren, 5.
 McKinley County: Lindgren, 6.
 San Mateo-Cuba coal field: Gard-
 ner, 7.

Economic geology (Continued).

- Magdalena district : Argall, 1;
Haddon, 1; Herrick, C. L., 2;
Johnson, W. M., 1; Keyes, 19;
Lindgren, 6; Statz, 4; Tuttle, 1.
Manganese: Wells, E. H., 1.
See also Kelly camp, page 92.
Manganese: Furness, 1; Harder, 2;
Jones, E. L., 1; Wells, E. H., 1;
Umpleby, 1; Anon., 10.
Map showing distribution:
Healey, 1; Hewett, D. F., 1;
Wells, E. H., 1.
See also particular districts.
Marble:
Luna County: Darton, 2.
See also Onyx, page 93.
Meerscham:
Grant County: Bush, 5; Michel, 1;
Paige, 7; Sterrett, 1, 2.
Mica: Jones, 1.
Mora County: Sterrett, 4; Anon., 8.
Rio Arriba County: Holmes, 1;
Sterrett, 3, 4.
San Miguel County: Sterrett, 4.
Mimbres district: See Grant County.
Mineral deposits: Jones, F. A., 1,
9; Lindgren, 6.
Mining districts : Hill, J. M., 1;
Lindgren, 6; Otero, 1; Raymond,
5.
History: Browne, 2; Jones, 1;
Lindgren, 6.
Aztec mine : Lee, 22.
Grant County : Birnie, 1.
Organ Mountain : Antisell, 1.
Map showing: Hill, 1; Otero, 1.
Mining maps showing districts:
Hill, J. M., 1; Jones, F. A., 9.
Mining properties :
Appraisal : Finlay, 2.
Mogollon district : Anderson, 1, 2;
Bush, 6; Ferguson, 1, 2; Graham,
1; Henrich, 2; Kidder, 1; Lind-
gren, 6; Otero, 1; Scott, 1;
Weatherby, 1; Weed, 1.
History: Ferguson, 2; Scott, 1.
Molybdenum: Horton, 1.
San Miguel County: Bush, 8; Hor-
ton, 1.
Taos County: Larsen, 1; Sundberg,
1.
Mora County: Lindgren, 6.
Copper: Austin, 1, 2.
Mica: Sterrett, 4; Anon., 8.
Moreno district : See Colfax Coun-
ty, page 90.
Natural gas: Ellis, 3.
Navajo country: Gregory, 1, 2.
Nickel: Leach, A. A., 1.

Economic geology (Continued).

- Nitrates, southern: Gale, 1.
Northern: Stevenson, 5.
Placers: Carruth, 1.
Onyx: Merrill, 2.
Luna County: Darton, 12.
Ore deposits: Jones, F. A., 1, 9;
Keyes, 73; Lindgren, 6; Tovote,
1.
Appraisal of : Finlay, 2.
Classification: Finlay, 2; Lind-
gren, 6.
Kelly limestone: Gordon, 2.
Lake Valley limestone: Gordon, 2.
Mogollon district: Ferguson, 1;
Scott, 1.
Origin:
Pinos Altos district: Wade, 4.
Silver, Lake Valley : Clark, E., 1;
Keyes, 36.
Turquoise, Burro Mountains,
Paige, 5.
Rocky Mountain region: Butler,
3.
Secondary enrichment: Emmons,
W. H., 1.
Organ Mountains: Antisell, 1; Grif-
fin, 1; Keyes, 14; Lindgren, 6;
Raymond, 1; Weed, 1; Welsh, 1;
Anon., 1, 11.
Production: Bond, 1.
Ortiz grant:
Santa Fe County: Raymond, 7;
Anon., 2.
See also Maps, page 110.
Otero County: Lindgren, 6.
White sands (gypsum) : Brady, 1.
Petroleum: Ellis, 1, 3; Knox, 1, 2.
Alamosa Creek valley, Socorro
County: Winchester, 2.
Artesia oil field: Davis, M. J., 1;
Rich, A., 1.
Carbon ratios: Dobbin, 1; Storm,
1.
Chaves County: Merritt, 1.
Dayton: Richardson, 4.
Eastern: Knox, 1, 2.
Granite in wells: Lee, 27.
Gravity: Dobbin, 1.
Hogback field, San Juan Basin:
Nowels, 1.
Map, United States: Day, 2.
Oil possibilities: Knox, 1, 2.
Alamosa Creek valley: Winches-
ter, 2.
Puertecito district: Wells, E. H.,
2.
Oil resources, probable: Knox, 2.
Oil situation: Ellis, 1.
Pecos Valley: Dinsmore, 4.

Economic geology (Continued).

Petroleum (Continued).

- Permian, accumulation in: Willis, 4.
 Production figures:
 San Juan Basin: Nowels, 1.
 Puertecito district: Wells, E. H., 2.
 Raton: Lakes, 4; Lee, 29.
 Rattlesnake field, San Juan Basin: Nowels, 1.
 San Juan Basin: Knox, 1, 2; Nowels, 1.
 Shiprock district: Nowels, 1.
 Socorro County: Wells, E. H., 2; Winchester, 2.
 Southeastern: Willis, 1, 2.
 Table Mesa field, San Juan Basin: Nowels, 1.
 Valencia County: Wells, E. H., 2; Winchester, 2.
 Well records: See Borings, page 87.
 Withdrawals and restorations: Ball, M. W., 1.
 Pinos Altos: Birnie, 1; Blood, 1; Bush, 2; Otero, 1; Paige, 2; Wade, 4; Wright, I. L., 1
 Pipe vein:
 Silver Hill: Keyes, 65.
 Placers: Lindgren, 6; Stone, 2.
 Placers: Lindgren, 6; Stone, G. H., 2.
 Arid region: Stone, G. H., 2.
 Colfax County: St. John, 1.
 Dry placers: Heikes, 1.
 Mesa del Oro: Leatherbee, 3.
 Santa Fe County: Brinsmade, 3; Carruth, Jones, F. A., 3; Newberry, 4; Statz, 1.
 Rio Arriba County: Silliman, 1.
 Sandoval County: Heikes, 1.
 Sierra County: Leatherbee, 3.
 Taos County: Silliman, 1.
 Potash:
 Crater salt lake: Hance, 1.
 Estancia Valley: Hance, 1.
 Otero Basin: Free, 1.
 Southeastern: Hance, 1; Hoots, 1; Mansfield, 3; Schaller, 3; U. S. G. S., 60-67; Wroth, 1.
 Production figures: Browne, 1, 2; Henderson, 1-11; Jones, F. A., 2; Lindgren, 6; Raymond, 1, 2, 3, 4, 7, 8.
 It was found impossible to include statistics of mineral production. These will be found in the following works:
 1. Mineral Resources of the United States, published annually by the U. S. Geological Survey, Washington, D. C., from 1882 until 1923. Published by the U. S. Bu-

Economic geology (Continued).

Production figures (Continued). reau

of Mines, Washington, D. C., since 1923.

2. The Mineral Industry, published annually since 1892 and for sale by the McGraw-Hill Book Company, New York City.
 3. Annual report of the Director of the Mint, Washington, D. C.
 4. Special numbers issued in January of each year by various mining journals.
 Turquoise: Fenderson, 1.
 Radium ore: Leach, A. A., 2; Leach, F. I., 1.
 Rare metals: Keyes, 70.
 See also, Cobalt, page 90; Molybdenum, page 93; Nickel, page 93; Radium, page 94; Tungsten, page 96; and Vanadium, page 96.
 Raton Mesa region: Lee, 29.
 Red River district: Bush, 3.
 Rincon district:
 Manganese: Jones, E. L., 1; Wells, E. H., 1.
 Rio Arriba County: Lindgren, 6.
 Bentonite: Ross, 1.
 Coal:
 San Mateo-Cuba field: Gardner, 7.
 Mica: Holmes, 1; Sterrett, 3, 4.
 Salt: Darton, 20; Herrick, C. L., 12; Jones, F. A., 1; Phalen, 1.
 Central: Herrick, C. L., 12; Johnson, D. W., 1, 3.
 Crater Lake: Phalen, 1.
 Estancia Valley: Herrick, C. L., 12; Phalen, 1.
 Otero salt basin: Free, 1; Phalen, 1.
 Southeastern: Hoots, 1.
 White sands region: Gibbs, 1; Phalen, 1.
 Zufii salt lake: Darton, 1, 2, 20.
 Samarskite:
 Rio Arriba County: Hess, 5.
 San Andreas Mountains:
 Copper and lead deposits: Herrick, C. L., 4.
 Sandia Mountains: Ellis, 2.
 Sandoval County: Lindgren, 6.
 Cochiti district: Barbour, 1.
 Coal:
 San Mateo-Cuba field: Gardner, 7.
 Una del Gato field: Campbell, 2.
 Fluorspar: Johnston, 1.
 Sandstone copper: Bains, 1; Cazin, 2; Finch, 1; Jenks, 1, 2; Lindgren, 6; Newberry, 4; Turner, 2.

Economic geology (Continued).**Sandstone Copper (Continued).**

Bent: Ball, S. H., 1.

Mora County: Austin, 1, 2; Conkling, 2, 3.

Oscura Mountains: Emmons, S. F., 4; Peters, 1; Turner, 1.

San Andreas Mountains: Emmons, S. F., 4; Herrick, C. L., 4.

San Juan County: Lindgren, 6.

Coal: Bauer, 2.

Petroleum, Nowels, 1.

San Miguel County: Lindgren, 6.

Coal: Gardner, 5, 8.

Mica: Sterrett, 4.

San Pedro district: Berryman, 1; Brinsmade, 3; Henrich, 1; Keyes, 43; McCaffery, 1; Raymond, 7; Anon., 3.

Santa Fe County: Lindgren, 6.

Santa Fe region: Berryman, 1; Blake, 3; Browne, 2; Henrich, 1; Lindgren, 6; Otero, 1; Raymond, 1, 2, 7; Statz, 1; Anon., 2.

Iron: Raymond, 7.

Los Cerrillos mines: Lakes, 4; Stevenson, 1.

Placer districts: Blake, 1; Stevenson, 4; Wislizenus, 1.

San Pedro: Berryman, 1; Brinsmade, 3; McCaffery, 1; Anon., 3.

Turquoise: Johnson, D. W., 4; Raymond, 7.

Santa Rita region: Birnie, 1; Clifford, 2; Dinsmore, 2; Lindgren, 6; MacDonald, D. F., 1; Paige, 6, 7; Raymond, 7; Rickard, 1; Weed, 1, 2.

Enrichment at: Bagg, 1; Emmons, W. H., 1.

Sierra County: Birnie, 1; Lindgren, 6; Otero, 1.

Fluorspar: Johnston, 1.

Manganese: Jones, E. L., 1; Wells, E. H., 1.

See also Hillsboro, page 92; Kingston, page 92; Lake Valley, page 92; and Sierra de los Caballos, page 95.

Sierra de los Caballos: Keyes, 20.

Sierra del Oro: Keyes, 60.

Silver: Lindgren, 1, 6; Winchell, 1.

Black Range district: Fishback, 1; Wright, J. W., 1.

Cerargyritic ores, genesis: Keyes, 32, 36.

Cochiti district: Barbour, 1.

Cooney district: Anderson, 1, 2.

Grant County:

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

Lake Valley district: Clark, 1;

Economic geology (Continued).

Silver (Continued).

Lake Valley district (Continued).
Cope, 26; Keyes, 36; MacDonald, B., 1.Lordsburg region: Jones, F. A., 4.
Magdalena district: Argall, 1; Jones, F. A., 1; Lindgren, 6; Tuttle, 1.

Mogollon district: Ferguson, 1, 2; Scott, 1.

Organ Mountain district: Welsh, 1.

Pinos Altos district: Blood, 1; Paige, 2.

Production: Min. Ind., 1; U. S. Bur. Mines, I; U. S. G. S., 1.

San Pedro Mountain: Brinsmade, 3.

Silver Cell group, Pinos Altos district: Blood, 1.

Silver City: Brinsmade, 4.

Silver pipe:
Central: Keyes, 3.

Silver City district: Brinsmade, 4; Furman, 1; Lindgren, 6; Paige, 7; Tovote, 1.

Copper: Tovote, 2.

Manganese: Jones, E. L., 1; Wells, E. H., 1.

Silver pipe:
Central: Keyes, 3.

Socorro County: Lindgren, 6; Raymond, 9.

Coal: Gardner, 6.

Copper: Lindgren, 6.

Oscura Mountains: Emmons, S. F., 4.

Fluorspar: Johnston, 1.

Iron:

Fairview deposit: Smythe, 1.

Jones Camp: Emmens, 1; Jones, F. A., 1; Keyes, 9, 67.

Manganese: Jones, E. L., 1; Wells, E. H., 1; Anon., 10.

Rosedale district: Jones, F. A., 1; Lindgren, 6.

Tripoli: Herrick, C. L., 1.

Zinc: Argall, 1; Brinsmade, 2.

See also Catron County, page 89.

Soda:

Dona Ana and Otero Counties:
Otero, 1.

Sodium sulphate:

Dona Ana County:

Lake Lucero: Wells, R. C., 1.

Torrance County:

Laguna Salina: Wells, R. C., 1.

Soil surveys:

Mesilla Valley: Nelson, 2.

Pecos Valley: Cummins, 1; Means, 1.

Rio Grande: Nelson, 1.

Economic geology (Continued).

- Southern: Endlich, 1; Furman, 1;
Silliman, 3; Tovote, 1.
Zinc deposits: Blake, 6.
Steeple Rock district: Bush, 4; Lindgren, 6; Pickard, 1.
Stone: Burchard, 5.
Sulphur: Jones, 1.
Guadalupe Mountains: Otero, 1.
Jemez Canyon: Mansfield, 1, 2.
Sylvanite district: Dinsmore, 1;
Jones, F. A., 6, 7; Martin, G. A., 1.
Taos County: Browne, 2; Lindgren, 6.
Fluorspar: Johnston, 1.
Molybdenum: Larsen, 1.
Red River district: Bush, 3.
Taylor Creek tin deposits: Hill, J. M., 2; Naething, 1.
Tin:
Catron and Sierra Counties: Hill, J. M., 2; Naething, 1.
Torrance County: Lindgren, 6.
Sodium sulphate:
Laguna Salina: Wells, R. C. 1.
Tres Hermanas district: Darton, 12; Lindgren, 5, 6; Wade, 2.
Tripoli:
Socorro County: Herrick, C. L., 1.
Tungsten: Hess, 2.
Hidalgo County: Hess, 3.
Luna County: Darton, 12.
Turquoise: Blake, 2; Clark, 2; Cowan, 1; Fenderson, 1; Jones, F. A., 1, 8, 9; Kunz, 5; Lakes, 3; Otero, 1; Silliman, 2; Snow, 1; Sterrett, 2a, 2b, 2c.
Burro Mountains: Jones, F. A., 8; Zalinski, 1, 2; Anon., 4, 5.
Azure mine: Dinsmore, 3.
Origin: Paige, 5.
Cerrillos Hills: Blake, 2; Clark, 2, 3; Johnson, D. W., 3.
Hachita: Cowan, 1; Hidden, 1.
Jarilla Mountains: Cowan, 1; Hidden, 1.
Tyrone district: Bush, 1, 7; Paige, 9.
Uranium: Keyes, 70; Leach, A. A., 2; Leach, F. I., 1.
Valencia County: Lindgren, 6.
Coal:
San Mateo-Cuba field: Gardner, 7.
Fluorspar: Johnston, 1.
Vanadium: Carrera, 1; Leatherbee, 1, 2; Johnson, E. D., 1; Larsh, 2.
Grant County: Larsh, 3.
Northwestern: Edwards, 1.
Sierra County:
Caballo Mountains: Allen, 1;

Vanadium (Continued).

- Sierra County (Continued).
Caballo Mountains (Continued).
Clifford, 1; Hess, 1; Larsh, 1; Leatherbee, 1;
Elephant Butte: Keyes, 74.
Victorio district: Darton, 12.
Water resources: Newell, 1; Sullivan, 1.
Luna County: Darton, 7.
Mesilla Valley: Barker, 1.
See Underground water, page 125.
White Oaks: Lindgren, 6; Smith, E. P., 1.
Zinc: Brinsmade, 1; Demaret, 1; Lindgren, 1.
Carbonate ores:
Magdalena Mountains: Keyes, 19.
Grant County: Blake, 6; Brinsmade, 4.
Hanover: Blake, 6; Brinsmade, 4.
Kelly Camp: Brinsmade, 2; Johnson, W. M., 1; Keyes, 19.
Luna County: Darton, 12; Lindgren, 5.
Magdalena district: Argall, 1; Haddon, 1; Tuttle, 1.
See also Kelly Camp, page 92.
Pinos Altos district: Paige, 2.
Production figures: Min. Ind., 1; U. S. Bur. Mines, 1; U. S. G. S., 1.
Silver City: Brinsmade, 4.
Southwestern: Blake, 6; Tovote, 2.
Tres Hermanas district: Lindgren, 5; Wade, 2.
Zuni Mountains: Schrader, 2.

Geologic formations described.

- Abo sandstone:
Carboniferous: Baker, C. L., 2; Lindgren, 6; Richardson, 3.
Pennsylvanian: Bose, 1; Lee, 11; Semmes, 1.
Permian: Blanchard, 1; Darton, 22, 25, 29; Ellis, 2; Wells, E. H., 2; Willis, 1, 3.
Sandoval County: Renick, 2.
Alamito formation:
Pennsylvanian: Keyes, 24, 45, 57, 62.
Albuquerque marl: Bryan, 1; Keyes, 57, 62; Reagan, 1.
Allison barren member:
Cretaceous: Sears, 1.
Anian period:
Proterozoic: Keyes, 62.

Economic geology (Continued).

Geologic formations described (Continued).

- Animas formation :
Tertiary (?) : Knowlton, 8; Reese, 2.
- Antonio terrane:
Proterozoic: Keyes, 57, 62.
- Antonito terrane:
Permian : Keyes, 57, 62.
- Apishapa shale:
Cretaceous : Darton, 22; Garrett, 1;
Keyes, 57, 62.
- Archuleta terrane:
Eocene; Keyes, 57, 62.
- Armendaris terrane:
Ordovician : Keyes, 57, 62.
- Arriban series:
Miocene; Keyes, 34, 57, 62.
- Aztecan series :
Eocene: Keyes, 57, 62.
- Bartlett barren member :
Cretaceous: Sears, 1.
- Beartooth quartzite:
Cretaceous: Darton, 22.
Silver City : Paige, 7.
- Bella shales:
Devonian: Keyes, 38, 57, 62.
- Bell Mountain sandstone member:
Cretaceous: Winchester, 2.
- Bernalillo shale:
Carboniferous: Keyes, 45, 57, 62.
- Berenda limestone:
Devonian: Keyes, 36, 57, 62.
Bibliography : Keyes, 55, 57; Weeks, 1.
Paleozoic : Gordon, 1.
San Juan Basin: Bauer, 1.
- Bliss sandstone:
Cambrian: Darton, 12, 15, 16, 22, 29; Keyes, 57; Richardson, 1, 2.
Luna County: Darton, 12, 15.
Silver City region: Paige, 7.
- Bolson deposits: Hill, R. T., 14;
Tight, 1.
Quaternary : Darton, 29; Keyes, 7.
Structure: Keyes, 1.
- Burro terrane:
Cambrian: Keyes, 57, 62.
- Canyon Largo sandstones :
Oligocene: Keyes, 34, 57, 62.
- Capitan limestone:
Permian: Baker, C. L., 2 ; Beede, 1 ; Crandall, 1; Girty, 2; Keyes, 24, 45, 57, 62; King, P. B., 1 ; Lloyd, 1; Richardson, 1, 2, 3; Tarr, 3.
- Carlile shale:
Cretaceous : Darton, 22, 25; Garrett, 1.
- Carlsbad limestone member : Blanchard, 1; Crandall, 1; Darton, 24.

Geologic formations described (Continued).

- Carrasco terrane:
Cambrian: Keyes, 57, 62.
- Castile formation:
Permian: Meinzer, 5.
Roswell Basin: Blanchard, 1;
Darton, 25, 29; Fielder, 2;
Willis, 1, 3.
Trans-Pecos Texas : Richardson, 1; Udden, 1.
- Cenocene series :
Quaternary: Keyes, 57.
- Chaco terrane:
Oligocene: Keyes, 57, 62.
- Chacra terrane:
Cretaceous : Keyes, 57, 62.
- Chaman series:
Oligocene: Keyes, 34, 57, 62.
- Chamisco formation:
Cretaceous : Winchester, 2.
- Chaquaqua terrane:
Jurassic: Keyes, 57, 62.
- Chaves terrane:
Permian: Keyes, 57, 62.
- Chinle formation:
Triassic: Darton, 22, 29; Renick, 2.
- Chiricahuan series:
Cambrian: Keyes, 57, 62.
- Chloridian series :
Cambrian: Keyes, 57, 62.
- Chupadera formation:
Permian: Crandall, 1; Darton, 22, 25, 29; Ellis, 2 ; Keyes, 62.
Eddy County: Nye, 1; Renick, 3.
Roswell Basin: Fielder, 2.
Sandoval County : Renick, 2.
- Chuska sandstone:
Tertiary : Darton, 29; Gregory, 2.
- Cibola terrane:
Silurian: Keyes, 57, 62.
- Cimarronian series:
Carboniferous: Keyes, 45, 57.
Permian: Keyes, 24, 62.
- Cliff House sandstone:
Cretaceous: Bauer, 2; Darton, 22.
Coconino sandstone: Darton, 3, 29; Gregory, 2.
- Colorado shale:
Cretaceous: Darton, 12, 15, 29; Stanton, 1.
Silver City : Paige, 7.
- Comanchan series:
Cretaceous : Keyes, 57.
Luna County : Darton, 12.
- Coyote terrane:
Carboniferous: Keyes, 45, 57.
Pennsylvanian: Keyes, 24, 62.
- Cranktown sandstone:
Mogollon district: Ferguson, 2.

Geologic formations described

- (Continued).
- Cristobal terrane:
Ordovician: Keyes, 57, 62.
- Dakota sandstone:
Cerrillos Hills: Johnson, D. W., 4.
Cretaceous: Baker, C. L., 2; Darton, 22, 29; Gardner, 2; Garrett, 1; Gregory, 1, 2,; Keyes, 24, 57; Kirk, r; Stevenson, Wells, E. H., 2; Winchester, 1, 2.
Gallup-Zuni Basin: Sears, 1.
Its relation to the Morrison formation: Stanton, 2.
Northern: Keyes, 26.
Origin of name: Gress, 1.
Sandoval County: Renick, 2.
- Datil formation:
Tertiary: Darton, 29; Winchester, 2.
- Delaware Mountain formation:
Keyes, 77.
Carboniferous: Beede, 2; Richardson, 3.
Permian: Baker, C. L., 2; Blanchard, 1; Crandall, 1; Darton, 24; Girty, 2; Richardson, 1, 2.
- Dilco coal member:
Cretaceous: Sears, 1.
- Dockum group:
Triassic: Adams, J. H., ; Darton, 22, 29.
- Dog Gulch formation :
Mogollon district: Ferguson, 2.
- Doloresian series:
Triassic: Keyes, 57, 62
- Dragoonan series:
Cambrian: Keyes, 57, 62.
- Dune sands:
Quaternary: Darton, 29.
- Eddy terrane:
Carboniferous: Keyes, 45, 57.
Permian: Keyes, 24, 62.
- El Paso limestone:
Luna County: Darton, 12, 15.
Ordovician: Darton, 15, 16, 22, 29; Keyes, 36, 57, 62; Richardson, 1, 2.
Silver City: Paige, 7.
- Epicene series:
Quaternary: Keyes, 57.
- Exeter (?) formation:
Jurassic: Keyes, 57, 62.
Triassic: Garrett, 1.
- Farmington sandstone member:
Cretaceous: Bauer, 2; Reeside, 1, 2.
Fierro limestone:
Carboniferous:
Silver City region: Paige, 7.
- Fort Benton:
Cerrillos Hills: Johnson, D. W., 4.

Geologic formations described

- (Continued).
- Fort Union group:
Albuquerque: Reagan, 1.
- Fredericksburg terrane:
Camanchean: Keyes, 57, 62.
- Froncosa terrane:
Ordovician: Keyes, 57, 62.
- Fruitland formation:
Cretaceous: Bauer, 1, 2; Darton, 22, 29; Reeside, 2.
- Fusselman limestone: Richardson, 2.
Luna County: Darton, 12, 15.
Silurian: Darton, 5, 16, 22, 29.
Silver City region: Keyes, 57; Paige, 7.
- Galisteo formation: Hayden, 1.
Cerrillos Hills: Cope, 14; Johnson, D. W., 4.
Tertiary: Baker, C. L., 2; Keyes, 57, 62.
Tertiary (?) : Darton, 29.
- Gallego sandstone member:
Cretaceous: Keyes, 57, 62; Winchester, 2.
- Gallinas terrane:
Cretaceous: Keyes, 57.
Gallup sandstone member:
Cretaceous: Sears, 2.
- Garnuan series:
Proterozoic: Keyes, 57, 62.
- Garrett terrane:
Comanchean: Keyes, 57, 62.
- General: Darton, 16, 29; Keyes, 5, 57, 62; Lee, 23; Shumard, G. G., 1.
- Gibson coal member:
Cretaceous: Sears, 1.
- Gila conglomerate:
Mogollon district: Ferguson, 2.
Quaternary: Darton, 29; Keyes, 57, 62.
- Glacial deposits:
Quaternary: Darton, 29.
- Glorieta sandstone:
Cretaceous: Keyes, 57, 62.
Permian: Baker, C. L., 2; Rich, J. L., 2; Willis, 1.
- Grande terrane:
Mississippian, Keyes, 36, 45, 57, 62.
- Graneros shale:
Cretaceous: Darton, 22; Garrett, 1.
- Graphic terrane:
Proterozoic: Keyes, 57, 62.
- Greenhorn limestone:
Cretaceous: Darton, 22; Garrett, 1.
- Greer terrane:
Permian: Keyes, 62.
- Guadalupe formation:
Permian: Merritt, 1.

Geologic formations described (Continued).

- Guadalupe group:
 Permian: Beede, 2; Darton, 24;
 Keyes, 24, 45, 57, 62.
- Gym limestone:
 Carboniferous: Darton, 12, 15, 25.
- Gypsum series:
 Albuquerque: Reagan, 1.
- Hawkins tefrane:
 Cambrian: Keyes, 57, 62.
- Houten terrane:
 Cenozoic (Tertiary): Keyes, 57, 62.
- Hueco limestone:
 Carboniferous: Beede, 2; Darton,
 29; Keyes, 45.
 Trans-Pecos Texas: Girty, 1;
 Richardson, 1.
- Jemez marls:
 Albuquerque: Reagan, 1.
- Jornadan series:
 Present: Keyes, 57, 62.
- Kelly limestone:
 Mississippian: Gordon, 2, 3; Lind-
 gren, 6; Wells, E. H., 2.
- Kiowa terrane:
 Comanchean: Keyes, 57, 62.
- Kirtland shale:
 Cretaceous: Bauer, 1, 2; Darton,
 22, 29; Reeside, 1, 2. Ladronean
 series:
 Pennsylvanian: Keyes, 24, 28, 45,
 57, 62.
- La Jara terrane:
 Cretaceous: Keyes, 57, 62.
- Lake Valley limestone: Cope, 26, 39.
 Lake Valley: Gordon, 2; Keyes,
 23; Springer, F., 1.
 Luna County: Darton, 12, 15.
 Magdalena Mountains: Keyes, 23.
 Mississippian: Darton, 15, 16, 22,
 29; Gordon, 2; Keyes, 24, 36, 45,
 57, 62; Lindgren, 6.
- La Plata group:
 Jurassic: Darton, 22; Gregory, 1,
 2; Keyes, 57, 62.
- Laramie: Newberry, 8.
 Cerrillos coal field: Stevenson, 12.
 Cretaceous: Cross, 4; Gardner, 2,
 7; Keyes, 62; Lee, 23; Steven-
 son, 1, 2, 6, 8.
 Northwestern: Cope, 55; Gardner,
 7; Lee, 16; Sinclair, 2.
 Raton coal field: Lee, 10. Sub-
 divided into Fruitland and
 Kirtland: Bauer, 2.
- Lewis shale:
 Cretaceous: Bauer, 1, 2; Darton,
 22, 29; Gardner, 2; Keyes, 57,
 62; Lee, 16, 23; Shaler, 3.
 Sandoval County: Renick, 2.

Geologic formations described (Continued).

- Lewis Shale, (Continued).
 San Juan Basin: Reeside, 2.
 San Mateo-Cuba coal field: Gard-
 ner, 7.
- Le Roux terrane:
 Triassic: Keyes, 57, 62.
- Llano Estacado terrane:
 Pliocene: Keyes, 34, 57, 62.
- Lobo formation:
 Triassic (?):
 Deming quadrangle: Darton, 12,
 15, 22.
- Lone terrane:
 Cambrian: Keyes, 57, 62.
- Loup Fork formation: Cope, 34, 47,
 50.
- Lufkin formation:
 Tertiary: Keyes, 36.
- Lunasan series:
 Pennsylvanian: Keyes, 57, 62.
- McDermott formation:
 Cretaceous (?): Darton, 29.
- McElmo formation:
 Cretaceous (?): Darton, 22.
 Jurassic (?): Gregory, 2; Keyes,
 57, 62.
 Gallup-Zuni Basin: Sears, 1.
- Madera limestone:
 Pennsylvanian: Gordon, 3; Her-
 rick, C. L., 6; Keyes, 8, 14, 24;
 Lee, 11; Lindgren, 6; Wells, E.
 H., 2.
 Permian: Keyes, 45, 57, 62, 69.
- Madrid coal group:
 Cerrillos Hills: Johnson, D. W., 4.
- Magdalena group:
 Pennsylvanian: Baker, C. L., 2;
 Darton, 12, 22, 29; Ellis, 2; Gar-
 rett, 1; Gordon, 3; Keyes, 69;
 Lee, 11, 27; Lindgren, 6; Rich-
 ardson, 3; Semmes, 1; Wells, E.
 H., 2.
- Mancos shale:
 Cretaceous: Baker, C. L., 2; Bauer,
 2; Cross, 2; Darton, 3, 22, 29;
 Gardner, 2; Gregory, 1, 2; Kirk,
 1; Lee, 16; Wells, E. H., 2;
 Winchester, 1.
 Gallup-Zuni Basin: Sears, 1.
 Sandoval County: Renick, 2.
 San Juan Basin: Reeside, 2.
- Mangas terrane:
 Cambrian: Keyes, 57, 62.
- Manzano group: Keyes, 77.
 Carboniferous: Keyes, 45, 57, 62;
 Richardson, 3.
 Pennsylvanian: Herrick, C. L., 11;
 Lee, 11; Lindgren, 6.

Geologic formations described

(Continued).

- Manzano group, (Continued).
 Permian: Baker, C. L., 2; Darton, 10, 22, 25; Ellis, 2; Gordon, 3; Keyes, 24, 69; Wells, E. H., 2.
 Martinian series:
 Devonian: Keyes, 57, 62.
 Maxwell terrane:
 Cenozoic (Tertiary) : Keyes, 57, 62.
 Maya terrane:
 Cenozoic (Tertiary) : Keyes, 57, 62.
 Menefee formation:
 Cretaceous: Bauer, 2; Darton, 22.
 Mesaverde formation: Bauer, 1; Darton, 29; Gregory, 1; 2; Lee, 16, 23.
 Cretaceous: Darton, 3; Kirk, 1; Wells, E. H., 2; Winchester, 1.
 Gallup-Zuni Basin: Sears, 1.
 Sandoval County: Renick, 2.
 San Mateo-Cuba coal field: Gardner, 7.
 Mesaverde group:
 Cretaceous: Bauer, 2; Darton, 22, 29; Gardner, 2; Keyes, 57, 62; Lee, 15, 16; Reeside, 2.
 Miguel formation:
 Cretaceous: Winchester, 2.
 Mimbres limestone:
 Lake Valley: Gordon, 2.
 Ordovician: Keyes, 57, 62.
 Modoc terrane:
 Mississippian: Keyes, 57, 62.
 Moenkopi formation:
 Carboniferous: Keyes, 45.
 Triassic: Darton, 3, 22, 29; Keyes, 24.
 Montanan:
 Cretaceous: Keyes, 57.
 Montoya terrane:
 Carboniferous: Keyes, 24, 45, 57, 62.
 Montoya limestone: Richardson, 2.
 Ordovician: Darton, 12, 15, 16, 22, 29; Keyes, 57, 62; Paige, 7.
 Monument formation:
 Tertiary: Keyes, 36.
 Mora sandstone: Keyes, 43.
 Morrison formation: Keyes, 57, 62; Lee, 1, 21; Mook, 2, 3.
 Cretaceous (?): Darton, 11, 12, 22, 29; Lee, 15.
 Its relation with Comanche and Dakota: Stanton, 2.
 Jurassic: Garrett, 1.
 Sandoval County: Renick, 2.
 Type section: Lee, 25.
 Mosca terrane:
 Pennsylvanian: Keyes, 24, 45, 57, 62.

Geologic formations described

(Continued).

- Nacimiento group: Gardner, 9.
 Sandoval County: Renick, 2.
 San Juan Basin: Reeside, 2.
 Tertiary: Gardner, 9; Keyes, 34, 57, 62; Reeside, 2.
 Naiad terrane:
 Silurian: Keyes, 57, 62.
 Navajo sandstone:
 Cretaceous: Keyes, 57, 62.
 Gallup-Zuni Basin: Sears, 1.
 Jurassic: Darton, 22, 29; Gregory, 2.
 Niño's terrane:
 Archeozoic: Keyes, 57, 62.
 Ogallala formation:
 Miocene and Pliocene: Darton, 29.
 Ojo Alamo sandstone:
 Cretaceous: Bauer, 1, 2; Brown, 1, 2; Darton, 22, 29; Reeside, 1.
 Tertiary (?) : Reeside, 2; Sinclair, 1.
 Palomas gravel:
 Pleistocene: Darton, 22; Gordon, 3; Keyes, 57, 62; Lindgren, 6.
 Pecos formation:
 Carboniferous: Keyes, 45.
 Pliocene: Keyes, 34, 57, 62.
 Pecurisan series:
 Archeozoic: Keyes, 62.
 Penasco terrane:
 Archeozoic: Keyes, 57, 62.
 Percha shale: Gordon, 2.
 Devonian: Darton, 22, 29; Keyes, 57, 62; Kindle, 1; Lindgren, 6; Paige, 7.
 Lake Valley: Clark, E., 1; Gordon, 2.
 Percha shale (?) :
 Franklin Mountains (New Mexico and Texas) : Darton, 28.
 Pictured Cliffs sandstone:
 Cretaceous: Bauer, 1, 2; Darton, 22, 29; Keyes, 57, 62; Reeside, 2.
 Pierre shale:
 Cretaceous: Darton, 22, 29; Garrett, 1; Lee, 29, 31.
 Cerrillos hills: Johnson, D. \AT, 4.
 Pina Vititos terrane:
 Cretaceous : Keyes, 57, 62.
 Placita marl:
 Albuquerque: Reagan, 1.
 Point Lookout sandstone:
 Cretaceous: Bauer, 2; Darton, 22.
 Poleo sandstone:
 Triassic: Darton, 22, 29; Renick, 2.
 Pre-Cambrian:
 Granite, gneiss, schist, etc.; Darton, 22, 29; Lindgren, 6.

Geologic formations described
(Continued).

Pueblo quartzite:
Taos Range: Gruner, 1.
Puerco formation:
Albuquerque: Reagan, 1.
Cretaceous: Brown, 1.
Tertiary: Bauer, 1, 2; Brown, 2;
Cope, 7, 34, 48; Darton, 22, 29;
Gardner, 7, 9; Keyes, 34, 62; Lee,
16; Reeside, 2; Shaler, 3; Sin-
clair, 1, 2.
Puertecito formation:
Triassic: Wells, E. H.
Puertecitos limestone:
Tertiary: Lee, 17.
Purgatoire formation:
Cretaceous: Darton, 22, 29; Gar-
rett, 1; Lee, 23.
Quartermaster terrane:
Permian: Keyes, 62.
Raton formation:
Tertiary: Darton, 22, 29; Garrett,
1; Keyes, 57, 62; Lee, 23, 29, 31.
Red beds: Case 8; Darton, 29.
Eastern: Baker, C. L., 5.
Rio Grande region: Lee, 6.
Rio Grande beds:
Tertiary: Bryan, 1.
Rio Grande gravels:
Quaternary: Bryan, 1.
Rociada terrane:
Archeozoic: Keyes, 57, 62.
Rustler limestone: Blanchard, 1;
Crandall, 1; Darton, 25, 29;
Richardson, 1; Udden, 1; Willis,
1, 3.
Saline deposits:
Quaternary: Darton, 29.
San Andreas limestone:
Carboniferous: Richardson, 3.
Pennsylvanian: Ellis, 2; Gordon, 2;
Keyes, 24, 69; Lee, 11; Lindgren,
6; Wells, E. H., 2.
Permian: Baker, C. L., 2; Blanch-
ard, 1; Ellis, 2; Lee, 11; Nye, 1;
Rich, 5; Semmes, 1; Willis, 1, 3.
Sandia formation:
Carboniferous: Keyes, 45, 57.
Pennsylvanian: Herrick, C. L., 8,
9, 11, 17; Keyes, 62; Lindgren, 6.
Sandoval terrane:
Proterozoic: Keyes, 57, 62.
Santa Fe formation:
Tertiary: Cope 4; Darton, 22, 29;
Keyes, 34, 57, 62; Simpson, G.
G., 1.
Santa Fe marls: Cope, 4.
Cerrillos Hills: Johnson, D. W., 4.
Tertiary: Henderson, J., 1.
Santa Rita limestone:

Silurian: Keyes, 36, 57, 62.
Geologic formations
described
(Continued).
Santa Rosa sandstone:
Triassic: Darton, 22; Rich, J. L., 5.
Sapello terrane:
Archeozoic: Keyes, 57, 62.
Sarten sandstone:
Cretaceous: Darton, 12, 15, 22, 29.
Selkirkian period:
Proterozoic: Keyes, 62.
Serna terrane:
Archeozoic: Keyes, 57, 62.
Seven Rivers gypsiferous member:
Permian: Crandall, 1; Fielder, 2;
Meinzer, 5; Willis, 1, 2.
Shandon quartzite:
Cambrian: Darton, 16, 22, 29; Gor-
don, 1, 3; Keyes, 57; Lindgren, 6.
See also Bliss sandstone.
Shinarump conglomerate:
Triassic: Darton, 22, 29.
Shinarump sandstone:
Permian: Baker, C. L., 2.
Triassic: Keyes, 57, 62.
Sierra limestone:
Mississippian: Keyes, 36, 45, 57, 62,
Sierra Blanca series:
Cretaceous: Semmes, 1.
Silver Pipe limestone: Gordon, 2.
Silver shales:
Devonian: Keyes, 36, 57.
Socorran series:
Mississippian: Keyes, 24, 45, 62.
Solitario terrane:
Archeozoic: Keyes, 57, 62.
Superioran period:
Proterozoic: Keyes, 62.
Taosan series:
Archeozoic: Keyes, 57, 62.
Tecovas terrane:
Triassic: Keyes, 57, 62.
Tellera terrane:
Permian: Keyes, 57, 62.
Tijeras terrane:
Proterozoic: Keyes, 57, 62.
Timpas limestone:
Cretaceous: Darton, 22; Garrett, 1;
Keyes, 57, 62.
Todilto formation:
Jurassic: Darton, 22, 29; Gregory, 2;
Renick, 2; Sears, 1.
Tohachi shale:
Tertiary: Darton, 29, 30; Gregory, 2.
Torrance terrane:
Permian: Keyes, 57, 62.
Torrejon formation:
Tertiary: Bauer, 1, 2; Darton, 22,
29; Gardner, 7, 9; Keyes, 34, 57,
62; Reeside, 2; Sinclair, 1, 2.
Travester terrane:
Jurassic: Keyes, 57, 62.

Geologic formations described (Continued).

- Trinidad sandstone:
Cretaceous : Darton, 22, 29; Garrett, 1; Lee, 29, 31.
- Truchas terrane:
Archeozoic: Keyes, 57, 62.
- Trujillo terrane:
Triassic: Keyes, 57, 62.
- Unclassified:
Early Tertiary: Darton, 29.
- University beds : Bryan, 1.
- Valencian series :
Proterozoic: Keyes, 57, 62.
- Vermejo formation:
Cretaceous : Darton, 22, 29; Garrett, 1; Knowlton, 3 ; Lee, 29, 31.
- Wasatch formation:
Tertiary: Bauer, 1, 2; Cope, 7, 34; Darton, 22, 29 ; Gardner, 7; Keyes, 34; Reeside, 2.
- Washita terrane:
Comanchean : Richardson, 1.
- Wingate sandstone:
Jurassic : Darton, 3, 22, 29; Gregory, 2; Lee, 26; Renick, 2.
Triassic : Keyes, 57, 62.
- Yeso formation : Keyes, 77.
Carboniferous : Richardson, 3.
Pennsylvanian: Lee, 11; Lindgren, 6; Semmes, 1.
Permian: Baker, 2 ; Blanchard, 1; Ellis, 3 ; Keyes, 57, 62 ; Rich, J. L., 5.
- Ysidro terrane:
Proterozoic: Keyes, 57, 62.
- Zuni sandstone :
Cretaceous : Winchester, 1.
Jurassic: Keyes, 57, 62.
Triassic: Darton, 3.

Geologic formations, tables and sections.

- Abo :
Otero County : Blanchard, 1.
- Alamosa Creek valley: Winchester, 2.
- Beartooth quartzite:
Silver City : Paige, 7.
- Bell ranch, San Miguel County: Lee, 1.
- Bliss sandstone : Darton, 22, 29; Lindgren, 6.
Silver City Range: Paige, 7.
Southern: Darton, 16; Gordon, 1.
- Caballos Mountains : Darton, 29.
- Carboniferous : Darton, 16; Gordon, 3; Keyes, 23, 24, 45.
- Carlsbad Cavern : Lee, 34.
- Carthage coal field: Gardner, 6.
- Cerrillos coal : Fleming, 1.

Geologic formations, tables and sections (Continued).

- Cerrillos coal field : Johnson, D. W., 4 ; Stevenson, 12.
- Chupadera formation: Darton, 25, 29.
- Cliff House sandstone:
San Juan County : Reeside, 2.
Cluster Mountain, Eddy County:
Hoots, 1.
- Coal:
Carthage field : Gardner, 6.
Gallup-Zuni Basin: Sears, 1.
Raton Mesa region: Lee, 29, 31.
San Juan County: Bauer, 2.
- Coal fields : Lee, 16.
- Colorado shale:
Silver City: Paige, 7.
- Cooks Range : Darton, 15.
- Cornudas Mountains : Shumard, G. G., 3.
- Cretaceous : Gress, 1 ; Lee, 16.
San Juan Basin: Reeside, 2.
Texas-New Mexico : Hill, R. T., 13.
- Cretaceous-Tertiary :
North America and Europe: Matthew, 4.
- Delaware Mountain formation: Richardson, 1.
- Deming quadrangle : Darton, 15.
- Durango-Gallup field : Shaler, 3.
- Eddy County: Blanchard, 1; Davis, M., J., 1; Hoots, 1; Willis, 1, 3.
- El Paso limestone : Darton, 16.
- Lone Mountain: Paige, 7.
- El Vado dam site, Rio Arriba County: Wells, E. H., 4.
- Farmington sandstone member :
San Juan County: Reeside, 2.
- Fierro limestone:
Silver City: Paige, 7.
- Florida Mountains : Darton, 15.
- Franklin Mountains (New Mexico and Texas) : Richardson, 1.
- Fruitland formation:
San Juan County : Reeside, 2.
- Galisteo Creek: Dall, 1.
- Gallina-Raton Springs coal field:
Gardner, 2.
- Gallup coal : Fleming, 1.
- Gallup-San Mateo coal field: Gardner, 4.
- Gallup-Zuni Basin: Sears, 1.
- General: Darton, 22, 29 ; Keyes, 8, 24, 25, 26, 27, 54, 55, 57, 62; Lindgren, 6; Wilmarth, 1.
- Guadalupe Mountains : Darton, 24, 29; Pope, 1.
- Gym limestone:
Deming quadrangle: Darton, 15.
- Gypsum deposits : Darton, 20.

Geologic formations, tables and sections (Continued).

- Hagan field: Lee, 16.
- Hidalgo County : Schwennesen, 3.
- Hillsboro : Darton, 15.
- Kingston : Darton, 15.
- Kirtland formation:
 - San Juan County: Reeside, 2.
- Laguna :
 - Cretaceous rocks : Lee, 16.
- Lake Valley district: Clark, E., 1; Darton, 15; Gordon, 2 ; Keyes, 36.
- Lake Valley limestone : Darton, 16, 29.
 - Lake Valley : Clark, E., 1.
 - Luna County: Darton, 12, 15.
- Lakewood, Eddy County : Hoots, 1.
- Laramie :
 - Northern: Stevenson, 1.
- Lea County: Hoots, 1.
- Lewis shale :
 - San Juan County: Reeside, 2.
- Lobo formation, Triassic (?) : Darton, 12, 15.
- Luna County : Darton, 12, 15.
- McElmo formation: Mook, 3.
- McDermott formation :
 - San Juan County: Reeside, 2.
- Menefee formation:
 - San Juan County: Reeside, 2.
- Mesaverde group :
 - San Juan County : Reeside, 2.
- Mesozoic: Keyes, 26.
- Mississippian : Gordon, 2.
- Mogollon district: Ferguson, 2.
 - Monero coal area, Rio Arriba County : Gardner, 3.
- Morrison formation: Mook, 3.
 - Type section : Lee, 25.
- Nacimiento group : Gardner, 9.
- Navajo country: Gregory, 1, 2.
- Northern :
 - Along Santa Fe Railway : Darton, 10.
- Northwestern : Darton, 3.
- Ojo Alamo sandstone :
 - San Juan County: Reeside, 2.
- Otero County: Blanchard, 1.
- Paleozoic: Lindgren, 6.
- Pennsylvanian : Darton, 3, 25; Gordon, 3.
- Permian : Baker, A. A., 1 ; Darton, 25.
 - Great Plains : Gould, 2.
 - Texas-New Mexico : Crandall, 1; Lloyd, 1; Willis, 1, 3.
- Carboniferous red beds : Colorado and New Mexico : Melton, 2.
- Rio Grande Valley: Case, 9.
- Southeastern: Hoots, 1.

Geologic formations, tables and sections (Continued).

- Pictured Cliffs sandstone:
 - San Juan County: Reeside, 2.
- Point Lookout sandstone :
 - San Juan County: Reeside, 2.
- Puerco formation:
 - San Juan County: Reeside, 2.
- Puerco region: Gardner, 9.
- Pyroclastic rocks :
 - Luna County: Darton, 12.
- Raton field: Lee, 10, 16, 31.
- Raton Mesa region: Lee, 23, 29.
- Red Hills, Eddy County : Hoots, 1.
- Rio Grande region : Keyes, 45; Lee, 11 ; Lindgren, 6.
- Rio Puerco coal field: Lee, 16.
 - Rustler limestone : Hoots, 1 ; Richardson, 1.
- Sacramento Mountains : Darton, 15.
- San Andreas formation :
 - Eddy County: Blanchard, 1.
- San Andreas Mountains : Darton, 15, 29.
- San Juan County : Bauer, 1; Dutton, 2 ; Reeside, 2.
- San Mateo-Cuba coal field: Gardner, 7.
- San Pedro district: McCaffery, 1.
- San Ygnacio :
 - Mesaverde rocks : Lee, 16.
- Seven Rivers-Carlsbad : Lee, 34.
- Sierra Blanca coal field: Wegemann, 1.
- Sierra County : Lindgren, 6.
- Sierra Lucero : Darton, 29.
- Silver City region: Darton, 15; Paige, 7.
- Socorro County: Darton, 29; Lindgren, 6.
 - "Coal Measures," east of Socorro: Herrick, 14.
- Southeastern: Hoots, 1; Pope, 1.
- Staked Plains : Johnson, W. D., 1.
- Tertiary : Dall, 2; Keyes, 34.
 - San Juan Basin : Reeside, 2.
 - Texas-New Mexico salt basin : Hoots, 1 ; Lloyd, 1; Willis, 1, 3.
- Tijeras coal field : Lee, 15, 16.
- Torrejon formation :
 - Cedar Hill, San Juan County: Reeside, 2.
- Triassic: Darton, 3, 12, 29; Lloyd, 1.
 - Tucumcari Mountain: Cummins, 1; Drake, 1.
- Tularosa Basin: Meinzer, 3.
- Unconformities : Keyes, 25.
- Vermejo formation :
 - Raton coal field : Lee, 31.
- Wasatch:
 - Cedar Hill, San Juan County: Reeside, 2.

Geologic formations, tables and sections (Continued).

Willow mine, Van Houten: Lee, 18.
 Wingate sandstone: Sears, 1.
 Zuni Plateau: Dutton, 2.
 Zuni salt lake: Darton, 2.
 Zuni uplift, near Guam: Darton, 3.

Geologic maps.

Alamosa Creek valley: Winchester, 2.
 Albuquerque: Bryan, 1; Herrick, C. L., 10; Reagan, 1.
 Bernalillo County: Herrick, C. L., 9.
 Tijeras coal field: Lee, 15.
 Brilliant: Lee, 29.
 Burro Mountains: Paige, 3; Somers, 1.
 Carlsbad region: Meinzer, 5.
 Carthage coal field: Gardner, 6.
 Catalogue: Marcou, 7.
 Central: Darton, 29.
 Cerrillos Hills: Johnson, D. W., 4.
 Chama Basin: Darton, 29.
 Coal fields:
 San Mateo-Cuba field: Gardner, 7.
 Southern Rocky Mountain field, showing cretaceous coal formations: Storrs, 1.
 Deming Quadrangle: Darton, 5, 15.
 Eddy County: Darton, 24.
 Elephant Butte: Lee, 5.
 Estancia Valley: Meinzer, 2.
 Fluorite Ridge:
 Luna County: Darton, 5.
 Fluorspar deposits: Johnston, 1.
 Gallina coal field: Gardner, 2.
 Gallup coal district: Sears, 1; Shaler, 3.
 Gallup-San Mateo coal field: Gardner, 4.
 Gallup-Zuni Basin: Sears, 1.
 General: Darton, 27; Davis, W. M., 1; Ellis, 4; Jones, F. A., 9; Lindgren, 6; Marcou, 4, 7; Metcalfe, 1; Wheeler, 8; White, L. A., 1.
 Grant County: Schwennesen, 1.
 Great Plains:
 Showing red beds: Gould, 2.
 Guadalupe group: Darton, 24.
 Guadalupe Mountain region: Darton, 29.
 Hanover:
 Iron district: Paige, 1.
 Hidalgo County: Schwennesen, 3.
 Iron Mountain: Smythe, 2.
 Jemez: Reagan, 1.
 Jornada del Muerto: Darton, 22; Keyes, 14.
 Koehler: Lee, 19.

Geologic maps (Continued).

Lake Valley: Clark, E., 1; Keyes, 36; Lindgren, 6.
 Luna County: Darton, 12.
 Fluorite Ridge: Darton, 5.
 Victorio Mountains: Darton, 12.
 Manzano Mountains: Darton, 22.
 Mogollon district: Ferguson, 1, 2.
 Morrison formation: Mook, 3.
 Nacimiento uplift:
 Southern end of: Darton, 29.
 Navajo Country: Gregory, 1, 2.
 North central: Darton, 29.
 Northern: Darton, 10; Gardner, 3; Stevenson, 5; Van Hise, 1.
 Northwestern: Darton, 3; Dutton, 2; Gregory, 1, 2.
 Oscura Mountains: Darton, 29.
 Otero County: Darton, 24.
 Permian:
 Southeastern: Willis, 1, 3.
 Pinos Altos: Paige, 2.
 Plateau province: Dutton, 2.
 Puerco region: Gardner, 9.
 Puertecito district: Wells, E. H., 2.
 Raton quadrangle: Lee, 29, 31.
 Rio Grande Valley: Lee, 5.
 Rio Grande-Pimo (Ariz.-N. Mex.): Antisell, 1.
 Roswell area: Fielder, 2; Fisher, 2.
 Sacramento Mountains: Darton, 29.
 San Andres Mountains: Darton, 29.
 Sandia Mountains: Darton, 22; Ellis, 2.
 San Juan County: Bauer, 1, 2; Reeside, 2.
 San Pedro district: Herrick, C. L., 6; McCaffery, 1.
 Santa Rita region: Paige, 6.
 Silver City quadrangle: Paige, 7.
 Socorro County: Darton, 22, 29; Wells, E. H., 2; Winchester, 2.
 Southeastern: Blanchard, 1; Darton, 24; Eccles & Hunter, 1; Hoots, 1; Willis, 1, 3; Anon., 12.
 Southern: Darton, 16.
 Southwestern: Wheeler, 8.
 Staked Plains: Cummins, 1.
 Taos Range: Gruner, 1.
 Taylor Creek:
 Tin deposits: Hill, J. M., 2.
 Tijeras area: Lee, 15, 16.
 Tularosa Basin: Darton, 22; Meinzer, 3; Powell, W. C., 1.
 Tyrone district: Paige, 9.
 Valencia County: Darton, 22, 29; Herrick, C. L., 9; Johnson, D. W., 2.
 Western: Van Hise, 1; Wheeler, 8.
 Zuni Mountains: Darton, 29.
 Zuni Reservation: Sears, 1.
 Zuni salt lake: Darton, 2.

Historical Geology.

- Abo sandstone :
 - Lincoln County, Bose, 1.
- Afton craters : Lee, 7.
- Alamosa Creek :
 - Socorro County: Winchester, 2.
- Albuquerque : Bryan, 1 ; Herrick, C. L., 3, 6, 10.
- Apache Canyon :
 - South central: Keyes, 4.
- Archean :
 - North America : Van Hise, 1.
 - Northern : Stevenson, 5.
- Basalt fields : Dutton, 1.
- Bishop's Cap, bone-cavern find :
 - Bryan, W. A., 1.
- Buried Mountains :
 - Estancia Valley : Lee, 27, Rich, J. L., 4.
- Burlington limestone :
 - Lake Valley : Springer, F., 1.
- Burro Mountains : Somers, 1.
- Caballo Mountains : Herrick, C. L., 4.
- Cambrian : Gordon, 1 ; Keyes, 62;
 - Lindgren, 6; Walcott, 1.
 - Central : Lee, 8.
 - Deming quadrangle : Darton, 15.
 - Eastern : Baker, C. L., 2.
 - Luna County : Darton, 12.
 - Paleogeographic map : Willis, B., 1.
 - Silver City quadrangle : Paige, 7.
 - Southern : Darton, 16.
- Carbonic column :
 - Rio Grande region : Keyes, 45.
- Carboniferous : Case, 6; Darton, 22, 29 ; Gordon, 1; Herrick, C. L., 17; Huene, 1; Keyes, 23, 24, 62; Lindgren, 6; Marcou, 10; Newberry, 3; Williams, H. S., 1.
- Burlington limestone : Springer, F., 1.
- Carlsbad region : Meinzer, 5.
 - Central : Lee, 8.
- Chaves County : Merritt, 1.
- Coal measures : Herrick, C. L., 8.
 - in Sierra Ladrones : Keyes, 28.
- Deming quadrangle : Darton, 15.
- Eastern : Baker, C. L., 2; Lee, 27 ; Rich, J. L., 5.
- Estancia plains : Keyes, 38.
- Estancia Valley : Meinzer, 2.
- Gallup-Zuñi Basin : Sears, 1.
- Guadalupe Mountains, Permian : Shumard, B. F., 1.
- Hanover district : Paige, 1.
- Jemez-Albuquerque region: Reagan, 1.
- Jornado del Muerto : Keyes, 14; Shumard, G. G., 2.
- Lake Valley district : Keyes, 36.
- Luna County : Darton, 12.

Historical geology (Continued).

- Carboniferous (Continued).
 - Manzano group : Lee, 11, 26.
 - Northeastern ; Garrett, 1; St. John, 1.
 - Northern : Stevenson, 1, 5; Williston, 4.
 - Northwestern : Darton, 3 ; Dutton, 2.
- Paleogeographic map : Schuchert, 2.
- Pecos Valley : Semmes, 1.
- Permian : Darton, 25 ; Herrick, C. L., 11.
 - Guadalupe Mountains : Shumard, B. F., 5.
 - Pecos Valley : Wrather, 1.
- Pre-Moenkopi unconformity :
 - Colorado Plateau : Dake, 1.
- Puertecito district : Wells, E. H., 2.
- Red beds : Case, 9 ; Darton, 29 ; Lee, 9.
- Rio Grande Valley : Gordon, 2, 3; Keyes, 45, 66.
 - Manzano group : Lee, 11.
 - Red beds : Case, 9; Darton, 29; Lee, 6.
- Rio Penasco Basin : Renick, 3.
- Roswell area : Fisher, 2.
- Sandia Mountains : Ellis, 2.
- San Miguel County : Gardner, 8.
- Santa Fe region : Blake, 4.
- Sierra Blanca field : Wegemann, 1.
- Silver City quadrangle : Paige, 7.
- Socorro County : Herrick, C. L., 9, 14.
 - Southeastern : Hoots, 1 ; King, P. B., 1; Rich, A., 1; Richardson, 3.
 - Southern : Darton, 16.
- Stratigraphy : Keyes, 24 ; Richardson, 3.
- Taos Range : Gruner, 1.
- Tijeras region : Herrick, C. L., 6.
- Tularosa Basin : Meinzer, 3.
- Valencia County : Herrick, C. L., 9.
- Carthage coal field : Gardner, 6.
- Cerrillos coal field : Johnson, D. W., 4 ; Lee, 19; Stevenson, 12.
- Cerrillos Hills : Johnson, D. W., 4.
- Chaco Canyon :
 - Recent deposits of : Bryan, 7.
- Chaves County : Merritt, 1.
- Chupadera Mesa :
 - Antiquity of : Keyes, 67.
- Coal formations : Lesquereux, 7 ; White, C. A., 11.
 - Sierra Blanca field : Wegemann, 1.
 - Fields around southern end of Rocky Mountains : Lee, 16.
- Coal measures :
 - Near Socorro : Herrick, C. L., 8, 14.

Historical geology (Continued).

- Colorado Plateau :
 Uniformity of : Dake, 1.
 Comanche series : Hill, R. T., 11.
 See also Cretaceous, page 106.
 Cretaceous : Darton, 22, 29 ; Hill, R. T., 11 ; Keyes, 62; Knox, 1; Lee, 20; Marcou, 10; Matthew, 4; Newberry, 3; White, 13.
 Alamosa Creek valley : Winchester, 2.
 Albuquerque region : Herrick, C. L., 10.
 Carthage coal field : Gardner, 6.
 Cerrillos field : Lee, 19.
 Cerrillos Hills : Johnson, D. W., 4.
 Close of, in North America : Osborn, 4.
 Correlation : Brown, 2.
 Dakotan series : Keyes, 26.
 Deming quadrangle : Darton, 15.
 Eastern : Baker, C. L., 2.
 Estancia Valley : Meinzer, 2.
 Flora of the Dakota formation : Gress, 1.
 Galisteo Creek : Stevenson, 3.
 Gallina-Raton Spring coal field : Gardner, 2.
 Gallup Basin : Kirk, 1.
 Gallup-San Mateo field : Gardner, 4.
 Gallup-Zuili Basin : Sears, 1.
 Jemez-Albuquerque region : Reagan, 1.
 Jornada del Muerto : Keyes, 14.
 Laramie group : Stevenson, 2.
 Laramie hiatus : Keyes, 72.
 Luna County : Darton, 12.
 Morrison formation : Darton, 11.
 Mount Taylor region : Shimer, 1.
 Navajo country : Gregory, 2.
 North America : White, 17.
 North central : Lee, 16.
 Northeastern : Garrett, 1; St. John, 1.
 Northern : Gardner, 3 ; Stevenson, 1, 5, 9.
 Northwestern : Darton, 3 ; Dutton, 2.
 Ojo Alamo beds : Brown, 1.
 Paleogeographic map : Willis, B., 1 ; Schuchert, 2.
 Pecos Valley : Semmes, 1.
 Puertecito district : Wells, E. H., 2.
 Raton field : Lee, 10, 29, 31.
 Raton Mesa region : Knowlton, 3; Lee, 23 ; Stevenson, 8.
 Rio Grande Valley : Lee, 6.
 Rocky Mountain region : Lee, 20; Lesquereux, 7.
 San Carlos Mountains : White, 14.
 Sandia Mountains : Ellis, 2.

Historical geology (Continued).

- Cretaceous (Continued).
 San Juan County : Bauer, 1, 2; Knowlton, 5; Reeside, 1, 2.
 San Mateo-Cuba district : Gardner, 7.
 Sierra Blanca field : Wegemann, 1.
 Silver City quadrangle : Paige, 7.
 Socorro County : Herrick, C. L., 9.
 Southeastern : Shumard, G. G., 1.
 Southern : Stevenson, 6.
 Tucumcari : Cummins, 1, 3 ; Hill, R. T., 3, 10.
 Tularosa Basin : Meinzer, 3.
 Valencia County : Herrick, C. L., 9.
 Western : Winchester, 1.
 Cretaceous-Tertiary boundary : Knowlton, 4; Stanton, 3.
 Dakotan series : Keyes, 26.
 Deming quadrangle : Darton, 15.
 Florida Mountains : Becker, 1.
 Devonian : Darton, 29 ; Gordon, 1 ; Grabau, 1 ; Keyes, 62; Kindle, 1; Lindgren, 6; Williams, H. S., 1.
 Deming quadrangle : Darton, 15.
 Eastern : Baker, C. L., 2.
 Fauna (Percha shale) : Kindle, 1.
 Lake Valley district : Clark, E., 1 ; Keyes, 36.
 Luna County : Darton, 12.
 Paleogeographic map : Schuchert, 2; Willis, B., 1.
 Physical and faunal evolution of North America : Grabau, 1.
 Silver City quadrangle : Paige, 7.
 Southern : Darton, 16.
 Eastern : Baker, C. L., 2; Hill, R. T., 6 ; Lee, 27 ; Rich, J. L., 5; Van Diest, 1.
 Eocene : Cope, 3.
 Faunal horizons : Granger, 1.
 of North America : Clark, W. B., 1 ; Smith, J. H., 1.
 See also Tertiary, page 109.
 Estancia plains : Keyes, 38; Meinzer, 2.
 Evolution, physical and faunal : Grabau, 1.
 Florida Mountains : Becker, 1.
 Folsom culture : Brown, B., 3.
 Formations :
 Table of : Keyes, 55, 57.
 Galisteo Creek : Stevenson, 3.
 Gallup Basin : Kirk, 1; Sears, 1.
 General : Antisell, 1 ; Bailey, 1 ; Blake, 1 ; Cope, 7, 12, 14; Darton, 29; Gilbert, 1 ; Hayden, 1, 2 ; Herrick, C. L., 6, 13; Hill, R. T., 4, 6 ; Howell, 1 ; Jewett, 1 ; Keyes 5, 25, 62; Knox, 1 ; Le Conte, 3 ; Lindgren, 6 ; Loew, 1; Macfarlane, 2; Marcou, 1, 3, 4, 5;

Historical geology (Continued). I Historical geology (Continued).

- General (Continued).
 Newberry, 1, 3, 4; Stevenson, 5;
 Wheeler, 1 to 6.
 Geologic structure : Darton, 22.
 See also Structural geology, page
 123.
 Geologic time classification: Wil-
 marth, 1.
 Guadalupe group: Darton, 24.
 Guadalupan reef theory : Keyes, 75.
 Jemez coal field : Reagan, 3.
 Jemez Plateau : Kelly, 1. Jemez-
 Albuquerque region: Reagan, 1.
 Jornada del Muerto : Keyes, 1, 14;
 Shumard, G. G., 1.
 Jurassic: Broadhead, 1; Darton, 22,
 29; Huene, 1; Hyatt, 2; Keyes,
 17, 63 ; Lee, 26; Marcou, 10;
 White, 8.
 Gallup-Zuffi Basin : Sears, 1.
 Morrison formation : Darton, 11.
 Navajo country : Gregory, 2.
 Northeastern: Garrett, 1.
 Northern: Lee, 1.
 Paleogeographic map : Schuchert,
 2; Willis, B., 1.
 Southern end of Rocky Moun-
 tains : Keyes, 17.
 Lake Otero : Herrick, C. L., 16.
 Lake Valley :
 beds, age of : Cope, 26, 39; Keyes,
 23, 36.
 Burlington limestone : Springer,
 F., 1.
 Laramie group : Cope, 55; Newberry,
 8; Stevenson, 2, 6, 8.
 Laramie hiatus :
 Southern Rocky Mountains :
 Keyes, 72.
 Lava fields : Dutton, 3; Reagan, 2 ;
 Tarr, 2.
 Lignite :
 Age of : Lesquereux, 7.
 Formation of : Lesquereux, 8.
 Limitar volcano : Herrick, C. L., 5.
 Loup Fork beds :
 Formation: Cope, 47.
 Gila River : Cope, 50.
 Luna County : Darton, 12.
 Deming quadrangle : Darton, 15.
 Florida Mountains : Becker, 1.
 Magdalena Mountains : Herrick, C.
 L., 2, 5; Keyes, 19, 23.
 and Black Range region : Gordon,
 5.
 Manzano group :
 Rio Grande Valley : Lee, 11, 26.
 Mesozoic : Darton, 29; Hill, R. T., 1;
 Marcou, 10; Stevenson, 9;
 White, 12.
 Rio Grande Valley: Gordon, 2.
 See also Carboniferous, page 10!
 Mogollon : Ferguson, 1, 2; Henricl
 2.
 Morrison formation : Berry, 1; Da/
 ton, 11 ; Lee, 1, 21; Lull, 1
 Mook, 2, 3.
 Mountain ranges : Antisell, 1.
 Mount Taylor, region about: Dutto
 2; Shimer, 1.
 Volcanic necks : Johnson, D. W
 7.
 Mud and lava:
 Deposits of : Cope, 32.
 Navajo country : Gregory, 1, 2.
 Neocene:
 North America : Dall, 1.
 Northeastern: Baldwin, 1; • Garret
 1; • Marcy, 1; St. John, 1.
 North central: Lee, 16.
 Northern: Conkling, 1; Keyes, 16
 Lesquereux, 6; Marcou, 1, 3
 Stevenson, 1, 5, 7.
 Northwestern: Darton, 3; Powell, ;
 W., 1.
 Ordovician: Gordon, 1; Grabau,
 Keyes, 62; Lindgren, 6.
 Central: Lee, 8.
 Deming quadrangle: Darton, 15.
 Eastern: Baker, C. L., 2.
 Lake Valley district: Keyes, 36.
 Luna County: Darton, 12.
 Paleogeographic map : Schucher
 2; Willis, B., 1.
 Physical and faunal evolution c
 North America: Grabau, 1.
 Silver City quadrangle: Paige, 7.
 Southern: Darton, 16.
 Organ Mountains: Antisell, 1.
 Ortiz Mountains : Keyes, 43; Ogilvie
 3.
 Paleogeography: Gould, 2; Keye
 61; Schuchert, 2; Willis, B.,
 Maps: See the various geologi
 systems under Historical geolog:
 page 105.
 Paleozoic formations: Darton, 29
 Gordon, 1; Keyes, 61, 68.
 Central: Lee, 8.
 Luna County: Darton, 12.
 Southern: Darton, 15, 16, 17
 Keyes, 69; Richardson, 2.
 Paleogeographic map: Case, 10
 Schuchert, 2 ; Willis, B., 1.
 Pecos Valley: Means, 1; Semmes,
 Permian formations of : Wrathe
 1.
 Mexican boundary : Emory, 2, 3
 Hall, 2; Hill, 1.
 Mississippian formations :

Historical geology (Continued).

- Pennsylvanian formations:
 Rio Grande Valley: Gordon, 3.
 See also Carboniferous, page 105.
- Permian: Archaic, 1; Beede, 2; Case, 10; Cope, 28; Darton, 25, 29; Girty, 1; Huene, 1; Marsh, 2; Shumard, B. F., 4; White, 1; Williston, 1; Wrather, 1.
- Guadalupe Mountains: Beede, 2; Crandall, 1; Shumard, B. F., 1.
- Paleogeography: Case, 10.
 Great Plains: Gould, 2.
- Pecos Valley: Wrather, 1.
- Revolution in North America: Finlay, 1.
- Texas-New Mexico: Baker, C. L., 4, 5; Crandall, 1; King, P. B., 1; Willis, 1.
 See also Carboniferous, page 105.
- Permo-Carboniferous:
 Northern: Case, 6; Williston, 4.
- Pre-Cambrian: Keyes, 16, 53, 62; Lindgren, 6.
- Burro Mountains: Somers, 1.
- Deming quadrangle: Darton, 15.
- At Hamilton mine: Lindgren, 2.
- Jornada del Muerto: Keyes, 14.
- Luna County: Darton, 12.
- Paleogeographic map: Schuchert, 2.
- Silver City quadrangle: Paige, 7.
- Taos Range: Gruner, 1.
- Pre-Moenkopi:
 Unconformity, Colorado Plateau: Dake, 1.
- Puerco formation: Cope, 5, 55; Gardner, 9; Matthew, 2.
- Puertecito: Wells, E. H., 2.
- Quaternary: Keyes, 62; Lindgren, 6.
- Deming quadrangle: Darton, 15.
- Luna County: Darton, 12.
- Navajo country: Gregory, 2.
- Northeastern: Garrett, 1.
- Raton-Brilliant-Koehler Area: Lee, 29.
- Raton coal field:
 Unconformity in: Lee, 10, 13.
- Raton Mesa: Knowlton, 3; Lee, 10, 14, 23, 29.
- Igneous rocks of: Mertie, 1.
- Red beds: Case, 5, 7; Darton, 9, 29; Lee, 6, 9.
- Rio Grande Valley, age: Case, 9.
- Rio Grande region: Henderson, J., 1.
- Carboniferous of: Keyes, 66.
- Rio Grande Valley: Henderson, J., 1; Keyes, 69; Lee, 5, 11.
- Mississippian formations: Gordon, 2.

Rio Penasco Basin: Renick, 3.

Historical geology (Continued).

- Rocky Mountains:
 Building of: Lee, 30; Melton, 1.
- Roswell area: Fielder, 2; Fisher, 2.
- Saline basins:
 Central: Johnson, D. W., 3.
- San Andreas Mountains: Herrick, C. L., 4.
- Sandia Mountains: Ellis, 2; Herrick, C. L., 6.
- San Jose and Rio Puerco Valley, Sandoval County: Renick, 2.
- San Juan Basin: Endlich, 1; Reeside, 2; Sinclair, 2.
 Paleocene deposits: Sinclair, 1.
- Puerco and Torrejon formations: Matthew, 2.
- San Juan County: Bauer, 1, 2; Knowlton, 5; Reeside, 1.
- San Pedro district: Berryman, 1; Herrick, C. L., 6.
- San Simon Valley: Schwennesen, 2.
- Santa Fe region: Blake, 3; Simpson, G. G., 1.
- Santa Rita region: Paige, 6; Rickard, 1.
- Santa Rosa: Prout, F. S., 1.
- Sierra de los Caballos: Keyes, 14.
- Silver City quadrangle:
 General: Paige, 7.
- Silurian: Gordon, 1; Grabau, 1; Keyes, 62; Lindgren, 6.
- Deming quadrangle: Darton, 15.
- Eastern: Baker, C. L., 2.
- Lake Valley district: Keyes, 36.
- Luna County: Darton, 12.
- Organ Mountains: Jenney, 1.
- Paleogeographic map: Schuchert, 2; Willis, B., 1.
- Physical and faunal evolutions of North America: Grabau, 1.
- Silver City quadrangle: Paige, 7.
- Southern: Darton, 16.
- Socorro County: Herrick, C. L., 9.
- Socorro Mountains: Herrick, 5.
- Southeastern: Hoots, 1; Jenney, 1; Rich, A., 1; Richardson, 1; Shumard, G. G., 1; Tarr, 3.
- Southern: Antisell, 1; Darton, 14, 16; Endlich, 1; Shumard, G. G., 3.
- Southwestern: Antisell, 1; Schwennesen, 1, 2; Webster, 1.
- Staked Plains: Blake, 1; Cummins, 1; Hill, R. T., 1, 2, 6.
- Mesozoic stratigraphy: Jenney, 1.
- Stratigraphy: Darton, 29; Willis, B., 1.
- Abo formation, age of: Baker, C. L., 2.
- Albuquerque: Bryan, 1.

Historical geology (Continued).

- Stratigraphy (Continued).
 Benton formation, eastern N. Mex.:
 Baker, C. L., 2.
 Burlington limestone, Lake Valley:
 Springer, F., 1.
 Carboniferous, southeastern: King,
 P. B., 1; Richardson, 3.
 Carthage coal field: Gardner, 6.
 Central: Darton, 22, 25.
 Chaco Valley: Bauer, 1.
 Chama Basin: Darton, 22.
 Coal fields: Lee, 16.
 Comanche series: Hill, R. T., 11.
 Correlation:
 Cretaceous-Eocene: Brown, 2.
 See also Correlation, page 87.
 Cretaceous: Brown, 1, 2; Knowlton,
 4; Reeside, 2; Stanton, 3.
 Type section: Lee, 16.
 Unconformity on older rocks:
 Keyes, 8.
 Deming quadrangle: Darton, 15.
 Eastern: Baker, C. L., 2; Rich, J.
 L., 5; Willis, 1.
 Eddy County: Renick, 3.
 Cactus Flat dam site: Nye, 1.
 Permian: King, P. B., 1; Willis,
 1, 2, 3, 4.
 Gallina-Raton Spring coal field:
 Gardner, 2.
 Gallup coal fields : Sears, 1; Sha-
 ler, 3.
 Gallup-Zulii Basin: Darton, 22.
 Glorieta sandstone: Baker, C. L., 2.
 Guadalupe group: Darton, 24.
 Guadalupe Mountains: Tarr, 3.
 Hagan field: Lee, 16.
 Jornada del Muerto: Darton, 22;
 Keyes, 14.
 Jura-Trias: Broadhead, 1.
 Lake Valley: Clark, E., 1; Keyes,
 36.
 Laramie: relation to Puerco: Cope,
 55.
 Lea County: King, P. B., 1; Wil-
 lis, 1, 3.
 Luna County: Darton, 12.
 Manzano group: Lee, 11, 26.
 Monero, Rio Arriba County: Gard-
 ner, 3.
 Morrison: Lee, 25.
 Mount Taylor region: Blodgett, 1;
 Shimer, 1.
 Northeastern: Darton, 22; Garrett,
 1.
 Northwestern: Darton, 3, 22; Dut-
 ton, 2; Reeside.
 Paleozoic:
 Northern: Case, 4.
 Southern: Darton, 16.

Historical geology (Continued).

- Stratigraphy (Continued).
 Permian: Darton, 25.
 Northern: Baker, A. A., 1; Case,
 4.
 Texas-New Mexico: Crandall, 1;
 King, P. B., 1; Willis, 1, 3.
 Permo-Carboniferous :
 Northern: Case, 4.
 Plateau region: Reagan, 2.
 Puerco, relation to Laramie: Cope,
 55.
 Raton coal field: Lee, 31.
 Red beds : Darton, 9, 29.
 Eastern: Baker, C. L., 2; Case,
 4, 5, 9.
 Northeastern: Case, 5, 7.
 Southeastern: Davis, M. J., 1;
 King, P. B., 1; Willis, 1 to 4.
 Roswell artesian basins: Fielder, 2.
 Sandoval County: Renick, 2.
 San Juan County: Bauer, 1, 2;
 Holmes, 1; Reeside, 1, 2.
 San Mateo-Cuba coal field: Gard-
 ner, 7.
 Santa Rita: Rickard, 1.
 Silver City quadrangle: Paige, 7.
 Southeastern: Hoots, 1; Mansfield,
 3; Willis, to 4.
 Southern: Darton, 6; Richardson,
 2.
 Staked Plains : Cummins, 1; Dar-
 ton, 22; Drake, 1.
 Tertiary: Brown, 2; Reeside, 2.
 Triassic: Drake, 1.
 Tucumcari Mountain: Baker, C. L.,
 2; Case, 7; Cummins, 1, 2, 3;
 Hill, R. T., 2, 6, 10.
 Tularosa Basin: Darton, 22; Mein-
 zer, 3; Powell, W. C., 1.
 Yeso formation: Baker, C. L., 2;
 Darton, 29.
 Zufii Mountains : Darton, 22.
 See also, Geologic formations de-
 scribed, page 96, and Geologic
 formations, table and sections,
 page 102.
 Taos Range: Gruner, 1.
 Tertiary: Cope, 3, 7, 20, 34; Dall, 2;
 Darton, 22, 29; Herrick, C. L., 6;
 Keyes, 34, 62; Knox, 1; Lind-
 gren, 6; Matthew, 2, 4.
 Alamosa Creek valley: Winchester,
 2.
 Albuquerque region: Bryan, 1;
 Herrick, C. L., 10; Reagan, 1.
 Carthage coal field: Gardner, 6.
 Cerrillos Hills: Johnson, D. W., 4.
 Colorado Plateau: Newberry, 4.
 Correlation: Brown, 2.
 Deming quadrangle: Darton, 15.

Historical geology (Continued).

- Tertiary (Continued).
 Eocene: Granger, 1.
 Eocene formations:
 Petrographic analysis : Johannsen, 1.
 Formations, table of : Dall, 2.
 Gallina-Raton Spring coal field: Gardner, 2.
 Gallup-Zuni Basin: Sears, 1.
 Intrusives, Pecos Valley: Semmes, 1.
 Jemez region: Reagan, 1.
 Jornada del Muerto: Keyes, 14.
 Lake Valley district: Keyes, 36.
 Loup Fork beds: Cope, 47, 50.
 Luna County: Darton, 12.
 Mexican boundary: Hall, 2.
 Mogollon district: Ferguson, 2.
 Navajo country: Gregory, 2.
 North central: Lee, 16.
 Northeastern: Garrett, 1.
 Northern: Gardner, 3; Stevenson, 5.
 Northwestern: Darton, 3.
 Opening of, in North America: Osborn, 4.
 Paleogeographic map: Schuchert, 2; Willis, B., 1.
 Pecos Valley: Semmes, 1.
 Peneplains: Robinson, 1.
 Plateau district: Robinson, 1.
 Puerco formation : Gardner, 9 ; Matthew, 2. Raton-Brilliant-Koehler area: Lee, 29.
 Raton coal field: Lee, 29, 31.
 Raton Mesa region: Knowlton, 3, 6; Lee, 23, 28.
 Rio Grande region: Henderson, J., 1.
 San Juan Basin: Reeside, 2 .
 Paleocene deposits: Sinclair, 1.
 San Juan County: Bauer, 1, 2.
 San Mateo-Cuba district: Gardner, 7.
 Santa Fe marls: Cope, 4.
 Silver City quadrangle: Paige, 7.
 Socorro and Valencia Counties: Herrick, 9.
 Torrejon formation: Gardner, 9; Matthew, 2.
 Tularosa Basin: Meinzer, 3.
 Tertiary plateau:
 Northeastern: St. John, 1.
 Tijeras coal field: Lee, 15.
 Torrejon formation: Gardner, 9; Matthew, 2.
 Triassic: Adams, J. E., 1; Darton, 22, 29; Huene, 1, 3; Hyatt, 2;
 Historical geology (Continued).

Triassic (Continued).

- Keyes, 18, 26; Lee, 26; Marcou, 10.
 Deming quadrangle: Darton, 15.
 Eastern: Adams, J. E., 1; Baker, C. L., 2; Drake, 1; Rich, J. L., 5.
 Gallup-Zuni Basin: Sears, 1.
 Luna County: Darton, 12.
 Navajo country: Cross, 3; Gregory, 2.
 Northern: Cross, 3; Williston, 4.
 Northeastern: Garrett, 1.
 Northwestern: Dutton, 2.
 Paleogeographic map: Schuchert, 2; Willis, B., 1.
 Puertecito district: Wells, E. H., 2.
 Red beds: Case, 7.
 Tucumcari Mountain: Cummins, 1, 3; Hill, R. T., 1, 2, 3, 10, 11; Marcou, 11, 12, 13.
 Tuertos Mountains: Keyes, 43.
 Tularosa Basin: Meinzer, 3; Powell, W. C., 1.
 Tyrone district: Paige, 9.
 Unconformity:
 At base of Cretaceous: Keyes, 8.
 Pre-Moenkopi, Colorado Plateau: Dake, 1.
 Significance of : Keyes, 25.
 Valencia County: Herrick, C. L., 9; Johnson, D. W., 2.
 White sands: Herrick, C. L., 11; Herrick, H. N., 1.
 White Oaks: Smith, E. P., 1.
 Zuni Plateau: Dutton, 2.

Maps, general.

- Apache National Forest: U. S. F. Serv., 1.
 Absorption areas:
 Roswell area: Fisher, 2.
 Alkali flat, Dona Ana County: Wells, R. C., 1.
 Areas of artesian flow:
 Roswell Basin: Fisher, 2.
 Baldy mining district: Belcher, 1.
 Bernalillo County: U. S. F. Serv., 7.
 Black Range and Apache districts:
 Bender, 1; Irumbar, 1; Lindgren, 6; Merry, 1.
 Burro Mountains mining district:
 Johnson, C. E., 1.
 Canadian region, sketch map: St. John, 1.
 Carlsbad Cavern National Monument: Lee, 34.

Maps, general (Continued).

- Carlsbad irrigation project: Meinzer, 5.
- Carson National Forest: U. S. F. Serv., 2.
- Catron County: U. S. F. Serv., 1, 4, 5.
 Cooney district: Ferguson, 2; McKee, 1.
- Cerrillos coal field: Lee, 19.
- Cerrillos Hills, old mining map: Hayward, 1; Johnson, D. W., 4.
- Chaves County: U. S. F. Serv., 6.
- Claim map:
 Black Range district: Bender, 1; Irumbar, 1.
 Burro Mountain district: Johnson, C. E., 1.
 Cooney district: McKee, 1.
 Mogollon district: Ferguson, 2.
 Sylvanite district: Ober Eng. Co., 1.
- Clark's coal mine: Fleming, 1.
- Coal fields: Campbell, 4, 7; Parker, 1.
 Southern Rocky Mountain region: Lee, 20.
- Colfax County: Amerine, 1; Belcher, 1; White, E. D., 1.
- Colorado and New Mexico:
 Showing continental divide: Conkling, 2.
- Contact-metamorphic deposits, location of: Lindgren, 6.
- Cook and White coal mine, Madrid: Fleming, 1.
- Cooney mining district: Ferguson, 2; McKee, 1.
- Copper-producing districts, location of: Butler, 1, 2.
- Coronado National Forest: U. S. F. Serv., 3.
- Datil National Forest: U. S. F. Serv., 4.
- Dawson coal district: Lee, 31.
 Elizabethtown mining district: Belcher, 1.
- Estancia Valley:
 Water condition: Meinzer, 2.
- Fluorspar deposits, location of: Johnston, 1.
- Forest maps: U. S. F. Serv., 1-9.
- General: Darton, 29; G. L. O., 1, 2; Long, 1; Sullivan, 1; U. S. F. Serv., 1-9; U. S. G. S., 59.
- Geologic: See Geologic maps, page 104.
- Gila National Forest: U. S. F. Serv., 5.
- Grant County: U. S. F. Serv., 5.
- Maps, general (Continued).
- Grant County (Continued).
 Burro Mountain mining district: Johnson, C. E., 1.
- Gypsum, showing location of: Darton, 19.
- Gypsum mills, location of: Burchard, 4; Stone, R. W., 2.
- Hidalgo County: U. S. F. Serv., 3.
- Hillsboro district: Lindgren, 6.
- Iron districts, location of: Harder, 1.
- Keystone mining district: Amerine, 1.
- Kingston, Carpenter and Sierra Blanca districts: Lindgren, 6; Merry, 1.
- Lincoln County: U. S. F. Serv., 6, 7.
 Lincoln National Forest: U. S. F. Serv., 6.
- Lucas coal mine, Madrid: Fleming, 1.
- Luna County:
 Water conditions: Darton, 7, 12.
- McKinley County: U. S. F. Serv., 8.
- Magdalena mining district: Lindgren, 6.
- Manganese deposits, location of: Healey, 1; Hewett, D. F., 1; Wells, E. H., 1.
- Manzano National Forest: U. S. F. Serv., 7, 8.
- Mining districts, showing location of: General Land Office, 1; Hill, J. M., 1; Lindgren, 4a, 6; Otero, 1.
- Mogollon district, showing faults and veins: Ferguson, 2; Scott, 1.
 See also Cooney district.
- Monero coal area, Rio Arriba County: Gardner, 3.
- Mora County: U. S. F. Serv., 9.
- Navajo Reservation:
 Oil structures: Nowels, 1.
- Northern: Long, 1.
- Northwestern: Newberry, 4.
- Oil and gas fields: Day, 1, 2.
- Ortiz mine grant: Ortiz Syndicate, I.
- Otero County: U. S. F. Serv., 6.
- Paleogeographic: See the various geologic systems under Historical geology, page 105.
- Pittsburg district: Lindgren, 6.
- Plateau country: Dutton, 2.
- Public surveys: General Land Office, I.
- Quay County:
 Tucumcari oil field: Martin, 1.
 Raton Coal & Coke Company mine: Fleming, 1.
- Red River district: Belcher, 1.
- Relief map: Darton, 29.
- Southwestern: Darton, 15.
- Rio Arriba County: U. S. F. Serv., 2, 9.

Maps, general (Continued).

Roswell artesian basin: Fielder, 2.

Salt basin:

Southeastern: Hoots, 1.

Sandoval County: U. S. F. Serv., 7, 8, 9.

"Sandstone Copper," showing location of: Lindgren, 6.

San Juan Basin: Reeside, 2.

Oil structures: Kroeger & Ritter, 1; Nowels, 1.

Puerco-Torrejon type locality: Gardner, 9.

San Juan County, coal field: Bauer, 2.

San Miguel County: U. S. F. Serv., 9.

San Simon Valley:

Showing water condition: Schwennesen, 2.

Santa Fe County: U. S. F. Serv., 9.

Santa Fe National Forest: U. S. F. Serv., 9.

Sierra County: U. S. F. Serv., 4.

Black Range district: Bender, 1; Irumbar, 1; Merry, 1.

Socorro County: U. S. F. Serv., 4, 7.

Soil resources:

Carlsbad sheet: U. S. Bur. Soils, 1.

Mesilla Valley: Nelson, 1.

Middle Rio Grande: Nelson, 2.

Pecos Valley: Means, 1.

Roswell sheet: U. S. Bur. Soils, 2.

Southeastern: Darton, 20; Hoots, 1.

Stag Canyon fuel company, mine workings: Sheridan, 1.

Stone quarries, location: Burchard, 5.

Structural: Darton, 22, 29.

Artesia field: Davis, M. J., 1.

Capulin Mesa: Darton, 29.

Deming quadrangle: Darton, 15.

Dunken dome: Darton, 29, Renick, 3.

Eastern: Darton, 29.

Esterito dome, Guadalupe County: Darton, 22.

Gallup coal district: Sears, 1.

Hogback field: Nowels, 1.

McKinley County: Darton, 22.

Northeastern: Darton, 22, 29.

Puertecito district: Darton, 29;

Wells, E. H., 1; Winchester, 2.

Rattlesnake field: Nowels, 29.

Rio Arriba County: Darton, 22.

Salado and Alamosa Creeks: Darton, 22.

San Juan County: Kroeger & Ritter, 1.

Socorro County: Darton, 29;

Wells, E. H., 2.

Southeastern: Hoots, 1. Maps, general (Continued).

Valencia County: Wells, E. H., 2.

Sylvanite district: Ober Engineering Company, 1; Lindgren, 6.

Taos County: Belcher, 1; U. S. F. Serv., 2, 9.

Tijeras coal field: Lee, 15.

Topographic: See Topographic maps, page 124.

Torrance County: U. S. F. Serv., 7.

Tucumcari region: Cummins, 2; Martin, C. W., 1.

Tularosa Basin and adjacent territory: Meinzer, 3; Powell, W. C., 1.

Tyrone district:

Exploration: Paige, 9.

Burro Mountain Copper Co.: Paige, 9.

Valencia County: U. S. F. Serv., 7, 8.

Veins, Tertiary, showing locations of: Lindgren, 6.

Water condition:

Estancia Valley: Meinzer, 2.

Hidalgo County: Schwennesen, 2, 3.

Luna County: Darton, 7, 12.

Tularosa Basin: Meinzer, 3.

Water supply papers, areas covered by: Meinzer, 4.

Water table, contours:

Navajo country: Gregory, 1.

Deming quadrangle: Darton, 15.

Water table, depths to:

Carlsbad area: U. S. Bur. Soils, 3.

Deming quadrangle: Darton, 15.

Estancia Valley: Meinzer, 2.

Hidalgo County: Schwennesen, 1.

Luna County: Darton, 7, 12.

Roswell area: U. S. Bur. Soils, 4.

San Simon Valley: Schwennesen, 2.

Tularosa Basin: Meinzer, 3.

White Oaks district: Wegemann, 1.

White sands: Herrick, C. L., 11.

Zuni dam, Black Rock: Bryan, 14; Eng. News, 1.

Zuni Indian Reservation: Sears, 1.

See also Geologic maps, page 104, and Topographic maps, page 124.

Mineralogy.

Alum:

Grant County, Gila River: Hayes, 1.

Alunogen:

Gila River: Blake, 5.

Analysis: Clarke, 4, 6.

Structural (Continued).

Mineralogy (Continued).

- Alunogen (Continued).
 Description: Clarke, 1.
 Analyses:
 Alunogen, Grant County: Clarke, 1, 4, 6.
 Arsenides, Grant County: Clarke, 4; Hillebrand, 1; Waller, 1.
 Augite, Mount Taylor : Clarke, 4, 6.
 Bentonite, Rio Arriba County: Ross, 1.
 Chrysolite, Fort Wingate: Clarke, 4, 6.
 Descloizite, Grant County: Clarke, 4, 6.
 Fluorspar : Burchard, 3; Johnston, 1.
 Halotrichite, Grant County: Clarke, 4, 6.
 Nickel-skutterudite, Grant County: Waller, 1.
 Picrallumogene, Las Vegas: Clarke, 4, 6.
 Plumbojarosite, Cooks Peak: Clarke, 4, 6.
 Turquoise, Los Cerrillos: Clarke, 3, 4.
 Zinc ores, Tres Hermanas : Lindgren, 5.
 Arsenides:
 Nickel and cobalt: Clarke, 4; Hillebrand, 1; Waller, 1.
 Arsenopyrite:
 Tres Hermanas Mountains: Smythe, 1.
 Augite:
 Analysis:
 Mount Taylor region: Clarke, 4, 6.
 Aurichalcite:
 Magdalena Mountains : Keyes, 11, 70.
 Autunite:
 Grant County : Leach, F. I., 1.
 Socorro County: Keyes, 70.
 Azurite:
 Socorro County: Paul, 1.
 Barite:
 Bremen mine, Grant County : Furman, 1.
 Bauxite:
 Gila River : Blake, 5.
 Bentonite:
 Rio Arriba County: Ross, 1.
 Bornite:
 Microscopic nature of : Baumhauer, 1.
 Burro Mountains: Paige, 3, 7; Somers, 1.
 Caballo Mountains : Clifford, 1.
 Mineralogy (Continued).
 Crystals, Organ Mountains: Ford, 1.
 Grant County: Blake, 6.
 Calcite:
 Hillsboro: Schaller, 1.
 Caledonite:
 Las Cruces: Farrington, 1.
 Cave pearls:
 Carlsbad Caverns: Hess, 4.
 Chalmersite, at Fierro : Schwartz, 1.
 Chrysolite:
 Fort Wingate:
 Analysis: Clarke, 4, 6.
 Cobalt:
 Grant County: Clarke, 4; Hillebrand, 1; Waller, 1. Contact-metamorphic: Lindgren, 6. Copper : At Chloride: Baumhauer, 1.
 Crystallization, Grant County: Snow, 2.
 Red-beds type: Rogers, 1.
 Descloizite:
 Commercial mine, Georgetown, Grant County: Hillebrand, 2.
 Analysis of : Clarke, 4, 6.
 Dona Ana County: Genth, 3.
 Endlichite: Bowman, 1.
 Feldspar :
 Analysis:
 Mount Taylor region : Clarke, 6.
 Ferberite: Hess, 2.
 Fluorspar : Johnston, 1.
 Galena:
 Analyses:
 Organ Mountains: Antisell, 1.
 crystals from Sierra County: Chisholm, 1.
 General: Bailey, 1; Frazer, 1; Jones, F. A., 1, 9; Lindgren, 6; Loew, 2; Raymond, 1; • Schrader, 3; Simpson, J. H., 1; Stone, G. H., 3; Warren, 1 • Williams, A., 1.
 Grant County: Hillebrand, 1.
 Graphite:
 Colfax County: Lakes, 4; Lee, 18.
 Gypsum :
 Nacimiento Mountains, analysis: Clarke, 6.
 Halotrichite:
 Grant County, analysis: Clarke, 4, 6.
 Hematite: Foshag, 1.
 Hubnerite: Hess, 2.
 Iron:
 Fairview deposit: Smythe, 2.
 Hanover district: Paige, 1.
 Sesquisulphate of : Pearce, 1.
 Jarosite: Hillebrand, 3.

Calamine:

Mineralogy (Continued).

- Lepidolite:
 Embudo: Ross, 1.
 List of occurrences: Jones, 1, 5, 9 ;
 Lindgren, 6; Schrader, 3; Smock,
 1; Williams, A., 1.
 Magdalena district: Argall, 1.
 Manganese: Wells, E. H., 1.
 Meerschau: Bush, 5; Michel, 1;
 Paige, 7; Sterrett, 1, 2.
 Analysis, Grant County : Clarke, 6.
 Melanotekite:
 Hillsboro: Warren, 2.
 Meteorite: Cohen, f, 2 ; Genth, 1.
 Albuquerque: Eakins, 1.
 Analysis : Clarke, 6.
 Bonanza: Shepard, 1.
 Cañoncito, Santa Fe County: Kunz,
 1.
 Castilla, Taos County: Hills, 2.
 El Capitan Mountains: Howell, 2.
 Analysis of : Clarke, 6.
 Four corners, San Juan County :
 Merrill, 3.
 Glorieta Mountains, Santa Fe
 County : Cohen, 1, 2; Hills, 4;
 Kunz, 2, 3, 4.
 Kingston siderite: Hovey, 1.
 Luis Lopez, Socorro County : Pres-
 ton, 1.
 Oscura Mountains: Hills, 3.
 Sacramento Mountains, Eddy Coun-
 ty : Foote, 1.
 Sandia Mountains : Nininger, 1.
 Mimetite, refractive index of : Bow-
 man, 1.
 Montmorillonite:
 Rio Arriba County: Ross, 1.
 Muscovite:
 Purple, Taos County : Schaller, 2.
 Natural coke:
 Purgatory Canyon: Riggs, 1.
 Nickel:
 Nickel-skutterudite, Grant County:
 Waller, 1.
 See also, Cobalt, page 113, and
 Arsenides, page 113.
 Onyx: Merrill, 2.
 Picrallumogene:
 Las Vegas: Analysis: Clarke, 4, 6.
 Plumbojarosite:
 Cooks Peak:
 Description : Hillebrand, 3.
 Analysis : Clarke, 4, 6.
 Potash:
 Southeastern: Mansfield, 3; Schal-
 ler, 3.
 Pseudomorphs:
 Copper after azurite, Grant Coun-
 ty: Yeates, 1.

Mineralogy (Continued).

- Pyromorphite, refractive index of :
 Bowman, 1.
 Quartz crystals, southeastern: Tarr,
 W. A., 1, 2.
 Samarskite:
 Analysis : Hess, 5.
 Rio Arriba County : Hess, 5.
 Scheelite: Hess, 2.
 Selenite:
 Fort Stanton: Hills, 1.
 Silver City: Packard, 1.
 Smithsonite:
 Grant County : Blake, 6.
 Socorro County: Lindgren, 6.
 Sphalerite:
 Grant County: Blake, 6.
 Tetradymite:
 Hachita: Short, 1.
 Torbernite:
 Grant County : Leach, F. I., 1.
 Tres Hermanas : Wade, 2.
 Turquoise: Blake, 2; Jones, F. A., 8;
 Penfield, 3.
 Burro Mountains, Grant County :
 Dinsmore, 3; Hidden, 1; Paige,
 5; Snow, 1; Zalinski, 1, 2.
 Los Cerrillos: Clarke, 1, 3, 4 ; Cow-
 an, 1; Johnson, D. W., 4.
 Ultramarine:
 Grant County: Merrill, 1; Pack-
 ard, 1.
 Uranium : Keyes, 70; Leach, F. I., 1.
 Vanadate:
 Lake Valley: Genth, 3.
 and iodyrite, Sierra County : Genth,
 2.
 Vanadinite: Paul, 1; Penfield, 1.
 Lake Valley: Penfield, 1.
 Refractive index of : Bowman, 1.
 Willemite:
 New occurrence (Tres Hermanas)
 Lindgren, 4.
 Socorro County:
 Merritt mine: Penfield, 2.
 Tres Hermanas Mountains, analy-
 sis : Clarke, 6.
 Wulfenite:
 Jarilla Mountains : Ingersoll, 1.
 Wolf ramite : Hess, 2.
 Zinc:
 Grant County : Blake, 6.
- Paleontology.
 Abo sandstone, ammonoids of : B6se,
 1.
 Alamosaurus:
 Ojo Alamo formation: Gilmore, 4.

Paleontology (Continued).

- Algae:
 Guadalupe Mountains : Ruedemann, 1.
- Ammonoids :
 Abo sandstone : Bose, 1.
- Amphibia: Case, 1.
Broiliellus Williston: Williston, 7.
Chenoprosopus Mehl: Williston, 1.
Eryops Cope: Williston, 7.
 Permian : Case, 1 ; Douthitt, 1.
Platyhystrix Williston : Williston, 7.
- Animas formation:
 Flora : Knowlton, 8.
- Antelope deer :
 Santa Fe marls : Cope, 10.
- Araucarioxylon : Knowlton, 1.
- Arriba Saurus :
 El Cobre Canyon: Williston, 5.
- Ashmunella :
 San Miguel County : Cockerell, 1.
- Ayes : Cope, 13.
Diatryma : Cope, 18.
 Turkey:
 Puye Indian ruins : Shufeldt, 1.
- Batrachia :
 Catalogue : Cope, 8.
- Belodon: Cope, 27.
- Bird:
 Loup Fork marls : Cope, 13.
 Bishop's Cap : Bryan, W. A., 1.
- Bliss sandstone : Richardson, 1.
- Boundary region : Hall, 2.
- Brachiopoda :
 Bibliography and synonymy : Schuchert, 1.
- Bryozoa : Prout, H. A., 1
- Burlington limestone : Springer, F., 1.
- Camarasaurus* Cope: Mook, 1.
- Capitan limestone : Richardson, 1.
- Carboniferous : Hall, 1 ; Keyes, 13 ; Newberry, 3, 5 ; White, 3.
 Burlington limestone: Springer, F., 1.
- Coal measures : Herrick, C. L., 8.
 Guadalupe Mountains : Shumard, B. F., 2, 3, 5.
- Invertebrata: White, 3.
- Lake Valley district :
 Mississippian: Miller, 1.
- Limnoscelis* : Williston, 3.
- Manzano group : Girty, 3.
- Permian : Herrick, C. L., 11.
 Reptiles : Williston, 2.
- Permo-Carboniferous, vertebrates :
 Case, 6.
- Sphenacoden : Williston, 8.

Paleontology (Continued).

- Carnivora :
 Eocene : Cope, 17.
- Castile gypsum: Richardson, 1 ; Udden, 1.
- Catalogue :
 Batrachia and Reptilia of North America: Cope, 8.
- Cephalopoda:
 Abo sandstone :
 Ammonoids : Böse, 1.
 Mancos shale : Reeside, 3.
 Mesaverde sandstone: Reeside, 3.
 Cerrillos Hills : Johnson, D. W., 4.
- Champsosaurus : Cope, 24.
- Chara :
 Las Vegas : Knowlton, 2.
- Chirox :
 Puerco beds : Cope, 58.
- Chupadera formation: Darton, 25.
 Coal-measure forest: Herrick, C. L., 8, 14.
- Coelophysis :
 Triassic: Cope, 61.
- Colorado shale : Darton, 12 ; Stanton, 1.
- Conchochelys :
 Puerco beds : Hay, 2.
- Coryphodon radians*: Osborn, 2.
- Cretaceous : Brown, 1 ; Conrad, 1 ; Cope, 2 ; Hill, R. T., 13 ; Lee, 16 ; Matthew, 7 ; Meek, 2.
- Albuquerque region: Herrick, C. L., 10.
 Boundary region: Conrad, 1 ; Hall, 2.
- Cerrillos Hills : Johnson, D. W., 4.
- Comanche : Hill, R. T., 11 ; Twenhofel, 1.
- Dakota: Twenhofel, 1.
- Distribution of invertebrate: Lee, 16.
- Exogyra Texana* Roemer : Twenhofel, 1.
- Mount Taylor region: Shimer, 1.
- Ojo Alamo beds : Brown, 1 ; Hay, 4.
- Ostrea quadruplicata* Shumard: Twenhofel, 1.
- Pismo: Twenhofel, 1 ; White, 4.
- San Juan County: Gilmore, 1 ; Knowlton, 5, 8 ; Reeside ; Stanton, 5.
- Trigona emoryi* Conrad: Twenhofel, 1.
- Tucumcari: Hill, R. T., 10.
- Vermejo flora: Knowlton, 6.
- Vertebrata: Cope, 5.
- Washita formation: Twenhofel, 1.
- Crinoids : Springer, F., 2.

Paleontology (Continued).

- Dakota formation : Gress, 1; White, 18.
 Delaware Mountain formation: Richardson, 1; Darton, 24.
 Devonian:
 Lime Creek fauna: Keyes, 30.
 Percha shale: Kindle, 1.
 Diadectes lentus :
 Rio Arriba County: Case, 2.
 Dinosauria Mook, 4.
 San Juan County : Reeside, 1.
 Triassic: Cope, 61.
 Eddy County:
 Recent shells : Sterki, 1.
 El Paso limestone : Richardson, 1.
 Eocene: Cope, 3.
 Bird : Cope, 18.
 Faunas : Cope,
 Mammalia : Cope, 22, 29 ; Wortman, 3.
 Vertebrata : Cope, 6, 20, 30.
 Zalambdodont insectivore: Matthew, 3.
 Eryopsoides :
 Permian: Douthitt, 1.
 Fauna :
 Laramie : Newberry, 8.
 Puerco : Cope, 40; Matthew, 1.
 San Juan Basin, faunal zones : Reeside, 2.
 Triassic: Huene, 3.
 Tucumcari: Hyatt, 1.
 Flora : Lesquereux, 1; Newberry, 2, 6.
 Abiquiu copper mines : Fontaine, 1; Ward, 1.
 Animas formation: Knowlton, 8.
 Carboniferous, Socorro County: Herrick, C. L., 14.
 Cerrillos : Lesquereux, 4.
 Chara, Las Vegas : Knowlton, 2.
 Coal flora: Lesquereux, 1, 2, 6.
 Cretaceous, Raton Mountains: Knowlton, 7; Lesquereux, 3, 7.
 Dakota formation: Gress, 1; Lesquereux, 7.
 Fisher's Peak: Newberry, 6.
 Fruitland formation : Knowlton, 5.
 Kirtland formation: Knowlton, 5.
 Laramie group: Newberry, 8.
 Fisher's Peak: Newberry, 6.
 Vermejo Canyon : Newberry, 6.
 Placer Mountains: Ward, 1.
 Raton region: Emory, 1; Knowlton, 3, 6; Lesquereux, 4, 5; Ward,
 Rio Grande: LeConte, 1.
 San Juan County: Knowlton, 5.
 Tertiary : Lesquereux, 4, 6 ; Newberry, 6.

Flora (Continued).

- Triassic: Fontaine, 1.
 Trinidad: Knowlton, 3.
 Tucumcari beds :
 Cretaceous : Cummins, 1.
 Vermejo : Knowlton, 6.
 Vermejo Canyon, Laramie: Newberry, 6.
 Folsom : Brown, B., 3; Science Service, 1.
 Fossil wood: Knowlton, 1.
 Abiquiu copper mines : Fontaine, 1.
 Fruitland formation, flora of: Knowlton, 5.
 Vertebrate fauna: Gilmore, 1.
 Fusselman limestone :
 Silurian : Darton, 29.
 Gastropoda : Cockerell, 1, 2; Springer, A., 1.
 Ashmunella : Cockerell, 1.
 Physa : Springer, A., 1.
 Tertiary: Cockerell, 4.
 General: Bailey, 1; Cope, 12 ; Darton, 29; Hall, 1; Knowlton, 4; Meek, 1 ; Newberry, 3.
 Guadalupe group : Darton, 24.
 Guadalupian fauna : Girty, 2.
 Gryphaea pitcheri : Hill, R. T., 13; Marcou, 9.
 Guadalupe Mountains : Darton, 24; Ruedemann, 1; Shumard, B. F., 2, 3, 5.
 Gym limestone:
 Carboniferous, Luna County : Darton, 12, 15.
 Haploconus :
 Puerco : Cope, 35.
 Hemiganus :
 Puerco beds : Cope, 37, 53.
 Hueco formation :
 Franklin Mountains : Girty, 1; Richardson, 1.
 Invertebrata : Meek, 1; White, 1, 2a, 3.
 Brachiopoda : Schuchert, 1.
 Carboniferous : Newberry, 5; White, 3.
 Cerrillos Hills : Johnson, D. W., 4.
 Coal measures : Herrick, C. L., 8.
 Cretaceous : Meek, 2.
 Dakota formation: White, 18.
 Guadalupe Mountains : Shumard, B. F., 2, 5.
 Jurassic : White, 9.
 Lake Valley district: Cope, 33; White, 5.
 Mississippian : Miller, 1.
 Manzano group : Girty, 3.
 Morrison formation : Mook, 3.
 Permian : Beede, 1.

Paleontology (Continued).

Paleontology (Continued).

Invertebrata (Continued).

Plateau province: White, 2.

San Juan County, Nonmarine Cretaceous: Stanton, 5.

Kirtland formation:

Fauna: Gilmore, 1; Reeside, 2.

Flora of: Knowlton, 5.

Kritosaurus, new dinosaur: Brown, 1.

Laramie: Lee, 16.

Lake Valley limestone:

Carboniferous: Darton, 29.

Lake Valley: Cope, 33; Gordon, 2; Miller, 1; Springer, F., 1; White, 5.

Laramie group:

Molluscan fauna: White, 6.

Lemuroids:

Puerco formation: Cope, 51.

Lepidodendrids:

Clay beds, east of Socorro: Her-
rick, C. L., 14.

Lewis shale:

San Juan Basin: Reeside, 2.

Lime Creek fauna of Iowa, at Lake
Valley: Keyes, 30.

Limnoscelis: Williston, 3.

Lobo formation:

Triassic (?): Darton, 12.

Loup Fork fauna: Cope, 20.

Magdalena formation:

Carboniferous: Darton, 12, 29.

Mammalia:

Bison, Folsom: Hay, 5.

Cenozoic horizons: Osborn, 3.

Cretaceous-Tertiary: Matthew, 4.

Eocene: Cope, 6, 22, 25, 29, 30, 35;
Wortman, 3.

Puerco beds: Cope, 38, 45, 52.

Zalambdodont insectivore: Mat-
thew, 3.

Mastodon: Cope, 9; Leidy, 1.

Santa Fe marls: Cope, 4, 16.

Pantolambda, Puerco beds: Cope,
35.Puerco beds: Cope, 35, 36, 38, 42,
43, 44, 45, 48, 52, 59; Matthew,
1; Osborn, 1.Psittacotherium: Cope, 31, 57;
Wortman, 2.

Ungulates: Earle, 1.

Rhinoceros: Cope, 49.

Ruminant, Pleistocene: Gidley, 1.

San Juan Basin: Granger, 2.

Santa Fe marls: Cope, 4.

Steneofiber: Cope, 9.

Tertiary: Matthew, 4.

Faunal lists: Osborn, 3.

Trusodon: Cope, 40.

Zalambdodont insectivore, Eocene:
Matthew, 3.

Man. Brown, B., 3; Cook, 1; Science

Service, 1.

Mancos shale:

San Juan County: Reeside, 2.

Manzano group:

Rio Grande Valley: Girty, 3.

Marsupials:

Eocene: Cope, 54, 58.

Mastodon: Cone, 9, 16; Leidy, 1.

Mesaverde: Lee, 16; Wieland, 1.

San Juan County: Reeside, 2.

Mexican boundary: Conrad, 1; Hall,
1.

Mississippian:

Lake Valley district: Miller, 1.

Mollusca:

Laramie group: White, 6, 10.

Mount Taylor region: Shinier, 1.

San Juan County, Nonmarine Cre-
taceous: Stanton, 5.

Tertiary: Cockerell, 3, 4; White, 7.

Montoya formation:

Ordovician: Darton, 12, 15, 16, 29;
Richardson, 1.Morrison formation, age of, from
paleobotanic evidence: Berry, 1;

Knowlton, 7.

Invertebrate and vertebrate fauna:

Lull, 1; Mook, 3; Stanton, 4.

Mount Taylor region: Shimer, 1.

Nothodectes:

San Juan Basin: Matthew, 6.

Ojo Alamo:

Fauna: Brown, 1; Gilmore, 1, 3, 4;
Hay, 4; Reeside, 2.

Organ Mountains:

Paleozoic: Jenney, 1.

Paleocene mammals, new genera:

Matthew, 7.

Vertebrates: Granger, 2; Matthew,
4.

Pantolambda:

Puerco: Cope, 35.

Pelecypoda:

Pinna: White, 4.

Pentaceratops: Osborn, 5.Percha shale: Darton, 16, 29; Kin-
dle, 1.

Permian: Cope, 28; Girty, 1, 2; King,

R. E., 1; Shumard, B. F., 2-5;

White, 16; Williston, 1.

Abo sandstone:

Ammonoids of: Bose, 1.

Amphibia: Case, 1.

Eryopsoides: Douthitt, 1.

Eryopsoides: Douthitt, 1.

Invertebrate, Upper Permian:

Beede, 1.

Pisces: Case, 1.

Reptilia: Cope, 21; Williston, 2, 6.

Paleontology (Continued).

Paleontology (Continued).

- Permian (Continued).
 Vertebrates : Williston, 1, 5.
 Permo Carboniferous :
 Amphibia : Case, 6 ; Cope, 28.
 Vertebrates : Case, 6, 9 ; Williston, 4.
 Physa :
 Las Vegas : Springer, A., 1.
 Phytosaur :
 Triassic, Guadalupe County : Mehl, 2.
 Pictured Cliffs sandstone :
 San Juan Basin : Reeside, 2.
 Pinna :
 Cretaceous : White, 4.
 Pisces :
 Paleozoic: Newberry, 7.
 Plagiaulacidae :
 Puerco beds : Cope, 56.
 Plantae : Newberry, 6.
 Plateau Province :
 Invertebrate: White, 2.
 Psittacotherium :
 Puerco beds : Cope, 57 ; Wortman, 2.
 Puerco and Torrejon faunas: Gardner, 9 ; Matthew, 1 ; Reeside, 2.
 Fauna : Cope, 35, 38, 40, 42, 44, 45, 48, 50, 59, 60 ; Hay, 1 ; Osborn, 1.
 Marsupials : Cope, 36, 54.
 San Juan Basin: Reeside, 2.
 Ungulates : Earle, 1.
 Puercosaurus :
 Miller bone-bed : Williston, 5.
 Quaternary, ruminant, Pleistocene: Gidley, 1.
 Raton flora : Knowlton, 6 ; Lesquereux, 3.
 Red beds :
 Eastern : Case, 5 ; Lee, 9.
 Invertebrates of : Beede, 1.
 Reptilia : Cope, 1 ; Marsh, 2 ; Williston, 1, 3.
Animasaurus Case and Williston: Williston, 7.
 Arribasaurus, El Cobre Canyon : Williston, 5, 7.
 Belodon: Cope, 27.
 Catalogue: Cope, 8.
Chasnasaurus Williston : Williston, 7.
 Champsosaurus : Cope, 24.
 Coelophysis :
 Triassic: Cope, 61.
 Conchochelys, Puerco beds : Hay, 2.
 Cretaceous, San Juan County : Gilmore, 2 ; Matthew, 4.
Diadectus Cope: Williston, 7.
Dasparactus Case: Williston, 7.

Reptilia (Continued).

- Edaphosaurus* Cope : Williston, 7.
 Eocene : Cope, 6.
 Kritosaurus, Ojo Alamo beds : Brown, 1.
Lirtnoscelis Williston : Williston, 3, 7.
 Ojo Alamo, Kirtland and Fruitland faunas :
 San Juan Basin : Gilmore, 1.
 Ophiacodon Marsh : Williston, 7.
 Pentaceratops : Osborn, 5.
 Permian : Cope, 21 ; Williston, 2, 6, 8.
 Permo-Carboniferous : Case, 6.
Puercosaurus Williston : Williston, 7.
 San Juan County : Gilmore, 1, 2.
fScaliomus Williston and Case: Williston, 7.
Sphenacodon Marsh : Williston, 7, 8.
 Tertiary : Gilmore, 2 ; Matthew, 4.
 Triassic : Huene, 2 ; Mehl, 1.
 Rhinoceros : Cope, 49.
 Rio Arriba County :
 Arribasaurus :
 El Cobre Canyon : Williston, 5.
Diadectus lentus : Case, 2.
 Ruminant :
 Pleistocene: Gidley, 1.
 Rustler formation : Richardson, 1.
 San Juan Basin :
 Invertebrates, Cretaceous : Stanton, 5.
 Mammalia : Granger, 2 ; Reeside, 2.
 San Juan County :
 Flora : Knowlton, 5, 8.
 Nonmarine Cretaceous Invertebrata : Stanton, 5.
 Vertebrata : Gilmore, 1.
 Santa Fe marls : Cope, 4, 7.
 Antelope deer : Cope, 10.
 Sarten sandstone :
 Cretaceous : Darton, 12, 15.
 Sauropod dinosaur, habitat of : Mook, 4.
 San Juan Basin : Gilmore, 3, 4.
 Silver City quadrangle : Paige, 7.
 Sloth : Lull, 2.
 Snails :
 Pleistocene: Cockerell, 2.
 Sphenacodon : Williston, 8.
 Staked Plains :
 Vertebrata : Cope, 62, 63.
 Steneofiber : Cope, 9.
 Tertiary : Cope, 46.
 Eocene Vertebrata : Cope, 6, 19, 29.

Paleontology (Continued).

Paleontology (Continued).

- Tertiary (Continued).
 Mammalia : Matthew, 4.
 Mexican boundary: Conrad, 1.
 Mollusca: Cockerell, 3, 4; White, 7.
 Plantae: Fontaine, 1; Lesquereux, 4.
 Puerco fauna: Cope, 30a, 40; Gardner, 9; Matthew, 1.
 Puerco beds: Hay, 2.
 Raton flora: Knowlton, 6.
 Reptilia: Matthew, 4.
 San Juan Basin: Granger, 2; Reeside, 2.
 Torrejon fauna: Gardner, 9.
 Vertebrata: Cope, 8, 20, 46.
 Tillodonta:
 Tooth: Cope, 41.
 Puerco?: Cope, 31.
 Torrejon:
 San Juan Basin: Reeside, 2.
 Triassic: Cazin, 2; Huene, 3; Newberry, 5.
 Copper-bearing rocks: Cazin, 2.
 Dinosauria: Cope, 61.
 Phytosaur : Mehl, 2.
 Reptilia: Cope, 62; Huene, 2 ; Mehl, 1.
 Trisodon:
 Eocene: Cope, 23, 40.
 Tucumcari: Cummins, 1, 3; Hill, R. T., 10, 11; Hyatt, 1; Marcou, 4, 13.
 Turtles, new species: Hay, 4.
 North America: Hay, 3.
 Ungulates: Cope, 11.
 Structure and affinity of : Earle, 1.
 Vermejo, and Raton floras : Knowlton, 6.
 Vertebrata: Case, 6, 7, 8, 9; Cope, 3, 7, 20, 62; Marsh, 1.
 Bibliography: Hay, 1.
 Cretaceous: Brown, 1; Cope, 5; Gilmore, 1.
 Eocene: Cope, 6, 30, 30a.
 Fruitland formation: Gilmore, 1.
 Kirtland formation: Gilmore, 1.
 Mesozoic: Cope, 20.
 Morrison formation: Mook, 3.
 North America: Hay, 1.
 Ojo Alamo beds : Brown, 1, 2; Gilmore, 1; Hay, 4.
 Permian: Williston, 1, 5.
 Puerco fauna: Cope, 60; Gardner, 9.
 San Juan County: Gilmore, 1.
 Santa Fe marls: Cope, 7.
 Staked Plains : Cope, 63.
 Tertiary: Cope, 46. Paleontology (Continued).

- Torrejon fauna: Gardner, 9.
 Wasatch fauna: Matthew, 5; Reeside, 2; Wortman, 1. Mammalia: Cope, 7, 17.
 White sands: Herrick, C. L., 11.
 Wood: Knowlton, 1.
 Zalambdodont insectivore, Eocene: Matthew, 3.

Petrology.

- Albuquerque district, igneous rocks:
 Bryan, 1; Herrick, C. L., 3, 10; Lindgren, 6.
 Analyses: Clarke, 3, 4, 6; Lindgren, 6.
 Adobe soil: Clarke, 3, 6.
 Andesite:
 Mount Taylor region: Clarke, 3, 6.
 Colfax County: Clarke, 6.
 Hillsboro: Clarke, 6.
 Basalt:
 Rio Grande Canyon: Clarke, 6.
 Mount Taylor region: Clarke, 6.
 Colfax County: Clarke, 6.
 Grant County: Clarke, 3.
 Caballo Mountains:
 Limestone and shale: Lee, 5.
 Camptonite, Las Vegas: Ogilvie, 1.
 Capitan limestone, El Capitan Peak: Richardson, 1.
 Colfax County: Clarke, 6.
 Cooks Peak:
 Porphyry: Clarke, 6; Dalton, 12.
 Dacite, Mount Taylor region: Clarke, 6.
 Dolomite: Richardson, 1.
 Gabbro porphyry, Los Cerrillos Hills: Clarke, 6.
 Hillsboro, andesite: Clarke, 6.
 Lava, Mount Taylor region: Clarke, 6.
 Limestone:
 Northern end of Caballo Mountains: Lee, 5.
 El Capitan Peak: Richardson, 1.
 Organ Mountains: Antisell, 1.
 Los Cerrillos hills: Clarke, 6.
 Mexican boundary: Easter, 1.
 Mount Capulin, basalt: Clarke, 6.
 Mount Taylor region: Clarke, 6.
 "Natural Coke": Clarke, 3.
 Nepheline basanite, Colfax County: Clarke, 6.
 Obsidian, Tewan Mountains: Clarke, 6.

Vertebrata (Continued).

Petrology (Continued).

- Analyses (Continued).
 Organ Mountains, quartz syenite: Clarke, 6.
 Ortiz Mountains, rocks from: Ogilvie, 3.
 Phonolite, Colfax County : Clarke, 6.
 Plagioclase basalt, Colfax County : Clarke, 6.
 Porphyry, Cooks Peak : Clarke, 6; Darton, 12.
 Pyroxene andesite, Colfax County : Clarke, 6.
 Quartz latite, Mount Taylor region: Clarke, 6.
 Rustler formation: Richardson, 1.
 Shale:
 Hermosa: Clarke, 6.
 Northern end of Caballo Mountains : Lee, 5.
 Syenite porphyry, Cooks Peak: Clarke, 6.
 Tewan Mountains, obsidian: Clarke, 6.
 Trachyte:
 Los Cerrillos : Clarke, 6.
 Peloncillo Hills: Antisell, 1.
 Analcite camptonite: Ogilvie, 1.
 Andesite:
 Luna County : Darton, 12.
 Basalt :
 Luna County : Darton, 12.
 Rio Grande Canyon:
 Analysis: Clarke, 6.
 Description: Idding, 1, 2.
 Brilliant quadrangle: Mertie, 2.
 Burro Mountains : Paige, 3; Somers, 1.
 Camptonite:
 Las Vegas : Ogilvie, 1.
 Carlsbad Cavern:
 Cave pearls : Hess, 4.
 Cerrillos Hills: Johnson, D. W., 4.
 Cooks Peak:
 Porphyries: Clarke, 6; Darton, 12.
 Crystalline rocks of the plains: Gould, 1.
 Deming quadrangle: Darton, 15.
 Eocene formations:
 Puerco: Cope, 5.
 Rocky Mountains: Johannsen, 1.
 General : Lindgren, 6; Loew, 1, 2.
 Granite:
 Luna County : Darton, 12.
 Hanover district, igneous rocks: Paige, 1.
 Keratophyre:
 Luna County: Darton, 12.
 Koehler quadrangle: Mertie, 2.
Petrology (Continued).

Latite:

- Luna County : Darton, 12.
 Luna County : Darton, 12.
 Magdalena district : Argall, 1; Lindgren, 6.
 Mexican boundary: Lord, 1.
 Mogollon district: Ferguson, 1, 2; Scott, 1.
 Mount Taylor region, igneous rocks: Johnson, D. W., 7.
 Navajo country: Gregory, 2.
 Northeastern, igneous rocks : Garrett, 1; Lee, 17; St. John, 1.
 Northern: Conkling, 2.
 Northwestern, igneous rocks : Dutton, 2.
 Ortiz Mountains : Ogilvie, 3.
 Pecos Valley : Semmes, 1. Pre-Cambrian rocks: Lindgren, 6.
 Puertecito district : Wells, E. H., 2.
 Pyroxenic Rock :
 Gila River : Merrill, 1.
 Raton region: Mertie, 1, 2.
 Rhyolite:
 Luna County : Darton, 12.
 Rio Grande Valley, igneous rocks: Lee, 5.
 Sandia Mountains : Ellis, 2.
 San Pedro: Berryman, 1.
 Santa Rita region, igneous rocks: Paige, 6.
 Sierra Blanca coal field: Wegemann, 1.
 Silver City quadrangle, igneous rocks; Paige, 7.
 Taos Range: Gruner, 1.
 Taylor Creek district: Hill, J. M., 2.
 Tewan Mountains : Iddings, 2.
 Tyrone district : Paige, 9.

Physical geology.

- Alamogordo desert: McBride, 1.
 Albuquerque region: Bryan, 1; Herrick, C. L., 6, 10.
 Arid erosion, measure of : Keyes, 46, 56.
 Pedestal rocks : Bryan, 2.
 Arid monadnocks: Keyes, 39.
 Arid regions, geologic processes: Keyes, 41, 47.
 Baldy Mountains: Chase, 1; Lee, 22.
 Bernalillo County :
 Albuquerque region: Bryan, 1; Gilbert, 2.
 Boulders, in gravel deposits: Rich, J. L., 3.
 Buttress structure:
 Ship Rock: Branson, 1.

Physical geology (Continued).

- Caballo Mountains: Allen, 1; Clifford, 1; Larsh, 1.
- Carlsbad Cavern: Baker, C. L., 3; Hess, 4; Lee, 32 to 36.
- Catron County :
 - Zuni salt lake: Darton, 2.
- Cimarron:
 - Landslide: Cross, 1.
- Central: Darton, 22.
- Chama Basin: Darton, 22.
- Channel erosion:
 - Rio Puerco, Socorro County: Bryan, 12.
 - Rio Salado, Socorro County: Bryan, 4, 9.
- Chaves County: Merritt, 1.
- Coal fields, structural features : Kirk, 2.
- Colorado Plateau:
 - Unconformity: Dake, 1.
 - Structural features : Moore, 1.
 - Concretions, physical origin, Chaco River : Gardner, 1.
- Dikes:
 - Pecos Valley: Semmes, 1.
- Earthquakes:
 - Socorro : Bagg, 2.
 - Central: Reid, H. F., 1.
- Erosion:
 - Arid, measure of : Keyes, 56.
 - Carlsbad Caverns: Lee, 34.
 - of channel, Rio Salado: Bryan, 9.
 - Eolic, certain features: Keyes, 44, 51.
 - Mesa de Maya: Keyes, 42.
 - Processes, efficiency under arid conditions: Keyes, 47.
 - Rio Puerco, changes in channel:
 - Bryan, 12.
 - and sedimentation, Zuni watershed: Bryan, 10, 15; Robinson, H. F., 2.
 - by solution and fill, Pecos Valley: Lee, 34.
 - Socorro arroyo: Keyes, 51.
 - Staked Plains: Tarr, 3.
 - Estancia plains: Keyes, 38; Meinzer, 2.
- Faulting:
 - Coal fields: Kirk, 1.
 - Estancia plains: Keyes, 38.
 - Hanover district: Paige, 1.
 - Luna County : Darton, 6.
 - Mogollon district: Ferguson, 2; Scott, 1.
 - Sandía Mountains: Ellis, 2.
 - Silver City quadrangle: Paige, 7.
 - Southwestern: Darton, 8.
- Gallup Basin: Kirk, 1; Sears, 1.
 - General: Brewer, 1; Darton, 29; Gordon, 4; Jewett, 1; Keyes, 52,

Physical geology (Continued).

- General (Continued).
 - 54, 58, 61, 62; Knowlton, 4; Lindgren, 6.
- Gila region: Blake, 5.
- Granite, in wells : Gould, 1.
- Grant County:
 - Burro Mountains: Paige, 3.
 - Pinos Altos: Paige, 2.
 - Silver City quadrangle: Paige, 7.
- Guadalupe Mountains : Tarr, 3.
- Ice cave near Gallup: Lee, 37.
- Intrusions:
 - Pecos Valley: Semmes, 1.
- Jornada del Muerto: Hill, R. T., 6.
 - Structure of : Keyes, 22.
- Kelly district: Brinsmade, 2; Lindgren, 6.
- Laccolithic structures : Keyes, 43, 63.
- Lake Valley: Clark, E., 1.
- Landslide:
 - Chaco Canyon: Dodge, 1.
 - Cimarron: Cross, 1.
- Lava flow, recent: Tarr, 2; Lee, 28.
- Lost rivers : Harrington, 1.
- Luna County: Darton, 12.
- McKinley County: Gilbert, 2.
- Manzano group : Lee, 26.
- Mesa de Maya: Hill, R. T., 6; Keyes, 42.
- Mesilla Basin: Hill, R. T., 6.
- Mexican boundary : Hall, 2.
- Mountain structures: Darton, 21; Herrick, C. L., 17.
- Mount Taylor : Cope, 32 ; Dutton, 1, 2 ; Johnson, D. W., 6.
- Mud and lava deposits: Cope, 32.
- Northeastern: Darton, 22; Garrett, 1; St. John, 1; Stevenson, 1.
- Raton-Las Vegas plateau: Hill, R. T., 6.
- Northern: Darton, tO; Marcou, 3; Newberry, 4.
- Northwestern: Darton, 3, 4, 22; Gilbert, 2; Gregory, 1, 2; Powell, J. W., 1.
- Pecos Valley: Lee, 34; Means, 1; Semmes, 1.
- Pedestal rocks : Bryan, 2, 3, 8.
 - Permian basin temperature gradients: Lang, W. B., 1.
- Plateau region: Reagan, 1; Robinson, 1.
- Plication of coal measures, NE N. Mex.: Van Diest, 2.
- Puertecito: Wells, E. H., 2.
- Raton coal field, metamorphosed coal: Lee, 12.
- Rio Grande region: Henderson, J., 1.

Physical geology (Continued).

- Rocky Mountains, building of : Lee, 30.
- Saline basins:
Central: Gibbs, 1; Johnson, D. W., 3.
- San Juan Basin: Bauer, 1; Darton, 22; Knowlton, 5; Reeside, 2.
- San Pedro district: McCaffery, 1.
- Santa Fe: Blake, 4.
- Sierra del Oro:
Northern: Keyes, 60.
- Sink holes:
Pecos Valley: Lee, 34.
- Socorro: Herrick, C. L., 9, 14.
- Staked Plains: Cummins, 1; Hill, R. T., 6; Marcou, 4.
- Stream trenching:
Silver City quadrangle: Rich, J. L., 2.
- Structure:
Coal fields: Kirk, 2.
Colorado Plateau: Moore, 1.
Features: Knox, 1.
of mountains: Darton, 21; Herrick, C. L., 11.
Jornada del Muerto: Keyes, 22.
Northeastern: Garrett, 1.
- Tucumcari: Cummins, 3; Hill, R. T., 3, 10, 11; Marcou, 4, 11, 12.
- Tyrone district: Paige, 9.1
- Unconformities:
Cretaceous, base of : Keyes, 8.
Estancia plains: Keyes, 38.
Colorado Plateau: Dake, 1.
Raton field: Lee, 10, 13.
- Valencia County: Gilbert, 2; Herrick, C. L., 9.
- Vein, recent at Ojo Caliente: Lindgren, 4.
- Volcanic cones and plugs: Darton, 3; Marcou, 14.
Albuquerque volcanoes: Herrick, C. L., 3.
Bernalillo volcano: Herrick, C. L., 3.
Eastern: Hill, R. T., 6.
Isleta volcano: Herrick, C. L., 3.
Mount Taylor region: Dutton, 2; Johnson, D. W., 6, 7; Shimer, 1.
San Juan County: Branson, 1.
- Volcanoes: Dutton, 3.
Capulin Mountain: Hill, R. T., 12; St. John, 1.
Explosion craters: Darton, 13.
Extinct: Blake, 1; Dutton, 1, 3; Hill, R. T., 12; Lee, 17, 28; Marcou, 14.
- Northeastern: Hill, R. T., 6; Lee, 17; St. John, 1.
Northern: Stevenson, 7. Physical geology (Continued).

Volcanoes (Continued).

- Northwestern: Dutton, 2.
Raton Mesa region: Mertie, 1.
- Weathering:
Chaco Canyon: Bryan, 13.
Windwork: Blackwelder, 1; Keyes, 41, 49.
Arid monadnocks: Keyes, 39.
Base level of eolian erosion: Keyes, 44.
on intermont plains of the arid region: Keyes, 37.
Movement of soil: Stuntz, 1.
Navajo country: Gregory, 1.
Plateau plains: Keyes, 50.
Terracing bajada belts: Keyes, 59.
Zuni uplift: Dake, 1; Darton, 22, 29; Dutton, 2.
- Zuñi watershed, erosion and sedimentation: Bryan, 10.

Physiographic geology.

- Afton craters: Darton, 13; Lee, 7.
- Aggraded terraces:
Rio Grande: Keyes, 33.
Albuquerque region: Bryan, 1.
Tijeras Canyon: Reagan, 4.
- Ancestral Rocky Mountains: Melton, 1.
- Arid region, formations of : Keyes, 41.
- Base-level of eolian erosion: Keyes, 44.
- Block mountains: Johnson, D. W., 5; Keyes, 6.
- Bolson plains: Fairbanks, 1; Hill, R. T., 14; Keyes, 1, 7, 12, 37; Lindgren, 6; Tight, 1.
Luna County: Darton, 12.
- Canyons, northeastern: Lee, 2.
- Caverns in Guadalupe Mountains:
Baker, C. L., 3.
- Chaco Canyon: Bryan, 7, 13.
- Channel trenching: Stevenson, 7.
- Arid Southwest: Bryan, 4.
Rio Salado: Bryan, 8.
- Clinoplains:
Rio Grande: Herrick, C. L., 15.
- Conoplains:
Ortiz Mountains: Ogilvie, 2.
Deming quadrangle: Becker, 1; Darton, 15.
- Drainage systems : Tarr, 1.
- Eastern: Baker, C. L., 2; Hill, R. T., 6.
- Ephemeral lakes: Keyes, 2.
- Estancia plains: Keyes, 38, 40, 44; Meinzer, 2.

Physiographic geology (Continued).

- Explosion craters :
 - Southern : Darton, 13.
- Gallina quadrangle: Case, 3.
- General : Brewer, 1 ; Darton, 29 ; Dutton, 1 ; Fairbanks, 1 ; Gannett, 2, 3 ; Gilbert, 1 ; Hill, R. T., 5, 14; Howell, 1 ; Huntington, 1; Jewett, 1 ; Keyes, 29, 52.
- Glaciation : Stone, G. H., 4.
 - Las Animas glacier : Stone, G. H., 1.
- Gravel plains : Rich, J. L., 1, 3.
- High Plains : Johnson, W. D., 1.
- Intermont plains : Keyes, 37.
- Jornada del Muerto :
 - Lake Otero : Herrick, C. L., 16.
 - Structure : Keyes, 22.
- Lake basins :
 - Estancia Valley : Meinzer, 2.
 - of Mexican tableland : Keyes, 40.
 - Sandoval County : Keyes, 2.
 - Santa Fe County : Keyes, 2.
 - Zuni salt lake: Darton, 2.
- Las Animas glacier : Stone, G. H., 1.
- Luna County : Darton, 12.
 - Florida Mountains : Becker, 1.
- Magdalena Range: Gordon, 5.
- Mesa de Maya, physiographic significance: Keyes, 34; Lee, 2.
- Mountain blocks, bisection : Keyes, 21.
- Mountain structure : Herrick, C. L., 11.
- Mount Taylor : Blodgett, 1 ; Dutton, 2 ; Johnson, D. W., 7.
- Navajo country : Gregory, 1, 2; Nowels, 1.
- Northeastern : Lee, 17 ; St. John, 1.
- Northern : Stevenson, 5, 7.
 - Channel trenching : Bryan, 4.
 - San Luis Valley : Atwood, 1.
- Origin of depressions in Sandia Mountains : Reagan, 4.
- Ortiz Mountains : Ogilvie, 2.
- Otero salt basin : Herrick, C. L., 16.
- Pecos Valley : Lee, 4.
- Pedestal rocks : Bryan, 8.
 - Jemez : Bryan, 3.
 - McKinley County : Bryan, 3, 8.
 - Sandia Mountains : Bryan, 2.
 - Sandoval County : Bryan, 3, 8.
- Peneplain: Robinson, 1.
- Physiographic features : Johnson, D. W., 6 ; Keyes, 29.
- Provinces, meeting point of diverse : Keyes, 76.
- Raton Mesa : Lee, 28.
- Re-eroded channel way : Stevenson, 7.
- Rocky Mountains : Lee, 24.

Physiographic geology (Continued).

- Sandia Mountains :
 - Pedestal rocks : Bryan, 2.
 - San Luis Valley, physiographic history : Atwood, 1.
 - Santa Fe peneplain: Campbell, 1.
 - Silver City quadrangle: Paige, 4, 7 ; Rich, J. L., 2.
 - Southern : Fairbanks, 1.
 - Channel trenching : Bryan, 4.
 - Southwestern: Schwennesen, 1.
 - Stream trenching : Bryan, 4, 9; Rich, J. L., 2.
 - Structure :
 - Block Mountain : Johnson, D. W., 5 ; Keyes, 6.
 - Jornada del Muerto: Keyes, 22.
 - of mountains : Herrick, C. L., 17.
 - Tertiary peneplain : Robinson, 1.
 - Toyalane and Lucero : Keyes, 50.
 - Tularosa Basin : Meinzer, 3.
 - Lost rivers : Harrington, 1.
 - Valencia County : Johnson, D. W., 2.
 - Volcanic craters : Darton, 13; Keyes, 31 ; Lee, 7.
 - Volcanoes :
 - Extinct : Hill, R. T., 12 ; Lee, 17.
 - Tularosa Basin : Meinzer, 3.
 - Zuni Plateau : Dutton, 2.
 - White sands region : Brady, 1 ; Herrick, C. L., 11 ; Meinzer, 3.
 - Zuni dam, erosion and sedimentation : Bryan, 15 ; Robinson, H. F., 1, 2.
 - Zuni Plateau : Dutton, 2.
 - Zuni salt lake: Darton, 2.
- ### Structural geology.
- Basin ranges : Keyes, 15.
 - Black Hills anticline, Chaves County : Renick, 3.
 - Block mountains : Johnson, D. W., 5 ; Keyes, 6.
 - Bluewater anticline, Chaves County : Renick, 3.
 - Bolson plains : Keyes, 1, 7, 22.
 - Caballo Mountains : Keyes, 15, 38, 46.
 - Cerrillos coal field: Stevenson, 12.
 - Chaves County : Merritt, 1 ; Renick, 3.
 - Chupadera Mesa : Keyes, 46.
 - Coal fields : Kirk, 2.
 - Coal, metamorphism :
 - Cerrillos field : Stevenson, 12.
 - Coal measures, plication: Van Diest, 2.
 - Colorado Plateau : Moore, 1.
 - Dam sites :
 - See dam and reservoir sites, page 88.

Structural geology (Continued).

- Deming quadrangle : Darton, 15.
 Dunken dome, Chaves County : Renick, 3.
 Eddy County: Renick, 3.
 Cactus Flat : Nye, 1.
 Elephant Butte region: Lee, 5.
 El Vado damsite, Rio Arriba County : Wells, E. H., 4.
 Estancia plains : Keyes, 37, 38.
 Faults :
 Chaves County: Fielder, 2.
 Coal fields : Kirk, 2.
 Gallup-Zuni Basin: Sears, 1.
 Luna County : Darton, 12.
 See also, Physical geology, Faulting page 121.
 Gallup-Zurii Basin: Sears, 1.
 General : Darton, 18, 21, 22, 23, 26, 29 ; Keyes, 21, 41, 62 ; Lindgren, 6.
 Jornada del Muerto : Keyes, 14, 22, 37 ; Shumard, G. G., 2.
 Laccoliths : Keyes, 43, 63.
 Luna County : Darton, 12.
 Manzano Mountains : Keyes, 38.
 Mesa de Maya : Keyes, 37.
 Mesilla Valley : Antisell, 1.
 Mexican tableland: Keyes, 46.
 Mogollon district : Ferguson, 2.
 Morrison formation: Lee, 21.
 Mountain ranges, laws of formation: Herrick, C. L., 17.
 Northeastern: Garrett, 1.
 Orographic movements : Emmons, S. F., 2.
 Ortiz laccolith : Keyes, 38.
 Paleozoic: Keyes, 61.
 Penasco structures : Renick, 3.
 Permian, Texas and New Mexico : Mansfield, 3; Willis, 1, 2, 3.
 Plateau region :
 Zuni country : Keyes, 50.
 Raton Mesa region: Lee, 29.
 Roswell Basin : Fielder, 2.
 Sandia Mountains : Ellis, 2 ; Keyes, 38, 46.
 "Sandia Structure" : Darton, 26.
 San Juan Basin: Nowels, 1; Van Wiebe, 1.
 Santa Rita (Chino) : Paige, 6.
 Sierra Blanca coal field: Wegemann, 1.
 Sierra del Oro: Keyes, 60, 63.
 Southeastern : Van Wiebe, 1.
 Shiprock oil district: Nowels, 1.
 Tyrone district: Paige, 9.
 Unconformities : Keyes, 25.
 Raton coal fields : Lee, 10, 13, 14.
 Upper Chama basin, Rio Arriba County : Wells, E. H., 4.

Structural geology (Continued).

- Y-0 overthrust, Chaves County: Fielder, 2 ; Renick, 3.
 See also Maps, general, structural, page 112.

Topographic maps.

- Alamo National Forest: See Lincoln National Forest.
 Albuquerque quadrangle: U. S. G. S., 3.
 Alum Mountain quadrangle: U. S. G. S., 5.
 Animas Peak quadrangle : U. S. G. S., 6.
 Antelope Wells quadrangle : U. S. G. S., 7.
 Aztec mine and vicinity: Lee, 22.
 Bernal quadrangle : U. S. G. S., 8.
 Bernalillo County : U. S. G. S., 3, 36, 49.
 Big Hatchet Peak quadrangle: U. S. G. S., 9.
 Brilliant quadrangle : Lee, 29 ; U. S. G. S., 10.
 Camel Mountain : U. S. G. S., 11.
 Canutillo quadrangle : U. S. G. S., 12.
 Canyon de Chelly : U. S. G. S., 13.
 Catron County: Ferguson, 2 ; U. S. G. S., 5, 33, 34, 38, 44, 45.
 Chaco quadrangle : U. S. G. S., 14.
 Chiricahua quadrangle : U. S. G. S., 15.
 Cienega Springs quadrangle: U. S. G. S., 16.
 Colfax County: Lee, 29; U. S. G. S., 10, 27, 43.
 Columbus quadrangle: U. S. G. S., 17.
 Corazon quadrangle : U. S. G. S., 18.
 Dam and reservoir sites :
 Espanola Valley: Newell, 2.
 Lacueva : Newell, 2.
 • San Felipe: Newell, 2.
 Santa Fe Creek: Newell, 2.
 Deming quadrangle: Darton, 15; U. S. G. S., 19.
 Dog Mountains quadrangle : U. S. G. S., 20.
 Dona Ana County: U. S. G. S., 11, 12, 30, 35, 37, 41.
 Espanola Valley dam and reservoir site : Newell, 2.
 Fort Bayard Military Reservation: U. S. G. S., 21.
 Fort Defiance quadrangle : U. S. G. S., 22.
 Fremont district : Lindgren, 6.
 Gallina quadrangle: U. S. G. S., 23.
 Gallina-Raton Spring coal field: Gardner, 2.

Topographic maps (Continued).
 General: Darton, 29; Lindgren, 6; U. S. G. S., 2 to 58; Wheeler, 7.
 Grant County: Paige, 7, 9; U. S. G. S., 5, 21, 24, 33, 34, 50, 51, 54, 55.
 Guadalupe County: U. S. G. S., 8, 18.
 Hachita quadrangle: U. S. G. S., 24.
 Hermanas quadrangle: U. S. G. S., 25.
 Hidalgo County: U. S. G. S., 6, 7, 9, 15, 16, 20, 24, 39, 40, 42, 47, 55, 56.
 Jemez quadrangle: U. S. G. S., 26.
 Kilburn Crater : Darton, 13.
 Koehler quadrangle: Lee, 29; U. S. G. S., 27.
 Lacueva dam and reservoir site: Newell, 2.
 Lamy quadrangle: U. S. G. S., 28.
 Largo quadrangle: U. S. G. S., 29.
 Las Cruces quadrangle: U. S. G. S., 30.
 Las Vegas quadrangle: U. S. G. S., 31.
 Lincoln National Forest : Meinzer, 3; U. S. G. S., 4.
 Luna County : Darton, 7, 12, 15; U. S. G. S., 11, 17, 19, 25, 55.
 McKinley County: U. S. G. S., 22, 36, 58.
 Magdalena district: U. S. G. S., 32.
 Mesilla Valley : Barker, 1; Lee, 5.
 Mogollon district: Ferguson, 2.
 Mogollon quadrangle: U. S. G. S., 33.
 Mora County: U. S. G. S., 31, 49, 57.
 Morenci quadrangle: U. S. G. S., 34.
 Mount Riley: U. S. G. S., 35.
 Mount Taylor quadrangle: Gannett, 3; U. S. G. S., 36.
 Noria quadrangle : U. S. G. S., 37.
 Otero County : Meinzer, 3; U. S. G. S., 4, 41, 53.
 Pelona quadrangle: U. S. G. S., 38.
 Perilla quadrangle: U. S. G. S., 39.
 Playas quadrangle: U. S. G. S., 40.
 Point of Sands quadrangle: U. S. G. S., 41.
 Portales Valley: Baker, C. L., 1.
 Pratt quadrangle: U. S. G. S., 42.
 Raton coal field: Lee, 31.
 Raton quadrangle: Lee, 29; U. S. G. S., 43.
 Reserve quadrangle: U. S. G. S., 44.
 Rio Arriba County: U. S. G. S., 23, 29.
 Rio Grande region: Lee, 5; Newell, 1.
 St. Johns quadrangle: U. S. G. S., 45.

Topographic maps (Continued).
 San Felipe dam and reservoir site: Newell, 2.
 Sandoval County: U. S. G. S., 3, 23, 26, 29, 36, 46, 48.
 San Juan County : U. S. G. S., 13, 14, 29.
 San Miguel County: U. S. G. S., 8, 18, 28, 31, 49, 57.
 San Pedro quadrangle: U. S. G. S., 46.
 San Simon quadrangle: U. S. G. S., 47.
 Santa Clara quadrangle : U. S. G. S., 48.
 Santa Fe County : U. S. G. S., 28, 46, 48, 49.
 Santa Fe Creek, dam and reservoir site: Newell, 2.
 Santa Fe quadrangle: Gannett, 1; Hill, R. T., 14; U. S. G. S., 49.
 Santa Rita area: U. S. G. S., 50.
 Silver City quadrangle: Paige, 7; U. S. G. S., 51.
 Socorro County: U. S. G. S., 32, 52, 53.
 Socorro quadrangle: U. S. G. S., 52.
 Tarrant County: U. S. G. S., 8, 28, 46.
 Tularosa quadrangle: U. S. G. S., 53.
 Tyrone district: Paige, 9; U. S. G. S., 54.
 Valencia County: U. S. G. S., 36, 45, 58.
 Victorio quadrangle: U. S. G. S., 55.
 Walnut Wells quadrangle: U. S. G. S., 56.
 Watrous quadrangle: U. S. G. S., 57.
 Wingate quadrangle: U. S. G. S., 58.
 Zuni crater: Darton, 2, 13.

Underground water.

Alluvium, water in: Slichter, 1, 2.
 Albuquerque district: Lee, 5.
 Animas Basin: Schwennesen, 1.
 Belen district: Lee, 5.
 Hachita Basin: Schwennesen, 1.
 Jornada del Muerto: Keyes, 14; Lee, 5.
 Lower Rio Grande Valley : Slichter, 1.
 Luna County: Darton, 7, 12.
 Mesilla Valley : Lee, 5; Slichter, 2.
 Playas Basin: Schwennesen, 1.
 Roswell artesian area: Fielder, 2; Fisher, 2.
 San Luis Basin: Schwennesen, 1.
 Silver City quadrangle: Darton, 7.
 Tularosa Basin: Meinzer, 3.

Underground water (Continued).

- Analyses : Clarke, 5; Goss, 1; Hare, 1; Peale, 1.
- Albuquerque area: Lee, 5.
 - Animas Basin: Schwennesen, 1.
 - Aztec Spring: Otero, 1; Peale, 1.
 - Belen district: Lee, 5.
 - Curry County, Clovis wells: Baker, C. L., 1.
 - Deming quadrangle: Darton, 15.
 - Estancia Valley: Meinzer, 2.
 - Eddy County, Pecos Valley: Lee, 34.
 - Faywood Springs (Hudson, near Deming) : Otero, 1.
 - Fort Wingate, spring near: Clarke, 5
 - Hachita Basin: Schwennesen, 1.
 - Jemez Hot Springs: Peale, 1.
 - Jornada del Muerto: Lee, 5.
 - La Mesa: Lee, 5.
 - Las Vegas Hot Spring: Otero, 1; Peale, 1.
 - Luna County: Darton, 12.
 - Mesilla district: Lee, 5.
 - Ojo Caliente, near Taos: Clarke, 5; Otero, 1.
 - Ojo Caliente (Josephis, Taos County) : Peale, 1.
 - Otero County: Richardson, 1.
 - Pecos Valley: Lee, 34.
 - Playas Basin: Schwennesen, 1.
 - Roswell artesian area: Fisher, 2.
 - San Luis Basin: Schwennesen, 1.
 - San Simon Valley: Schwennesen, 2.
 - Santa Fe, spring one mile west of : Clarke, 5.
 - San Ysidro Spring: Peale, 1.
 - Southeast : Blanchard, 1.
 - Sulphur Spring, Rio Pajarito, Taos County: Peale, 1.
 - Taos County, Ojo Caliente: Clarke, 5.
 - Tularosa Basin: Meinzer, 3.
 - Vaughn: Meinzer, 2.
 - Animas Basin: Schwennesen, 1.
 - Arid region: Hill, R. T., 7.
 - Artesian water: Hill, R. T., 9.
 - Artesian water: Carpenter, 1.
 - Analysis : Goss, 1.
 - Arid region: Hill, R. T., 9.
 - Eastern: Cummins, 4; Hill, R. T., 8.
 - Guadalupe Mountain region: Tarr, 3.
 - Hidalgo County: Schwennesen, 1.
 - Jornada del Muerto: Lee, 5.
 - Rio Grande Valley: Lee, 5.
 - Navajo country: Gregory, 1.
 - Pecos Valley: Fisher, 2.

Underground water (Continued).

- Artesian water (Continued).
- Roswell Basin: Fielder, 1, 2; Fisher, 2.
 - Sandoval County: Renick, 2.
 - Silver City quadrangle: Paige, 7.
 - Tularosa Basin: Meinzer, 3.
 - Bibliography: Carpenter, 1; Fuller, 2, 3; Meinzer, 4; Van Diest, 1.
 - Cambrian formations, water in: Silver City quadrangle: Paige, 7.
 - Carboniferous formations, water in: Jornada del Muerto: Keyes, 14.
 - Northwestern: Darton, 3.
 - Roswell Basin: Fisher, 2.
 - Tularosa Basin: Meinzer, 3.
 - Carlsbad, irrigation project: Meinzer, 5.
 - Cretaceous formations, water in: Jornada del Muerto: Keyes, 14.
 - Navajo Country: Gregory, 1.
 - Northwestern: Darton, 3.
 - Silver City quadrangle: Paige, 7.
 - Tularosa Basin: Meinzer, 3.
 - Crystalline rocks, artesian water in: Tularosa Basin: Meinzer, 3.
 - De Baca County: Bryan, 6.
 - Debris-filled basins, fluctuations of water table in: Deming quadrangle: Darton, 15.
 - Estancia Valley: Meinzer, 1, 2.
 - Jornada del Muerto: Keyes, 14.
 - Luna County: Darton, 7, 12.
 - Tularosa Basin: Meinzer, 3.
 - Deming quadrangle: Darton, 7, 12.
 - Eastern: Baker, C. L., 1; Hill, R. T., 8; Van Diest, 1.
 - Eddy County: Hope community: Renick, 3.
 - Estancia Valley: Meinzer, 1, 2.
 - Evaporation of ground waters, Estancia Valley: Meinzer, 2.
 - Faults: Relations of artesian waters to: Deming quadrangle: Darton, 7, 12.
 - Silver City quadrangle: Paige, 7.
 - Relations of springs to: Silver City quadrangle: Paige, 7.
 - Folsom Springs: Union County, near Capulin: Otero, 1.
 - General: Hill, R. T., 7.
 - Ground water: Sandoval County: Renick, 1.
 - Gypsum deposits, springs in: Tularosa Basin: Meinzer, 3.
 - Hachita Basin: Schwennesen, 1.
 - Hidalgo County: Schwennesen, 1.
 - High Plains: Johnson, W. D., 1.

Underground water (Continued).

Hot springs: Jones, F. A., 1.
 Analyses: Goss, 1.
 Grant County, Faywood: Birnie, 1.
 Ojo Caliente: Lindgren, 7.
 Jemez Plateau, springs of: Kelly, 1;
 Otero, 1.
 Jornada del Muerto: Keyes, 14.
 Jurassic formations, water in:
 Navajo country: Gregory, 1.
 Luna County: Darton, 7, 12.
 Mimbres Valley: Fielder, 3.
 Mesilla Valley: Barker, 1.
 Movement in cementation belt: Slichter, 1.
 Estancia Valley: Meinzer, 2.
 Luna County: Darton, 7, 12.
 Roswell area: Fisher, 2.
 Rio Grande Valley: Slichter, 2.
 Tularosa Valley: Meinzer, 3.
 Discussion of principles: King, F. H., 1.
 Navajo country: Gregory, 1.
 Northwestern: Darton, 3.
 Pecos Valley: Lee, 4.
 Playas Basin: Schwennesen, 1.
 Quality: Clarke, 5.
 Estancia Valley: Meinzer, 1, 2.
 Hidalgo County: Schwennesen, 1.
 Jornada del Muerto: Keyes, 14.
 Rio Grande Valley: Lee, 5.
 Tularosa Basin: Meinzer, 3.
 Red beds, springs in:
 High Plains: Johnson, W. D., 1.
 Jornada del Muerto: Keyes, 14.
 Rio Grande Valley: Lee, 5; Slichter, 2.
 Rio Penasco Basin: Renick, 3.
 Rio Puerco and San Jose Valley: Renick, 2.
 Rio Salado:
 Saline springs: Clark, J. D., 1.
 Roswell area: Fisher, 2.
 Artesian basin, Chaves and Eddy Counties: Fielder, 1, 2.
 Salt Water:
 Estancia Valley: Meinzer, 2.
 Rio Salado: Clark, J. D., 1.
 Tularosa Basin: Meinzer, 3.
 Sandoval County: Renick, 1.
Underground water (Continued).

Sandoval County (Continued).

Jemez Springs: Otero, 1.
 Saline springs: Clark, J. D., 1.
 San Jose-Rio Puerco Valley: Renick, 2.
 San Jose and Rio Puerco Valley: Renick, 2.
 San Luis Basin: Schwennesen, 1.
 San Simon Valley: Schwennesen, 2.
 Silver City quadrangle: Paige, 7.
 Socorro County: Black, 1; Bryan, 5.
 Springs: Meinzer, 6; Peale, 1.
 Analyses: Goss, 1.
 Luna County: Darton, 7, 12.
 Navajo country: Gregory, 1.
 Rio Grande Valley: Lee, 5.
 Roswell Basin: Fisher, 2.
 Sandoval County: Clark, J. D., 1.
 San Miguel County: Otero, 1.
 Silver City quadrangle: Paige, 7.
 Taos County: Otero, 1.
 Tularosa Basin: Meinzer, 3.
 Union County, Folsom: Otero, 1.
 Staked Plains: Cummins, 1.
 Taos County:
 Ojo Caliente: Otero, 1.
 Tertiary formations, water in:
 High Plains: Johnson, W. D., 1.
 Navajo country: Gregory, 1.
 Triassic formations, water in:
 Navajo country: Gregory, 1.
 Northwestern: Darton, 3.
 Tularosa Basin: Meinzer, 3; Powell, 1.
 Torrance County: Black, 1.
 Union County:
 Folsom Springs, near Capulin: Otero, 1.
 Valley fill, water in:
 Deming quadrangle: Darton, 15.
 Estancia Valley: Meinzer, 1, 2.
 Jornada del Muerto: Keyes, 14.
 Luna County: Darton, 7, 12.
 Rio Grande Valley: Lee, 5.
 Roswell area: Fisher, 2.
 San Simon Valley: Schwennesen, 2.
 Silver City quadrangle: Paige, 7.
 Tularosa Basin: Meinzer, 3.