Bibliography of New Mexico Geology And Mineral Technology Through 1950

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AND JOHN H. SCHILLING

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## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>General Note</td>
<td>1</td>
</tr>
<tr>
<td>Sources of Information</td>
<td>1</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>2</td>
</tr>
<tr>
<td>How Publications May Be Obtained</td>
<td>2</td>
</tr>
<tr>
<td>Serials</td>
<td>3</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>13</td>
</tr>
<tr>
<td>INDEX</td>
<td>150</td>
</tr>
<tr>
<td>Introductory Note</td>
<td>150</td>
</tr>
<tr>
<td>Index</td>
<td>151</td>
</tr>
<tr>
<td>MAPS (by Robert H. Weber)</td>
<td>187</td>
</tr>
<tr>
<td>Introductory Note</td>
<td>187</td>
</tr>
<tr>
<td>Base Maps</td>
<td>187</td>
</tr>
<tr>
<td>Mineral Resources Maps</td>
<td>188</td>
</tr>
<tr>
<td>Topographic Maps</td>
<td>188</td>
</tr>
<tr>
<td>Aerial Photographs and Mosaics</td>
<td>189</td>
</tr>
<tr>
<td>Sources of Maps and Map Information</td>
<td>189</td>
</tr>
<tr>
<td>PUBLICATIONS FOR SALE BY NEW MEXICO</td>
<td>190</td>
</tr>
<tr>
<td>BUREAU OF MINES AND MINERAL RESOURCES</td>
<td>190</td>
</tr>
</tbody>
</table>
Introduction

GENERAL NOTE

In this bibliography are listed bulletins, articles, papers, and reports on the geology and mineral technology of New Mexico that have appeared from the earliest years through 1950. The term "geology" has been interpreted broadly; the list includes articles on such subjects as meteorites and the antiquity of man, which, though not strictly geological topics, are closely related to geology.

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

Part II, Index, is an alphabetical list of subjects arranged under twelve major heads. These heads are subdivided according to the nature of the material indexed. One paper may be indexed under more than one head, but under each head the name of the author and the serial number of his paper follow appropriately. Using these data the reader can find the title and reference of the paper in the Bibliography, Part I. Further details regarding subdivision are given in the section preceding the Index.

Part III, Maps, is a list of maps of New Mexico other than geologic maps, which are included with the index. Explanatory remarks are given at the beginning of this section.

SOURCES OF INFORMATION

The papers listed in this bulletin through the year 1944 in large part have been taken from a previous bibliography entitled "Geologic literature of New Mexico through 1944," by Robert L. Bates and Marian R. Burks, issued in 1945 as Bulletin No. 22 of the State Bureau of Mines and Mineral Resources. Bulletins 746, 747, 823, 937, and 938 of the U. S. Geological Survey were also used as sources for these papers. Entries from 1945 through 1950 have been taken largely from U. S. Geological Survey Bulletins 949, 952, 958, 968, 977, and 985. A number of publications of local interest or dealing with mineral technology which were not covered by the U. S. Geological Survey Bulletins were examined by the compilers. Unpublished theses have also been included and for the most part were taken from the publication of the Petroleum Research Company, Denver, Colorado, entitled "Bibliography of geology theses."
ACKNOWLEDGMENTS

Grateful appreciation is extended to the following persons for their assistance in the compilation of this bibliography. Mr. Kenneth Reim, former student of the New Mexico Institute of Mining and Technology employed by the Bureau, spent considerable time on compilation. Mrs. Anne Dimock, of Antioch College, Ohio, whose husband attended the summer field camp at the New Mexico Institute of Mining and Technology, worked several months on research. Dr. Stuart A. Northrop, chairman of the department of geology, University of New Mexico, submitted omissions in Bulletin No. 22 which have been included in this bibliography. Mr. W. M. Speare, librarian, New Mexico Institute of Mining and Technology, gave his time and assistance to the compilers. Mrs. Constance Schilling helped by checking and typing the index. All members of the Bureau staff were very cooperative, and the suggestions and help from Dr. Eugene Callaghan, director, are greatly appreciated.

HOW PUBLICATIONS MAY BE OBTAINED

Many publications of the various governmental agencies may be obtained from the department or bureau of issue; there is a charge for some reports, but others will be furnished gratis. The stock of many bulletins has been exhausted. Whether or not a given publication of the U. S. Geological Survey is available, and its price, can be determined from a pamphlet entitled "Publications of the Geological Survey," issued in May 1953. This pamphlet may be obtained free of charge from the Superintendent of Documents, Government Printing Office, Washington, D. C.

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

A stock of publications still in print relating to areas in New Mexico is kept at the State Bureau of Mines, in Socorro. Included among these, in addition to the Bureau's own publications, are publications of the U. S. Geological Survey and other organizations, a list of which, with prices, is presented at the end of this bulletin.

There are a number of New Mexico libraries where government and other publications cited in this bibliography may possibly be consulted: Albuquerque, University of New Mexico; Las Vegas, New Mexico Highlands University; Santa Fe, State Library Extension Service; Silver City, New Mexico Western University; Socorro, New Mexico Institute of Mining and Technology; State College, New Mexico College of Agriculture and Mechanic Arts.
The State Bureau of Mines and Mineral Resources will be glad to supply current data regarding the availability of New Mexico geologic literature and to assist in obtaining original, typewritten, or photostat copies.

SERIALS

The following list gives both the abbreviated citation and the full name of the periodicals and serials which have been examined in the compilation of the bibliography. The place of publication is given, if known.


Acad. Sci. St. Louis Trans.—Academy of Science of St. Louis Transactions. St. Louis, Mo.


Am. Assoc. for the Advancement of Science Proc.—American Association for the Advancement of Science Proceedings. Washington, D. C.


Am. Forestry—American Forestry.


Am. Scientist—American Scientist. New Haven, Conn.


Canadian Naturalist. Montreal, Canada.
Civil Eng.—Civil Engineering. Easton, Pa.
Coal Age. New York City.
Colo. School of Mines Mag.—Colorado School of Mines Magazine. See Mines Magazine.
Compass—The Compass. Menasha, Wis.

Desert Mag.—Desert Magazine. El Centro, Calif.

Ecology. Brooklyn, N. Y.
Econ. Geology—Economic Geology. Urbana, Ill.
Explosives Eng.—Explosives Engineering. Wilmington, Delaware.

Fieldiana; Geology. Chicago, Ill.

Gems and Gemology. Los Angeles, Calif.
Geographische Gesellschaft in München, Jahresbericht.
Geophysics. Austin, Tex.


Iowa Univ. Thesis—Iowa University Thesis. Iowa City.


Kaiserlich-Königliche Naturhistorische Hofmuseum Annalen. Vienna.

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Min. and Contracting Rev.—Mining and Contracting Review. Salt Lake City, Utah.
Min. and Eng. World.—Mining and Engineering World.
Min. and Met.—Mining and Metallurgy. New York City.
Min. Eng.—Mining Engineering. Washington, D. C.
Min. Mag.—Mining Magazine. No longer published.
Min. Sci.—Mining Science. Apparently no longer published.
Mineral Collector.
Mineralogist—The Mineralogist. Portland, Ore.
Mines Mag.—Mines Magazine. Denver, Colo.
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Nat. History—Natural History. New York City.
Neues Jahrb. für Min., Geol., und Paläont.—Neues Jahrbuch für Mineralogie, Geologie, und Paläontologie. Stuttgart, Germany.
N. Mex. Mag.—New Mexico Magazine. Santa Fe.
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N. Mex. Min. Record—New Mexico Mining Record. No longer published.
N. Mex. Prof. Eng.—New Mexico Professional Engineer. Albuquerque.
Oil and Gas Jour.—Oil and Gas Journal. Tulsa, Okla.
Oil Weekly. Houston, Tex.
Palaeontographica Americana. Ithaca, N. Y.
Petrol. Eng.—Petroleum Engineer. Dallas, Tex.
Plateau, Flagstaff, Ariz.
Pit and Quarry, Chicago, Ill.
Pop. Astronomy—Popular Astronomy, Northfield, Minn.
Precambrian—The Precambrian, Winnipeg, Canada.
Preuss. Geol. Landesanstalt Jahrb.—Preussische geologische Landesanstalt Jahrbuch.
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Rock Products. Chicago, Ill.
Rocks and Minerals. Peekskill, N. Y.
School of Mines Quart.—School of Mines Quarterly, Columbia University, New York City.
Schweizer Min. und Petrogr. Mitt.—Schweizer mineralogische und petrographische Mitteilungen.
Science. Washington, D. C.
Smithsonian Inst. Ann. Rpt.; Expl. and Field Work; Misc. Coll.—Smithsonian Institute Annual Report; Explorations and Field Work; Miscellaneous Collections, Washington, D. C.
Soc. Research on Meteorites Contr.—Society for Research on Meteorites Contribution. (See Meteoritical Society.)
Soil Science. Baltimore, Md.
South-Western Mines, Albuquerque. No longer published.
Stone. Chicago, Ill.
Technology Quart.—Technology Quarterly and Proceedings of the

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Swendsen, G. L. See Hinderlider, M. C., 1, 2.

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Vacher, H. C. See Davis, C. W.

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Veatch, A. C.  See Fuller, M. L., 2.

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Welsh, Norval J.

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Winchell, Newton Horace.

Winchester, Dean Eddy. See also Shoenfelt, C. E., 1.


Winter, Niles B.

Wislizenus, A.

Wood, Albert Elmer.

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Wood, Gordon H., Jr. See Kelley, V. C., 3; Northrop, S. A., 12, 14; Read, C. B., 4, 5.

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Wright, J. W.

Wright, Lauren Albert. See also Jahns, R. H., 3.

Wright, Robert J. See Kerr, P. F.

Wright, Wilford S.

Wroth, James S.

Wuestner, Herman.

Wylie, Charles Clayton.

Wynkoop, W. C.

Yeates, William S.

Yeo, Herbert W.

Young, John Albion, Jr.

Young, William Harvey.


Youtz, Ralph B.

Yung, M. B. See MacCaffery, R. S.

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Index

INTRODUCTORY NOTE

The literature on geology and mineral technology of New Mexico is listed by subject under twelve major headings, as follows:

Areas. Papers which cover some phase of the geology or mineral technology for a given area are listed under that area.

Economic geology. Papers dealing with mineral deposits (mines, mining districts, and oil and gas fields), substances (metallics, nonmetallics, and fuels), and general mining and petroleum geology.

Geologic maps. Maps showing by colors, patterns, or symbols the areas of outcrop and ages of the rock units. Does not include maps as illustrations in papers.

Geophysics. Papers covering gravity, magnetic, resistivity, seismic, radioactivity, and other geophysical methods used to prospect for mineral deposits and to determine structures; also general geophysical subjects.

Historical geology. Papers covering the description, history, correlation, or geographic extent of formations and other rock units.

Mineralogy. Papers giving mineral descriptions and localities. Also includes descriptions of meteorites.

Mineral technology. Covers prospecting and exploration, development, mining, including drilling for and recovery of oil and gas, concentration, processing, refining, and utilization of useful minerals (metals, nonmetallics, fuels, and water).

Paleontology. Papers describing or interpreting fossil remains of animals, plants, and early man.

Petrology. Covers descriptions of igneous and metamorphic rocks.

Physical geology. Papers on structural geology, erosion and sedimentation, and general physical geology.

Physiographic geology. Covers land forms and their formation as related to geologic structures and stratigraphy.

Water. Papers on underground and surface water resources, including water level, analyses, stream investigations and measurements, springs, wells, quality and quantity, floods, etc.
INDEX

Areas

Abiquiu quadrangle, Rio Arriba County: Smith, H. T. U., 1, 4, 6.
Abo Canyon, Socorro County: Coleman; Hawkins.
Albuquerque area, Bernalillo County:
Bryan, K., 1; Herrick, C. L., 5; Marcou, 1; Lee, 6.
Albuquerque quadrangle, Bernalillo County: Herrick, C. L., 5, 10.
Animas Valley, Hidalgo County: McClure, 1; Schwennesen, 1.
Bernalillo County: Bryan, K., 1; Ellis, 2; Harrington, E. R., 17; Herrick, C. L., 5, 10; Hibben, 2, 3, 4; Kelley, 3; Keys, 98, 107; Lee, 16; Marcou, 1; Read, 4; Reagan, 1, 4, 5; Reiche, 6; Ugrinic.
Black Range: Fishback; Fries, 1; Gordon, C. H., 5; Harrington, E. R., 20, 21; Kelley, 5; Naething; Volin; Wright, J. W.
Brilliant quadrangle, Colfax County: Lee, 31; Mertie, 3.
Burro Mountains, Grant County:
Anon., 1, 5, 10; Bush, 1, 7; Dinsmore, 3; Lang, S. S.; Paige, 3, 5, 9, 11; Reid, G. B.; Snow, 1; Somers, 1, 2; Staubier, 1; Wade, 1; Zalinski, 1, 2.
Caballo Mountains, Sierra County:
Allen, C. A.; Clifford, J. O., 1; Herrick, C. L., 6; Hess, 1; Keys, 20; Larsh, 1.
Cabezon Peak area, Sandoval County:
Freeman.
Canadian River Valley:
Collins, W. D., 1, 2; Dalrymple; French, 1, 2, 3, 4, 5, 6, 7, 8, 9; Hinderlider, 2; Hoyt, 1, 4; May, C. A.; Murphy, E. C., 1; Neel, 1, 2, 3, 4, 5, 6, 7; Sidwell, 1; U. S. Geol. Survey, 10, 14; Williams, G. R.; Yeo, 1.
Capitan Mountains, Lincoln County:
Kelley, 2; Knapp; Soule, 4, 8.
Carlsbad Caverns, Eddy County: Bretz, 2; Darton, 32; Haas, W. H.; Hess, 5; Horberg; Lee, 34, 38; Wetmore, 1.
Catron County: Andersen, 1; Bush, F. V., 3; Darton, 3, 4, 34; Ferguson, 1, 2; Fries, 1; Herrich, 2; Herrick, C.
L., 9; Kidder; Powers, 1, 2; Scott, D. B.; Spilsbury; Sur, 2; U. S. Bur. Mines, 6; Volin; Weatherby.
Central New Mexico: Johnson, R. B.; Lee, 9; McCann, 2; Needham, 12, 13.
Cerrillos Hills, Santa Fe County: Anon., 1; Blake, 3; Gent, 4; Harrington, E. R., 6; Johnson, D. W., 3; Stoll.
Chaco Canyon: Bryan, K., 7, 13; Dodge; Vann, 1, 2.
Chaves County: Brown, R. H.; Fiedler, 1, 2; 3, 5, 6, 7, 8, 9; Fisher, 2; McClure, 2; Meinzer, O. E., 8; Merritt; Morgan, 1; Nye, 3; Reed, W. M.; Rogers, 2; Schwade; U. S. Geol. Survey, 13.
Chupadera Mesa: Keys, 69.
Cimarron Range, Colfax County:
Smith, J. F., Jr., 2, 3.
Coal Fields: see Economic Geology and Mineral Technology
Colfax County: Anon., 16; Chase, G. A.; Clausen, 1; Gardner, J. H., 2; Griggs; Jones, F. A., 13; Judd, E. K.; Lakes, 4; Lee, 11, 13, 15, 17, 19, 25, 25, 30, 31, 33; Lequereux, 3; Levings; McClure, 3; Mertie, 1, 2; Ray, L. L., 1, 2, 5; Riggs, R. B.; Schrader, 1; Sheridan, J. E.; Sidwell, 8; Smith, J. F., Jr., 1, 2, 3; Stevenson, J. J., 8; Stobbe, 3.
Cornudas Mountains, Otero County:
Clabaugh, 1; Lang, W. T. B., 16; Timm; Zapp.
Curry County: Antevs, 1, 6; Clark, W. T., Jr.; Cotter, 1, 2; Howard, E. B., 2; Hyatt, 1; Lohman; Sellards; Stock, 5; Theis, 1.
DeBaca County: Allen, K.; Bryan, K., 6; Dempsey, 1, 2.
Deming quadrangle, Luna County:
Darton, 9, 14, 17, 18.
Dona Ana County: Barker, F. C.; Bond; Dunham, 1, 2; Eames; Ford; Lee, 8; Luill, 2, 3; Reiche, 1, 3; Russell, P. L., 5; Sayre, 3; Slichter, 1, 2; Soule, 10; Stanton, 2; Stock, 1; Sur, 1; Taft; Trumbo; Welch.
Eastern New Mexico: Baker, C. L., 2; Clark, W. T., 1; Cox, W. B.; Hill, R. T., 6; Howard, E. B., 1;
Areas (continued)

Johnson, W. D.; Lee, 29; Rich, J. L., 5; Roberts; Sidwell, 5; Van Diest, 1.

Eddy County: Adams, J. E., 7; Ageton, 1, 2; Bailey, R. K.; Barr, J. A.; Bates, 1; Bretz, 2; Cathcart; Coghill; Conley; Cramer; Darton, 32; Davis, M. J.; Deford, 3; Devaney, 1; Dickey, 1, 2; Fiedler, 1, 3, 5, 6, 7, 8, 9; Fisher, 2; Fuller, M. L., 2, 3; Haas, W. H.; Harley, 3, 4, 5, 6, 7; Haworth, 1; Hess, 5; Horberg; Hubbell; King, R. H., 1; Lang, W. T. B., 11; Lee, 34, 38; Mansfield, 3, 4, 5, 6; McClure, 2; Mezner, 5; Morgan, 1, 2; Neel, 7; Nye, 3; Reed, W. M.; Renick, 5; Rich, A.; Smith, H. L., 1, 2; 3; Spicer, 1; Sterki; Storms, 3, 4; Theis, 9; West Texas Geol. Soc., 1; Wetmore, 1.

Espanola Valley: Denny, 3.

Estancia Valley, Torrance County: Keyes, 40; Melner, 1, 2.

Florida Mountains, Luna County: Becker.

Gallinas Mountains: Glass, 3; Kelley, 4, 6.

Gallina quadrangle: Case, 4.

Gila River region: Blake, 2, 6; Collins, W. D., 2, 3; Cope, 32; French, 1, 2, 3, 4, 5, 6, 7, 8, 9; Hayes, 2; Hinderlider, 1; May, C. A.; Merrill, 1; Neel, 1; Turner, S. F., 2; U. S. Bur. of Reclamation; U. S. Geol. Survey, 7, 12, 14; Williams, G. R.

Gran Quivira quadrangle: Bates, 9.

Grant County: Anom, 3, 10, 14; Bacon; Bagg, 1; Ballmer, 1, 2, 3; Barua; birkinbine; Blood; Bush, 1, 2, 5, 7; Cady; Clifford, 2; Dinsmore, 2; Duriez; Entwistle, 1, 2; Furman; Graf; Harrington, E. R., 19, 30; Hayes; Herron; Hill, R. S.; Kelley, 5; Kerr, P. F.; Knox, M. S.; Landon; Lang, S. S.; Larsh, 3; Lasky, 1, 6, 12, 14; Leach, F. L., 1; Luther; MacDonald, D. F.; May, A. J.; Michel; Morris; Mullins; Packard; Paige, 1, 2, 3, 4, 5, 6, 7, 9, 10, 11; Pickard; Ransome; Reid, G. D.; Rich, J. L., 1; Richard, F. W.; Rickard, 1; Rossin; Russell, P. L., 1, 4, 6; Schmitt, 1, 2, 4, 5, 6; Schwartz; Schwennesen, 1; Snow, 1, 2; Somers, 1, 2; Soule, 2, 5, 6, 7; Stauber, 1; Storms, 6, 7; Umpleby; Wade, 1, 4; Waller; West Texas Geol. Soc., 5; Wootton; Wright, 1, L., 1, 2; Wuestner; Yeates; Zalinski, 1, 2.

Guadalupe County: Dempsey, 2, 3, 4; Gibson, D. T.; Gorman; Holquist, 2; Prout, F. S.; Stauber, 2; Teague, U. S. Bur. Mines, 5.

Guadalupe Mountains: Barker, C. L., 3; Burnet; Johnson, J. H., 2; Keyes, 77; Lang, W. T. B., 12; Nymeyer; Rickard, 2; Schultz; Shumard, B. F., 1, 2, 3, 4, 5; Tarr, R. S., 3.

Harding County: Wendland.

Hidalgo County: Fry; Huntington, M. G.; Jones, F. A., 4; Lasky, 4, 8; McClure, 1; Morrison, 2; Sauer; Schwennesen, 1, 2; Storms, 5; Turner, S. F., 1, 2, 3; Wade, 3; Wells, J. L.

Jemez Mountains, Sandoval County: Church; Mansfield, 1, 2, 3; Ross, 2, 4.

Jornada del Muerto: Keyes, 14, 22; Lee, 6; Manning, C. L., 1; Shumard, G. G., 2.

Kilbourne Hole: Reiche, 3.

Koehler quadrangle, Colfax County: Lee, 31; Mertie, 3.

Ladron Mountains, Socorro County: Kelley, 3; Noble.

Las Vegas quadrangle, San Miguel County: Malmberg; Swanson; Williamson.

Lea County: Anderson, C. C.; Anderson, W. D.; DeFord, 1; Denham; Miller, C. P.; Nye, 2, 3, 4; Theis, 7; Winchester, 4; Zavoico.

Lincoln County: Campbell, 3; Hills, R. C., 1; Just, 1; Kelley, 6; Knapp; Patton, 1, 2; Sheridan, M. J., 1; Sidwell, 6, 7; Soule, 1, 4, 8; Talmage, 4; Wegemann.

Little Florida Mountains, Luna County: Evans; Lasky, 11.

Little Florida Mountains, Grant and Hidalgo Counties: Lasky, 10, 13.

Llano Estacado: Baker, C. L., 1; Bretz, 5; Cope, 66; Cummins, 1; Price, W. A., 3; Theis, 2, 3, 5; West Texas Geol. Soc., 4.

Los Pinos Mountains, Socorro County: Hurst; Stark, 1, 2, 3; Wilpolt.

Lucero Mesa: Kelley, 3.
Northern New Mexico: see Economic Geology

Ortiz Mountains, Santa Fe County: Keyes, 45; Ogilvie, 3.

Pecos River Valley: Collins, W. D., 1, 2;

McKinley County: Bryan, K., 10; Kirk, C. T., 1.

Mogollon Mountains: Anderson, 2;

Mora County: Austin, 1; Jahns, 7;

Nacimiento Mountains, Mount Taylor

Mora County: Austin, 1; Jahns, 7;

McClure, 3; Northrop, 15; Sidwell, 8.

Moreno Valley, Colfax County: Ray, L. L., 1, 5; Smith, J. F., 1.

Mount Taylor area, Valencia County: A.; Laril, 45, 46; Thies, 8; White, W. N., 1, 2.

Minerals: see Economic Geology and Mining Technology

Mines: see Economic Geology

Mines: see Economic Geology and Mineral Technology

Mining Districts: see Economic Geology

North central New Mexico: Bisbee, 1, 2; Butler, R.; Emmons, S. F., 3; Lee, 17.

Northwestern New Mexico: see Areas, San Juan Basin

Oil and Gas Fields: see Economic Geology

Organ Mountains, Dona Ana County: Dunham, 1, 2; Ford; Hunt, W. F., 1; Reiche, 1; Soule, 10; Stock, 1; Trumpo; Welsh.

Otero County: Ball, S. H.; Botkin; C. A., 16; Willison, 4; Wisianus.

Pecos River Valley: Collins, W. D., 1, 2;

Permian Basin: see Areas, Chaves County, Eddy County, Lea County, and Southeastern New Mexico

Portales Valley, Roosevelt County: Robbins; Theis, 1, 6; U. S. Geol. Survey, 13.

Quay County: Cummins, 2, 3; Dobrovolny, 1, 2; Hill, R. T., 1, 8; Keyes, 86; Marcon, 10, 11, 12.

Raton Mesa, Colfax County: Knowton, 3; Lee, 15, 25; Stirling, 5; Levens, Marvin, 1, 2, 3.

Raton quadrangle, Colfax County: Lee, 31; Mertie, 3.

Rio Arriba County: Atwood, W. W., 2;

Río Arriba County: Atwood, W. W., 2;

Benjovsky, 2; Bryan, K., 29; Butler, A. P., 1, 2; Colfax, 1, 2; Emmons, S. F., 3; Henbest, 2; Whatley, R. T., 5; Jahns, 8; Judd, E. W.; Lee, 1; Needham, 12; Northrop, 16; Rankin; Read, 1, 5; Stevenson, J. J., 1, 2, 5; White, C. A., 16; Willison, 4; Wisianus.

San Juan Basin

oil and Gas Fields: see Economic Geology

Organ Mountains, Dona Ana County: Dunham, 1, 2; Ford; Hunt, W. F., 1; Reiche, 1; Soule, 10; Stock, 1; Trumpo; Welsh.

Otero County: Ball, S. H.; Botkin; C. A., 16; Willison, 4; Wisianus.

Pecos River Valley: Collins, W. D., 1, 2;

Permian Basin: see Areas, Chaves County, Eddy County, Lea County, and Southeastern New Mexico

Portales Valley, Roosevelt County: Robbins; Theis, 1, 6; U. S. Geol. Survey, 13.

Quay County: Cummins, 2, 3; Dobrovolny, 1, 2; Hill, R. T., 1, 8; Keyes, 86; Marcon, 10, 11, 12.

Raton Mesa, Colfax County: Knowton, 3; Lee, 15, 25; Stirling, 5; Levens, Marvin, 1, 2, 3.

Raton quadrangle, Colfax County: Lee, 31; Mertie, 3.

Rio Arriba County: Atwood, W. W., 2;

Benjovsky, 2; Bryan, K., 29; Butler, A. P., 1, 2; Colfax, 1, 2; Emmons, S. F., 3; Henbest, 2; Whatley, R. T., 5; Jahns, 8; Judd, E. W.; Lee, 1; Needham, 12; Northrop, 16; Rankin; Read, 1, 5; Stevenson, J. J., 1, 2, 5; White, C. A., 16; Willison, 4; Wisianus.
Areas (continued)

Committee, 1, 2; Needham, 8;
Neel, 1; Nelson, J. W., 1, 2;
Newell, F. H., 3, 4; Northrop,
4; Rittenhouse, 2, 3; Scofield;
Slichter, 1, 2; Stabler; Taylor, T.
U.; Theis, 4, 10; U. S. Geol. Survey,
2, 3, 4, 14; West Texas Geol. Soc.,
4; White, C. A., 12; Williams, G. R.
Rio Puerco Valley: Bryan, K., 12, 23;
French, 1; Neel, 4; Renick, 2;
Wright, H. E., 2, 3.
Rio Salado Valley: Bryan, K., 9; Clark,
J. D., 1; Harrington, E. R., 29.
Roosevelt County: Fritz, W. C.; Rob-
bins; Sellards; Theis, 1, 6; Woods,
E. H., 1.
Sacramento Mountains, Otero County:
Bowsher; Laudon, L. R., 2, 3;
Penn; Pray; Roswell Geol. Soc.;
Stainbrook, 1.
San Acacia area, Socorro County:
Denny, 2.
San Andres Mountains: Baker, C. L., 8;
Herrick, C. L., 6.
San Agustín Plains, Catron and Socorro
Counties: Powers, 1, 2.
Sandia Mountains, Bernalillo County:
Ellis, 2; Harrington, E. R., 17;
Hibben, 2, 3, 4; Keyes, 98.
Sandoval County: Anon., 13; Barbour;
Campbell, 2; Church; Clark, J. D.,
1; Harrington, E. R., 12; Henbest,
1; Harrington: Jenks, 3; Kelly,
C; Keyes, 10; Kutsheuy, 9;
Mansfield, 1, 2; Neel, 6; Northrop,
14; Read, 4; Reagan, 1, 2, 3, 5;
Renick, 1, 2, 4; Ross, 2, 4; Statz, 6;
Wynkoop.
Sangre de Cristo Mountains: Cabot;
Conkling, 1; Dana; Gruner, 1;
Haley; Lee, 26, 32; Northrop, 13;
Ray, L. L., 2; Sidwell, 9, 10; Sie-
benthal, 1.
San Juan Basin: Antevs, 4; Barb;
Barnes, F. C., 1, 2, 3, 4, 5; Barrows;
Bass, 1, 2; Bates, 6, 8, 10, 11; Bauer,
1, 2; Beaumont, 1, 2; Bradish, 1, 2;
Bryan, K., 7; Coffin, 2; Colbert, 3;
Collins, W. D., 1, 2; Colton;
Cooper, C. F.; Cope, 7; Cross, 5;
Dane, 1, 2, 3; Darton, 5, 6;
Dehny; Dodge; Gardner, J. H., 3,
4, 9; Gazin; Gregory, 1, 2;
Grinsfelder; Harrington, E. R., 23;
Hendricks, 1, 2; Hintze; Hoover;
Hunt, C. B., 3; Johnson, C. D.;
Kelley, 10, 12; Kerr, J. L.; Keyes,
130; Kinney, 3; Kirk, C. T., 1;
Larsen, R. M., 1, 2; Lilly; Matthew,
9; Moore, R. C., 1; Nowells; Peters,
J. R.; Pike, 2, 3; Powell, J. W.;
Read, 8; Reeside, 1, 2, 5;
Reynolds, T. E., 3; Robinson,
H. H.; Schrader, 1; Schuchert,
2; Sears, J. D., 1, 2, 3; Shaler, 1, 2,
3; Silver, 2, 3; Simpson, G. G., 8, 9;
Simpson, J. H.; Sinclair, 1, 2;
Teiser; Umblach, 1, 2, 3, 4; Vann,
1, 2; Vokes; Waring, 1; Wengerd;
White, C. A., 2; Williams, H.; Wil-
son, R. W., 1; Winchester, 3;
Wood, F. E., 1, 2; Yeo, 2.
San Juan County: Baker, A. A., 1;
Bauer, 1, 2; Gilmore, 1; Hinson, 1,
2; Knowlton, 5; Stanton, 6.
San Juan Mountains: Atwood, W. W.,
2; Larsen, E. S., 2.
San Miguel County: Allison; Clair;
Dempsey, 3, 4; Fish; Gardner, J.
H., 5, 8; Hobbs; Holmquist, 1;
Jahns, 6; Krieger, 1; Malumber;
Neef; Northrop, 13; Read, 4;
Springer, A.; Stott; Swanson;
Williamson.
San Pedro Mountains, Sandoval Coun-
ty: Northrop, 14.
Santa Fe County: Anon., 1, 13; Berry-
man; Blake, 3, 4, 5, 8; Brinsmade,
3; Campbell, 1; Emerick; Emman-
uel; Frick, 1; Gardner, J. H., 5;
Gent, 4; Harrington, E. R., 6, 7,
13, 31; Henrich, 1; Herrick, C. L.,
5; Jones, F. A., 5; Johnson, D. W.,
5; Lakes, 1; Lee, 6, 20; Northrop,
1; Ogilvie, 2; Raunheim; Read, 2,
4; Reagan, 1, 5; Statz, 2, 4; Stearns,
C. E., 1, 2; Stevenson, J. J., 3, 12;
Stoll; Turnbull.
Sierra County: Allen, C. A.; Chisholm;
Clark, E.; Clifford; Cope, 26;
Dean, K. C.; Fishback; Fries, 1, 2;
Gent, 2, 3; Glass, 1, 2; Harley, 1;
Harrington, E. R., 15, 21; Herrick,
C. L., 6; Hess, 1; Hill, J. M., 2;
Jahns, 2, 4, 5; Keyes, 20, 39; Larsh,
1; Leatherbee, 1; Lee, 4; MacDon-
ald, B.; MacFarlane, A.; Powell,
W. C., 3; Roebrock; 1; Russell, P.
L., 3; Sheridan, M. J., 2; Stillman,
5; Storms, 1, 2; Stock, 1, 2; Volin;
White, C. A., 6.
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Southeastern New Mexico: Adams, J. E., 6, 7; Anon., 23; Bartley, 1, 2; Blanchard; Boss; Bretz, 2, 4; Bybee, 1, 2, 5, 4; Cantrell; Carpenter, C. B.; Cole; Coon; Crandall; Darron, 23; Deegan; DeFord, 1, 2, 3, 4, 5, 6; Denison, A. R.; Dickey, 1, 2; Ellison; Galley; Henderson, C. F.; Herrick, C. L., 16; Hoots; Kastrop; King, H. H., 1, 2, 3, 4; King, P. B., 1, 3, 4, 5; King, R. E., 1, 2, 3; King, R. H., 1, 2; Kroenlein; Lang, W. T. B., 2, 3, 4, 5, 6, 8, 9, 11, 12, 15, 17, 18, 19, 20, 21; Lee, 34, 35, 36, 37, 38; Lewis, 1, 2; Lloyd, E. R., 1, 2, 3; McGraw, R. M.; Melton, 3; Owen, E. W.; Patziek; Ray, B. A.; Reitzig, 1, 2, 3; Rich, A.; Richardson, 1, 2, 3, 4; Secor, D. M.; Skinner; Vietti; Webb; West Texas Geol. Soc., 1, 2, 3; Winter; Woods, E. H., 1, 2.
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Taos County: Berliner, 2; Bush, 4; Butler, A. P., 1, 2; Butler, B. S., 2; Carman, 1, 2; Ellis, 8; Fain; Gruner, 1; Healy, F. G.; Hirsch, 1, 2; Holmquist, 4; Jahns, 3; Johnson, J. H., 3; Just, 2; Kelly, R. P.; Knaus, C. L., 2; Montgomery; Park, 1, 2; Powell, W. C., 2; Reed, E. F.; Roos; Schilling; Schwennesen, 1; Sidwell, 4; Siekenthal, 2; Silliman, 1; Soule, 3; Sundberg; Vanderwilt, 2, 3; Wood, J. A., 1; Young, J. A., 3, 5.
Torrance County: Black, 1; Hurst: Keys, 40; Meinzer, 1; Read, 4; Wilpolt.
Tucumcari Mountain, Quay County: Cummins, 2, 3; Hill, R. T., 8; Marcou, 11.
Tularosa Basin: Calvin; French, 1, 7; Harrington, E. R., 8; Meinzner, 3; Neel, 1; Powell, W. C., 1; Talmage, 1, 2, 3; U. S. Geol. Survey, 11.
Union County: Brown, B., 3; Bryan, K., 24; Parker, B. H., 1; Stovall, 1; Van Tuyl, 2.
Valencia County: Blodgett; Bryan, K., 36; Dutton, 2; Goddard, 1, 2; Harrington, E. R., 1, 2, 3, 9; Herrick, C. L., 9; Hunt, C. B., 1, 3, 4; Johnson, D. W., 2, 6; Kelley, 3; Kutnewsky, 2; McCann, 1; Nichols, 7; Pike, 1; Read, 4; Reiche, 6; Robinson, H. F., 1; Shimer, 1; Wells, E. H., 2; Wilpolt; Woods, B., 2.
Western New Mexico: Darton, 5; Winchester, 1.
White Sands area: Botkin; Brady, F. W., 2; Calvin; Gould, 3; Harrington, E. R., 8; Herrick, C. L., 11; Keys, 100; Needham, 9; Powell, W. C.; Talmage, 1, 2.
Zuni Mountains: Dutton, 2; Goddard, 1, 2; Keys, 80; Kutnewsky, 4; Schrader, 2.

Economic Geology
Alum: Hayes.
Anhydrite: Kroenlein.
Apache mining district, Hidalgo County: Wade, 3.
Apache mica mine, Rio Arriba County: Holmquist, 3.
Artesia oil field, Eddy County: Davis, M. J.; Rich, A.
Asphalt: Gorman.
Atwood copper mine, Lordsburg district: Huntington, M. G.
Economic Geology (continued)

Aztec mine, Baldy district: Chase; Lee, 23.

Azure turquoise mine, Grant County: Dinsmore, 3.

Baldy mining district, Colfax County: Chase, C. A., 1; Lee, 23.

Barite: Clippinger, 5.

Barite: Clippinger, 5.

Bayard area, Grant County: Duriez; Lasky, 6.

Beryl: Jahns, 2, 5; MacFarlane, A.; Storms, 2; Strock, L. W., 1; U. S. Bur. Mines, 3.

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Through 1930: Wootton, 2.


Bishop Cap fluorite prospect: Set. 1.

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Black Range tin district: Fries, 1; Harrington, E. R., 21; Naething.

Bland mining district: see Cochiti mining district

Boston Hill mining district, Grant County: Entwistle, 1, 2; Uampleby; Wooton.

Brass ore in nature: Keyes, 72.

Burro Mountain mining district, Grant County: Anon., 10; Bush, 1, 7; Dinsmore, C. A., 5; Lang, S. S.; Paige, 3, 5, 9, 11; Reid, G. D.; Somers, 1, 2; Stauber, 1; Wade, 1; Zalinski, 1, 2.

Cabalo Mountains, Sierra County: Allen, C. A.; Hess, 1; Keyes, 20; Larsh, 1.

Calcite, optical: Anon., 27; Johnson, J. H., 3, 4; Kelley, 1; Van Amringe.

Capitan iron deposit, Lincoln County: Kelley; Soule, 2; Soule, 4, 8.

Carbon dioxide: Germann, 1; Miller, J. C.; Russell, S.; Talmage, 6; Wells, E. H., 10; Wendland.

Carthage coal field, Socorro County: Gardner, J. H., 6.

Cement Materials: Eckel, E. C.

Central mining district, Grant County: Barua; Duriez; Lasky, 1, 2, 12, 14; Mullen; Schmidt, 1, 4, 6.

Cerrillos coal field, Santa Fe County: Lee, 20; Stevenson, J. J., 12; Turnbull.

Cerrillos mining district, Santa Fe County: Anon., 1; Blake, 3; Harg-ington, E. R., 6; Johnson, D. W., 3; Stoll.

Chino mine: see Santa Rita mine

Chupadera Mesa iron deposit: Keyes, 69.

Clay: Clippinger, 3; Davis, C. W.; Herrick, C. L., 12; Shaler, 2.

Coal: Ashburner: Campbell, 6, 7; Dane, 2; Ellis, 12, 13; Gardner, J. H., 8; Hunt, C. B., 3; Judd, E. K.; Lakes, 2; Parker, E. W.; Read, 6, 7; Ritter; Storms; Young, W. H.

Analyses: Anon., 18; Campbell, 5; Ellis, 13; Fieldner, 1, 2, 3, 4; Lord, N. W.; Pope; Snyder.

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Cretaceous: Leconte, 2.

Dawson mine: Sheridan, J. E.

Durango-Gallup field: Schradar, 1; Shaler, 3.


Engle field: Lee, 4.

Fort Stanton Reservation: Campbell, 3.

Gallina-Raton Spring field: Gardner, J. H., 2.


Hagan field: Keyes, 10.

Jemez field: Reagan, 1, 3.

Lignite: Lesquereux, 6.

Lincoln County: Campbell, 3.

Mescal Canyon field: Keyes, 36.

North-central New Mexico: Lee, 17.

Northeastern New Mexico: Van Dient, 2.

Northern New Mexico: Judd, E. W.


Raton field: Judd, E. K.; Lee, 33; Stevenson, J. J., 8.

Resources: Averitt; Read, 6, 7.

Sandoval County: Campbell, 2.

San Juan Basin: Sears, J. D., 1, 2.

San Juan County: Bauer, 2.

San Miguel County: Gardner, J. H., 5, 8.
Santa Fe County: Gardner, J. H., 5.
Sierra Blanca fields: Wegemann.
Tijeras field: Lee, 16.
Una del Gato field: Campbell, 2.
White Mountains region: Fisher, 1.
Cobalt: Leach, A. A., 1.
Cochiti mining district, Sandoval County: Barbour; Harrington, E. R., 12; Herrington; Jenks, 3; Kutnewsy, 9; Statz, 6; Wynkoop.
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Contact manganese mine, Grant County: Russell, P. L., 1.
Contact metamorphic deposits: see Pyrometasomatic deposits
Cooks Peak mining district, Luna County: Soule, 2.
Cooney mining district, Catron County: see Mogollon mining district
Copper: Argall; Austin, 2; Ball, S. H.; Cazin, 1, 2; Fischer, 1; Fulton, C. H.; Hart; Jenks, 1, 2; Kochmann, 3; Lasky, 4; Lindgren, 1, 6; Paige, 11; Stauber, 2; Toyota, 1; U. S. Bur. Mines, 5; Wade, 3; Weed, 1, 2; Wendt; Winchell; Wright, J. W.
Apache district: Wade, 3.
Bent: Ball, S. H.
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Burro Mountain district: Bush, 1, 7; Lang, S. S.; Paige, 3, 9; Reid, G. D.; Somers, 1, 2; Stauber, 1; Wade, 1.
Caballos Mountains: Herrick, C. L., 6.
Cooney district: Graham.
Copper King mine: Holmquist, 4.
Deming quadrangle: Darton, 17.
Grant County: Snow, 2.
Hell Canyon district: Statz, 5.
Lordsburg district: Jones, F. A., 4; Lasky, 4; Huntington, M. G.
Magdalena district: Argall; Haddon.
Mora County: Austin, 1.
Organ district: Soule, 10.
Pinos Altos district: Paige, 2.
San Andres Mountains: Herrick, C. L., 6.
San Pedro district: Berryman; Brinsmade, 3; Henrich, 1.
Santa Rita mine: Bagg, 1; Ballmer, 2; Graf; Harrington, E. R., 19; Kerr, P. F.; Knox, M. S.; Paige, 6, 10, 11; Ransome; Rickard, 1; Spencer.
Silver City area: Brinsmade, 4.
Stauber mine: Holmquist, 2.
Zuni Mountains: Schrader, 2.
Copper King mine, Taos County: Holmquist, 4.
Crossroads oil field, Lea County: Barnes, K. B.
Dawson coal field, Colfax County: Sheridan, J. E.
Dayton oil field, Eddy County: Richard, 4.
Disseminated copper deposits: Locke.
Dolomite: Weitz.
Dolomitic limestone: Bulnes, 2.
Dona Ana County: Dunham, 1.
Durango-Gallup coal field: Schrader, 1; Shaler, 3.
Durango-Monero coal field, Rio Arriba County: Gardner, J. H., 8.
Elk Mountain mica deposit, San Miguel County: Holmquist, 1; Jahns, 6.
Ellis manganese deposit, Sierra County: Russell, P. L., 3.
Engle coal field, Sierra County: Lee, 4.
Eunice oil field, Lea County: Anderson, C. C.
Florida Mountains, Luna County: Becker.
Fluorite: Burchard, 1, 2; Darton, 7; Johnston, W. D.; Rothrock, 2; Russell, P. L., 2, 4; Sheridan, M. J., 2; Soule, 1, 2; U. S. Bur. Mines, 4, 6; Warner.
Bishop Cap prospect: Sur, 1.
Huckleberry spar mine: Sur, 2.
Zuni Mountains: Goddard, 1, 2; Kutnewsy, 4.
Fort Stanton Reservation coal fields, Lincoln County: Campbell, 5.
Gallinas Mountains mining district, Lincoln and Torrance Counties: Kelley, 4, 6.
Gallup Basin coal field: Kirk, C. T., 1.
Gems: Kay.
General: Ellis, 7; Emmons, S. F., 1; Frazer; Hayden, 1; Herrick, C. L., 12, 13; Hewett, J. V.; Hill, J. M., 1;
Economic Geology (continued)

Jones, F. A., 1, 15; Keys, 75;
Lasky, 2, 3, 8, 10; Lindgren, 1, 6;
Loew, 1, 2; Needham, 11; Owen,
R. E.; Ransome; Schmitt, 2, 5, 6;
Schrader, 5; Talmage, 5; Toyota,
2; Wells, E. H., 3, 5.
Globe pegmatite: Wright, L. A.
Gold: Fulton, C. H.; Jones, F. A., 2, 3,
6, 7, 9, 13; Lindgren, 6; Metzger;
Wells, E. H., 7.
Aztec mine: Chase, C. A.; Lee, 23.
Black Range district: Fishback;
Wright, J. W.
Cochiti district: Barbour; Harrington,
E. R., 12.
Cooney district: Graham.
Grant County: Pickard.
Lordsburg district: Jones, F. A.,
4.
Pinos Altos district: Bush, 2; Paige,
2; Wright, I. L., 1.
Placers: Carruth; Heikes; Keys, 4;
Leatherbee, 5; Silliman, 1; Statz, 4;
Stone, G. H., 2.
San Pedro Mountains: Brinsmade,
3; Statz, 2.
Santa Fe County: Jones, F. A., 3;
Statz, 4.
Santa Fe region: Blake, 4.
Sierra del Oro: Keys, 66.
Silver City: Brinsmade, 4.
Sylvanite: Dinmore, 1; Jones, F. A.,
6, 7; Martin.
Taos County: Silliman, 1.
Graphite: Lakes, 4; Lee, 13, 19.
Ground Hog mine, Grant County:
Barua; Lasky, 1, 12.
Guano: Brady, F. W., 1.
Gypsum: Brady, F. W.; Darton, 21;
Herrick, H. N.; Meinzer, 3; Shaler,
1; Stone, R. W., 1, 2.
Hagan coal field, Sandoval County:
Keys, 10.
Halite: Mansfield, 7.
Hanover-Fierro mining district, Grant
County: Birkinbine; Cady; Land-
don; Paige, 1, 10; Ransome; Rossin; Schmitt, 5; Schwartz.
Hansburg mining district, Socorro
County: Peters, E. D.; Turner, H.
W., 1.
Harding pegmatite mine, Taos Coun-
ty: Berliner, 2; Hirsch, 1, 2; Jahns,
3; Montgomery, A.; Roos; Soule, 3;
Stevens; Wells, R. C., 3.
Headstone mining district: Benjoysky,
2.
Helvite-beryllium deposit: see Iron
Mountain mining district
Hematite: Foshag, 1.
Huckleberry spar mine, Catron Coun-
ty: Sur, 2.
Hoblis oil field, Lea County: Carpen-
ter, C. B.; DeFord, 1; Dinsmore, 4;
Winchester, 4; Zavoico.
Hydrothermal alteration: Kerr, P. F.;
Patterson.
Hell Canyon mining district, Berna-
illo County: Statz, 5.
Iron: Birkinbine; Grantham; Herrich,
3; Kelley, 8; Sheridan, M. J., 1.
Capitan deposit: Kelley, 2; Soule, 4,
8.
Chupadera Mesa: Keys, 9, 69, 101.
Hanover-Fierro district: Birkinbine;
Paige, 1.
Iron Mountain, district: Smythe, 2,
3.
Jones mines: Emmens.
Manganiferous: Entwistle, 1, 2;
Jemez coal field, Sandoval County:
Reagen, 1, 3.
Kaolin: Richard, L. M.
Kelly mining camp, Socorro County:
Brinsmade, 2; Herrick, C. L., 2;
Johnson, W. M.
Lake Valley mining district, Sierra
County: Apell; Clark, E.; Cope,
26; Harrington, E. R., 15; Keys,
38; MacDonald, B.; Sill-
man, 5.
Las Vegas area, San Miguel County:
Bush, 8; Northrop, 13.
La Ventana-Chacra Mesa coal field,
Sandoval County: Dane, 2.
Lead: Fulton, C. H.; McKnight; Soule,
5.
Caballo Mountains: Herrick, C. L.,
6.
Central mining district: Lasky, 14.
Grant County: Larsh, 3.
Houston-Thomas prospect: Rom-
berg.
Kelly mine: Johnson, W. M.
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Pinon Altos district: Soule, 7.
Royal John deposits: Soule, 9.
San Andres Mountains: Herrick, C. L., 6.
San Pedro Mountains: Brinsmade, S.
Silver City area: Brinsmade, 4.
Tres Hermanas district: Lindgren, 5.
Lithium: Chambers; Jahns, J.; Roos; Santmyers, 2; Soule, 3; Stevens.
Little Florida Mountains mining district, Luna County: Evans; Lasky, 11.
Little Hatchet Mountains area: Lasky, 13.
Light aggregates: Ingram; Clipperinger, 1, 2.
Lignite: Lesquerreux, 6.
Lordsburg mining district, Hidalgo County: Fry; Huntington, M. G.; Jones, F. A.; 4; Wells, 1.
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Marble: Merrill, 2.
Moenchau: Bush, 6; Michel.
Mescal Canyon coal field: Keyes, 36.
Mica: Anon., 17; Holmes; Holmquist, 3; Sterrett, 6, 7.
Apache mine: Holmquist, 3.
Elk Mountain: Holmquist, 1; Jahns, 6.
Petaca district: Jahns, 6.
Mining districts, map: Northrop, 11.

Mogollon mining district, Catron County: Andersen, 1; Bush, S.; Ferguson, 1, 2; Graham; Herrich, 2; Kidder; Spilsbury; Weatherby.
Mogollon Range: Andersen, 2; Weatherby.
Molybdenum: Bush, 6; Horton; Petar; Vanderwilt, 1, 4.
Bent: Ball, S. H.
Niggerhead manganese deposit: Butler, B. S., 2; Larsen, E. S., 1; Schilling; Vanderwilt, 1, 2, 3, 4.
Romero mine: Bush, 8.
Monument oil field, Lea County: Anderson, W. D.
Natural gas: Cole; Rettger, 2, 3.
Fields: Bybee, 2, 3, 4; Krampert; Rettger, 2, 3; Winchester, 5, 6.
See also Oil and gas fields.
Unusual: Lang, W. T. B., 1.
Niggerhead manganese deposit, Socorro County: Russell, P. L., 7.
Nitrate: Gale.
Nonmetallics: Talmage, 5.
Northeastern New Mexico: Harley, 2; Sternberg.
Northern New Mexico: Stevenson, J. J., 5.
Oil: Bentz; Bybee, 2, 3, 4; Cole; Deford, 3; Krampert; Owen, E. W.; Rettger, 2, 3; Winchester, 5, 6.
Gravities: Bartram.
Limestone reservoirs: Adams, J. E., 3.
Limestone vs. sandstone as reservoir rocks: Bulnes, 1.
Open reservoirs: Adams, J. E., 4.
Pre-San Andres horizons: King, R. E., 3.
Woodford black shale: Ellison.
Oil and gas fields:
Artesia: Davis, M. J., 1; Rich, A.
Caprock: Lamb, N. R., 3.
Crossroads: Barnes, K. B.
Dayton: Richardson, 4.
Eunice: Anderson, C. C.
Hobbs: Carpenter, C. B.; Deford, 1;
Dinsmore, 4; Winchester, 4; Zavala.
Monument: Anderson, W. D.
Pecos Valley: Dinsmore, 4.
Permian Basin: Adams, J. E., 4;
King, H. H., 1, 2, 3, 4.
Economic Geology (continued)

Salt Lake: Miller, C. P.
San Juan Basin: Barnes, F. C., 1, 5; Bates, 11; Colton; Krampert; Kerr, J. L.; Silver, 3.
Shiprock area: Newells.
Oil and gas traps: Bartley, 2.
O'Mara coal field: Keyes, 73.
Organ mining district, Dona Ana County: Bond; Dunham, 1, 2; Soule, 10; Welsh.
Oro Grande mine, Grant County: Pickard.
Orogrande, Otero County: Leech.
Orito mining, Santa Fe County: Harrington, E. R., 7.
Pecos mine, San Miguel County: Krieger, 1; Stott.
Pecos Valley oil fields: Dinsmore, 4.
Pearless lead-zinc mine, Grant County: Soule, 5.
Pegmatites: Hess, 4, 6, 7; Jahns, 3, 6, 7; Just, 2; Kelley, 5; Landes, 1, 2; Page, 2; Soule, 5; Wright, L. A.
Pernian Basin oil fields: Adams, J. E., 4; King, H. H., 1, 2, 3, 4.
Petaca mining district, Rio Arriba County: Jahns, 6.
Petroleum: see Oil.
Pewabic mine, Grant County: Schmitt, 5.

Pigments, iron oxide: Wilson, H.
Pinos Altos mining district, Grant County: Blood; Bush, 2; Gibson, T. L.; Paige, 2; Soule, 7; Wade, 4; Wright, I. L., 1.
Placer deposits: Carruth; Pardee.
Apache Canyon: Keyes, 4.
Dry: Heikes; Stone, G. H., 2.
Mesa del Oro: Leatherbee, 3.
Santa Fe County: Jones, F. A., 3; Statz, 4.
Upper Rio Grande: Silliman, 1.
Potash: Ageton, 2; Anon., 25; Conley; Delacote; Hance; Harley, 6; Hoots; Kroenlein; Mansfield, 3, 4, 5, 6; Smith, H. L., 1, 2; Storms, 3, 4.
Pumice: Clippinger, 2; Counts; Kniewsky, 2.
Pyrometasomatic deposits: Cady; Hess, 3; Jahns, 2; Keyes, 45; Knopf, 1, 2; Landon, 1; Lasky, 5; Rossin; Smythe, 2.
Questa molybdenum mine, Taos County: Butler, B. S., 2; Larsen, E. S., 1; Schilling; Sundberg; Vanderwilt, 2, 3.
Raton coal field, Colfax County: Judd, E. K.; Lee, 55; Stevenson, J. J., 8.
Rattlesnake oil field, San Juan County: Hinson, 1.
Redbed deposits: Bains; Ball, S. H.; Emmons, S. F., 4; Finch, 1, 2; Fischer, 1; Rogers, 1; Turner, H. W., 2.
Red River mining district, Taos County: Bush, 4; Fain: Kelly, R. P.; Knauz, 2; Park, 1, 2; Reed, E. F.; Sidwell, 4.
Rocky Mountain area: Uren.
Rosedale mining district, Socorro County: Anon., 9; Statz, 3.
Salt: Ageton, 2; Datton, 3, 4, 23; Gibbs; Herrick, C. L., 12; Hoots; Kroenlein; Phalen, 1, 2.
Salt Lake oil field, Lea County: Miller, C. P.
San Juan Basin oil and gas fields: Barnes, F. C., 1, 5; Bates, 11; Colton; Kerr, J. L.; Silver, 3.
San Juan County coal fields: Bauer, 2.
San Mateo-Cuba coal field, Sandoval County: Gardner, J. H., 7.
San Pedro mining district, Santa Fe County: Berryman; Brinsmade, 5; Henrich, 1; Herrick, C. L., 5; McCaffery; Statz, 2.
Santa Fe region: Blake, 4.
Santa Rita (Chino) mine, Grant County: Bagg, 1; Ballmer, 2; Graf; Kerr, P. F.; Knox, M. S.; Paige, 6, 10, 11; Ransome; Rickard, 1; Spencer; Wright, R. J., 1, 2.
Sapello mining district, Grant County: Malmburg.
Secondary enrichment: Bagg, 1; Emmons, W. H.; Lasky, 7.
Sedimentary deposits: Ball, S. H.; Fischer, 1, 2; Jenks, 2; Staubert, 2.
Shiprock area, oil: Newells.
Sierra Blanca coal field, Otero County: Wegemann.
Sierra Cuchillo, Sierra County: Jahns, 1.
Sierra County: Harley, 1; Leatherbee, 1.
Sierra del Oro, Santa Fe County: Keyes, 62.
Silver: Clark, E.; Fischer, 1; Fulton, C. H.; Jones, F. A., 2; Leach, A. A.,
1; Lindgren, I, 6; McKnight; Winchell.
Black Range district: Fishback; Wright, J. W.
Bullard's Peak: Krieger, 2.
Cochiti district: Barbour.
Lake Valley district: Clark, E.; Cope, 2; Keyes, 58; MacDonald.
Lordsburg district: Jones, F. A., 4.
Magdalena district: Tuttle.
Pinos Altos district: Blood; Paige, 2.
San Pedro Mountains: Brinsmade, 3.
Silver City area, Grant County: Brinsmade, 4; Entwistle, 2; Furman; Hermion: Paige, 7; Umpleby; West Texas Geol. Soc., 5; Wuestner.
Silver Spot deposit, Grant County: Soule, 6.
Socorro County: Lasky, 2.
Sodium sulfate: Lang, W. T. B., 9; Wells, R. C., 1.
Southern New Mexico: Endlich; Silliman, 4.
Stauber copper mine, Guadalupe County: Holmquist, 2.
Steeple Rock mining district, Grant County: Russell, P. L., 6.
Stone: Burchard, 3.
Structural Relations: Billingsley; Newhouse, 1, 2.
Sulfur, Jemez Mountains: Mansfield, 1, 2.
Sylvanite, Hidalgo County: Dinsmore, C. A., 1; Jones, F. A., 6, 7, 9; Martin.
Tantalum: Berlinc, 2; Jahns, 3; Montgomery.
Taylor Creek tin deposits, Sierra and Socorro Counties: Hill, J. M., 2.
Tellurium: Ballmer, 1.
Tijeras coal field, Bernalillo County: Lee, 16.
Tin: Fries, 1; Harrington, E. R., 20; Hill, J. M., 2; Naething; Volin. Trace-element studies, Santa Rita: Graf.
Tres Hermanas mining district, Luna County: Lindgren, 5; Wade, 2.
Tripoli: Herrick, C. L., 1.
Tungsten: Hess, 2, 3; Storms, 1.
Turquoise: Cowan: Fenderson; Jones, F. A., 10, 14; Kunz, 6; Lakes, 3; Silliman, 2, 3; Sterrett, 3, 4, 5.
Azure turquoise mine: Dinsmore, 3.
Burro Mountains: Anon., 3, 10; Dinsmore, 3; Paige, 5; Zalinski, 1, 2.
Twinning mining district, Taos County: Park, 2.
Tyrone mining district: see Burro Mountains mining district
Uranium: Anon., 21; Coffin, 1; Fischer, 1, 2; Leach, A. A., 2.
In pegmatites: Page, 2.
White Signal district: Leach, F. I., 1.
Vanadium: Carrera: Coffin, 1; Edwards; Fischer, 1, 2; Johnson, E. D.; Lashe, 2; Leachbee, 2.
Caballo Mountains: Allen, C. A.; Clifford, 1; Hess, 1; Lashe, 1.
Grant County: Lashe, 3.
Sierra County: Keyes, 76; Leachbee, 1.
White Oaks district: Smith, E. P. Vein, recent, Ojo Caliente: Lindgren, 3.
Virginia mining district, Hidalgo County: Lasky, 5, 7.
White Eagle fluor spar mine: Soule, 2.
White Oaks mining district, Lincoln County: Smith, E. P.
White Signal mining district, Grant County: Anon., 21; Leach, F. L.
Zinc: Demaret, Hult; Kutnewsky, 3; Lindgren, 6; McKnight.
Carbonate ores: Keyes, 19.
Central district: Lasky, 14; Mullen. Kelly camp: Brinsmade, 2; Johnson, W. M.
Magdalena district: Argall; Haddon; Tuttle.
Pecos mines: Krieger, 1.
Pinos Altos district: Paige, 2; Soule, 7.
Silver City area: Brinsmade, 4.
Southwestern New Mexico: Blake, 7; Hultl.
Steeple Rock district; Russell, P. L., 6.
Tres Hermanas district: Lindgren, 5; Wade, 2.
Zoned deposits: Adams, F. C.
Zuni Mountains mining district, McKinley and Valencia Counties: Goddard, 1, 2; Kutnewsky, 4; Schrader, 2.
Geologic Maps

See "Geologic map index of New Mexico" by Leona Boardman and Annabel Brown, U. S. Geol. Survey, Index to geologic mapping in the United States, 1950, for actual areas covered by a given map.

Aztec mine: Lee, 23.
Bernalillo County: Bryan, K., 1; Ellis, 2; Herrick, C. L., 10; Kelley, 3; Reagan, 1; Reiche, 6.
Black Range: Fries, 1.
Boston Hill district: Joesting.
Burro Mountains: Paige, 3, 9.
Carthage coal field: Gardner, J. H., 6.
Catron County: Darton, 3; Ferguson, 1, 2; Fries, 1.
Central district: Lasky, 6, 12, 14; Schmitt, 1, 5, 6.
Cerrillos coal field: Lee, 20.
Cerrillos district: Stoll.
Chaco River Valley: Bauer, 1.
Chaves County: Fisher, 2; Nye, 3.
Chupadera Mesa: Wilpolt.
Cimarron Range: Smith, J. F., 3.
Colfax County: Griggs; Lee, W. T., 17, 23, 25, 31, 33; Smith, J. F., 3.
Cretaceous: Reciside, 5.
Dona Ana County: Dunham, 1, 2; Reiche, 5.
Eddy County: Lang, W. T. B., 6.
Espanola Valley: Denny, 3.
Estancia Valley: Meinzer, 2.
Gallinas district: Kelley, 6.
Gallinas Mountains: Kelley, 4.
Gila River: Hayes.
Globe pegmatite: Wright, L. A.
Grant County: Entwistle, 1, 2; Hayes; Hill, J. M., 2; Joesting; Kelley, 5; Kerr, P. F.; Lasky, 6, 12, 13; Paige, 1, 2, 3, 6, 7, 9; Schmitt, 1, 5; Spencer.
Ground Hog mine: Lasky, 12.
Guadalupe County: Gorman.
Hanoover-Fierro district: Paige, 1.
Harding County: Harley, 2.
Harding mine: Montgomery.
Hidalgo County: Lasky, 8, 10, 13; Schwennesen, 1.
Index to maps of New Mexico through 1950: Boardman.
Iron deposits: Kelley, 8.
Iron Mountain district: Jaynes, 4, 5.
Joyita Hills: Wilpolt.
Jornada del Muerto: Keyes, 22.
Kilbourne Hole: Reiche, 3; West Texas Geol. Soc., 3.
Lake Valley district: Clark, E.
Lea County: Nye, 4.
Lincoln County: Campbell, 3; Just, 1; Kelley, 4; Meinzer, 3; Wegemann.
Little Florida Mountains: Lasky, 11.
Little Hatchet Mountains: Lasky, 13.
Llano Estacado: Cummings, 1; West Texas Geol. Soc., 4.
Lordsburg district: Lasky, 8.
Los Pinos Mountains: Stark, 3; Wilpolt.
Lucero Mesa: Kelley, 3.
Luna County: Darton, 14; Grant, 17; Lasky, 11.
Magdalena district: Loughlin.
Manzano Mountains: Reiche, 6.
McKinley County: Gardner, J. H., 7; Kirk, C. T., 1; Shaler, 3.
Mogollon district: Ferguson, 1, 2.
Mora County: Harley, 2; Northrop, 13.
Nacimiento Mountains: Northrop, 14.
New Mexico: Darton, 31; Ellis, 5.
Northeastern New Mexico: Collins, R., 2; Mahel; Read, 3.
Northern New Mexico: Hayden, 4.
Ogallala formation: Bretz, 3.
Organ Mountains: Dunham, 1.
Otero County: Keyes, 100; Meinzer, 3; Wegemann.
Paleocene: Brown, R. W., 3.
Pewabic mine: Schmitt, 5.
Pecos mine: Krieger, 1; Scott.
Pecos Valley: Lang, W. T. B., 6.
Pinos Altos district: Paige, 2; Soule, 7.
Quay County: Dobrovolny, 1.
Quinta molybdenum mine: Vanderwilt, 2.
Raton coal field: Lee, 33.
Raton Mesa: Lee, 25.
Red River district: Park, 1.
Rio Arriba County: Atwood, W. W., 2; Dane, 4; Denny, 3; Just, 2; Northrop, 14; Smith, H. T., U., 5; Wright, L. A.
Rio Puerco Valley: Bryan, K., 23; Wright, H. E., 2, 3.
Royal John lead-zinc deposit: Soule, 9.
Sandia Mountains: Ellis, 2.
Sandoval County: Northrop, 14; Reagan, 1; Renick, 4.
Sangre de Cristo Mountains: Cabot; Gruner, 1; Northrop, 13; Park, 2; Ray, L. L., 2; Smith, J. F., 3.
San Juan Basin: Bauer, 1; Colbert, 3; Dane, 2, 4; Dutton, 5; Gardner, J. H., 5, 7; Gregory, 1, 2; Kirk, C. T., 1; Pike, 3; Reeside, 2; Sears, J. D., 1, 2; Shaler, 3; Silver, 2; Williams, H.
San Juan County: Bauer, 2; Gardner, J. H., 3; Shaler, 3.
San Juan Mountains: Atwood, W. W., 2.
San Luis Valley: Schwennesten, 1.
San Miguel County: Krieger, 1; Northrop, 15; Read, 1; Stott.
San Pedro district: Herrick, C. L., 5.
San Pedro Mountains: Northrop, 14.
Santa Fe County: Cabot; Lee, 20; Johnson, D. W., 3; Read, 2; Reagan, 1; Stearns, C. E., 2; Stoll.
Santa Rita mine: Ballmer, 2; Kerr, P. F.; Paige, 6; Spencer.
Sierra Blanca coal field: Wegemann.
Sierra County: Fries, 1; Harley, 1; Jahns, 4, 5; Roethrock, 1.
Silver City area: West Texas Geol. Soc., 5.
Socorro County: Denny, 2; Gardner, J. H., 6; Herrick, C. L., 9; Kelley, 3; Keyes, 22; Lasky, 2; Loughlin; Stark, 2; Wells, E. H., 2; Wilpolt; Winchester, 2; Wright, H. E., 1.
Southeastern New Mexico: Hoots.
Southwestern New Mexico: Lasky, 9.
Taos County: Cabot; Gruner, 1; Just, 2; Montgomery; Park, 1, 2; Upson; Vanderwilt, 1.
Torrance County: Bates, 9; Meinzer, 2; Wilpolt.
Tularosa Basin: Meinzer, 3.
Union County: Harley, 2.
Valencia County: Bryan, K., 25; Herrick, C. L., 9; Hunt, C. B., 4; Johnson, D. W., 2; Kelley, 3; Reiche, 6; Wells, E. H., 2; Wilpolt; Wright, H. E., 2.
West-central New Mexico: Dutton, 2.
White Sands: Keyes, 100.
Zuni Salt Lake: Dutton, 3.

Geophysics

Aeromagnetic maps:
De Baca County: Dempsey, 1, 2.
Guadalupe County: Dempsey, 1, 2, 3, 4.
San Miguel County: Dempsey, 3, 4.
Atom bomb test, reflection and refraction records: Gutenberg, Leet.
Boston Hill, iron deposits: Joesting.
Copper Flat:
Magnetic survey: Bacon.
Resistivity survey: Bacon.
De Baca County, aeromagnetic map: Dempsey, 1, 2.
Exploration, oil and gas, Permian Basin: Williams, N.
Geothermal gradients from wells:
Lone, A. C.; Lang, W. T. B., 2, 3, 7.
Gravity prospecting: Barnes, V. E.
Lead and zinc: Romberg.
Guadalupe County, aeromagnetic map: Dempsey, 1, 2, 3, 4.
Hobbs oil field: Coffin, 4.
Iron deposits, Boston Hill: Joesting.
Magnetic survey, Copper Flat: Bacon.
Oil and gas exploration: Coffin, 4; Dempsey, 1, 2, 3, 4; Dobyns; Williams, N.
Ore discovery, gravity meter survey: Romberg.
Permian Basin, oil and gas exploration: Williams, N.
Potash, resistivity prospecting: Spicer, 1.
Quinta molybdenum mine, resistivity prospecting: Sundberg.
Radioactivity logging, oil wells: Ingalls.
Resistivity logging, wells: Ingalls.
Resistivity prospecting:
Copper Flat: Bacon.
Monument oil field: England.
Potash: Spicer, 1.
Quinta molybdenum mine: Sundberg.
San Juan Basin, oil and gas exploration: Dobyns.
San Miguel County, aeromagnetic map: Dempsey, 3, 4.
Seismic information, atomic bomb test:
Gutenberg; Leet.
Seismic maps, velocity data: Dahm.
Geophysics (continued)
Seismology: Bagg, 2; Northrop, 10, 15; Reid, H. F.

Historical Geology

Abiquiu quadrangle: Smith, H. T. U., 1, 4, 6.
Abo formation: Bise; Romer, 5.
Afton craters, Dona Ana County: Lee, 8.
Alamita coal measures: Keyes, 83.
Alamosa Creek Valley, Socorro County: Winchester, 2.
Ancestral Rocky Mountains: Heaton, 1; Melton, 1; Schuchert, 5.
Animas sandstone: Keyes, 97.
Atwood copper group: Huntingdon, M. G.
Barberian series: Keyes, 129.
Basalt flows, age: Keyes, 90.
Basaltic sediments: Sidwell, 8.
Bayard area: Lasky, 6.
Beartooth sandstone: Keyes, 123.
Berenda limestone: Keyes, 114.
Bernalillo redbeds: Keyes, 112.
Bernalillo County: Bryan, K., 1.
Bernalillo shales: Keyes, 103.
Bibliography:
Through 1930: Wootton, 2.
Bioherms, Sacramento Mountains: Bowsher.
Black Range: Fries, 1; Gordon, C. H., 5.
Black River Valley: Lang, W. T. B., 17.
Blaine formation: Clifton, 1.
Buried mountains, Permian: Rich, 1, 6, 4.
Burlington limestone: Springer, F., 1.
Burro Mountains: Somers, 1.
Caballo Mountains: Herrick, C. L., 6; Keyes, 14.
Caballo novaculite: Baker, C. L., 7.
Cabezon Peak area: Freeman, J. C.
Cambrian, correlation: Walcott.
Capitan limestone: Keyes, 106; Lloyd, E. R., 1.
Capitan reef: Adams, J. E., 7; Link, 1, 2; Twenhofel, W. H.
Keyes, 24, 47, 68; King, P. B., 1; Richardson, 3.
Correlation: Williams, H. S.
Carlsbad dolomite: Lang, W. T. B., 12.
Analyses: Wells, R. C., 5.
Carthage coal field: Gardiner, J. H., 6; Needham, 6.
Castile formation: Kroenlein; Lang, W. T. B., 21; Udden.
Ceja del Río Puerco: Bryan, K., 25.
Cenozoic:
Tusas-Tres Piedras area: Butler, A. P., 1, 2.
Central district: Schmit, 4.
Central New Mexico: Needham, 12.
Cerrillos coal field: Lee, 20; Stevenson, J. J., 12.
Cerrillos Hills: Johnson, D. W., 5.
Cerro Colorado volcano: Wright, H. E., 1.
Chaco Canyon deposits: Bryan, K., 7.
Chaco River Valley: Bauer, 1.
Chacra Mesa-La Ventana coal field: Dane, 2.
Chaves County: Merritt.
Chupadera formation: Keyes, 92.
Analyses: Wells, R. C., 3.
Chupadera Mesa: Keyes, 69.
Cimarron vs. Chaves for redbeds: Keyes, 134.
Cimarron redbeds: Keyes, 99, 131.
Cimarron Range: Smith, J. F., 2, 3.
Cimarron Valley: Parker, B. H., 2.
Climate, Jurassic-Cretaceous: Leopold.
Clovis area: Antevs, 1, 6; Stock, 5.
Coal fields: see Economic Geology, coal fields
Coconino sandstone: Reiche, 2.
Colfax County: Griggs.
Colorado geosyncline: Harris, G. W.
Colorado group: Rankin; Stevenson, J. J., 10.
Comanche series: Hill, R. T., 9; Stanton, 2.
Contact manganese mine: Russell, P. L., 1.
Cornudas Mountains: Clabaugh; Timon; Zapp.
Correlation, general: Wilmarth, 1, 2.
Cretaceous: Cope, 14; Hansen; Harris, G. W.; Keyes, 89; Lee, 21; Osborn,
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H. F., 4; Pike, 1, 2; Reeside, 5; White, C. A., 14, 15.
Barberian series: Keyes, 129.
Beartooth sandstone: Keyes, 123.
Climate: Albritton; Leopold.
Colorado group: Rankin; Stevenson, J. J., 19.
Comanche series: Hill, R. T., 9; Stanton, 2.
Correlation: Brown, B., 2; White, C. A., 18.
Dakota sandstone: Stanton, 2.
Dakota series: Keyes, 26.
Morrison formation: Berry; Darton, 13; Mook; Stanton, 3; Stokes.
Ojo Alamo beds: Brown, B., 1, 2; Winchester, 1.
Revuelo formation: Keyes, 127.
San Juan Basin: Sears, 3; Umbach, 4; Vann, 1, 2.
Transgressive and regressive facies: Pike, 3; Sears, 3.
Trinity group: Lasky, 9.
Tucumcariian series: Keyes, 125.
Cretaceous-Tertiary boundary: Keyes, 133.
Curry County: Theis, 1.
Cyclolthems, Pennsylvanian: Young, J. A., 4.
Dakotan series: Keyes, 26.
Dakota sandstone: Stanton, 2.
Delaware Basin: Adams, J. E., 6; Coon; Lang, W. T. B., 5.
Delaware formation: Keyes, 79.
Devonian: Darton, 29; Marcou, 7; Stevenson, F. V., 4.
Correlation: Cooper, G. A.; Williams, H. S.
Onondaga equivalents: Stevenson, F. V., 2.
Ouray limestone: Keyes, 121.
Percha shale: Keyes, 85, 113.
Sly Gap formation: Stevenson, F. V., 1.
Southeastern New Mexico: Webb.
Dockum conglomerate: Roth, 2.
Dog Creek formation: Clifton, 1.
Eastern New Mexico: Baker, C. L., 2; Hill, R. T., 4; Lee; 5; Rich, J. L., 3; Van Dient, 1.
Eddy County: DeFord, 8; West Texas Geol. Soc., 1.
El Paso limestone: Kirk, E.
Eocene: Granger, 1, 2; Osborn, H. F., 4; Johanneson; Smith, J. H.
Animas sandstone: Keyes, 97.
Correlation: Brown, B., 2; Clark, W. B.
Estancia Valley: Keyes, 40.
Eunice oil field: Anderson, C. C.
Figueroa Wash: Slossan.
Florida Mountains: Becker.
Fluorite deposits: Goddard, 1; Rothrock, 1; Soule, 1.
Folsom, Union County: Bryan, K., 24; Cook, 1, 2.
Fusseilmann limestone: Keyes, 108.
Wells, R. C., 3.
Galisteo formation: Stearns, C. E., 2.
Gallinas Mountains: Kelley, 4, 6.
General: Abert; Antisell; Bailey, J. W.; Blake, 1, 2; Conkling, 1, 2, 3; Cope, 7, 12, 15; Dana; Darton, 12, 31, 33; Davis, W. M.; Emmons, S. F., 1, 3; Emory, 1, 2, 3; Gilbert, 1, 2; Gordon, C. H., 4; Griffin; Hayden, 1, 2, 3, 4; Herrick, C. L., 4, 5, 13; Hill, R. T., 2, 4; Howell, 1; Jewett; Johnson, D. W., 5; Jones, F. A., 12; Keyes, 5, 63, 64, 126; King, P. B., 2; Knox, J. K., 1; Leconte, 1, 3; Loew, 1, 5; Long; McFarlane, J.; Marcou, 1, 2, 3, 4, 5; Newberry, 1, 3, 4; Stevenson, J. J., 1; Wheeler, G. M., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11; Whipple, Wildenius.
Glaciation: Ellis, 8, 11; Ray, L. L., 2; Siebenthal, 1; Smith, H. T. U., 7; Stone, G. H., 1, 4.
Golden area, Santa Fe County: Em- erick.
Gran Quivira quadrangle: Bates, 9.
Ground Hog mine: Lasky, 1.
Guadalupe County, asphalt deposits: Gorman.
Guadalupe group: Beede, 2, 3; Darton, 26; Keyes, 93.
Guadalupe Mountains: Keyes, 77; Shumard, B. F., 1.
Gym limestones: Keyes, 118.
Headstone district: Benjovsky, 2.
Hermosa formation: Bradish, 2.
Hueco vs. Magdalena: Keyes, 85.
Hobbs and other oil fields: Carpenter, C. B.
Jemez (Valle) caldera: Ross, 4.
Jemez coal field: Reagan, 3.
Jemez Plateau: Kelly, C.
Historical Geology (continued)

Jornada del Muerto: Keyes, 1, 14; Shumard, G. G., 2.

Jurassic: Branson, E. B., 1, 3; Broadhead; Heaton, 3; Huene, 1, 3; Hyatt, 2; Keyes, 17, 86; White, C. A., 9.

Climate: Leopold.

Correlation: Baker, A. A., 2, 3; Schuchert, 2.

Overlap: Silver, 1.

San Juan Basin: Hoover.

Klamath formation: Clark, W. T.

Kilbourne Hole: Reiche, 3.

Ladron Mountains Noble.

Lake Valley district: Cope, 26; Keyes, 38.

Lake Valley limestone: Cope, 40; Keyes, 23, 102, 104, 109; Laudon, 1.

Lake Valley manganese deposits: Apell.

La Plata sandstone: Goldman.

Laramie group: Newberry, 8; Steven- son, J. J., 2, 6, 8.

Laramie hiatus, Southern Rocky Mountains: Keyes, 74.


Las Vegas quadrangle: Swanson; Williamson.

Lava fields: Dutton, 1, 5.

La Ventana-Chacra Mesa coal field: Dane, 2.

Lea County: Nye, 3.


Little Florida Mountains: Lasky, 11.

Little Hatchet Mountains: Lasky, 10, 13.

Llano Estacado: Baker, C. L., 1.

Lordsburg district: Lasky, 8.

Los Pinos Mountains: Stark, 1, 3.

Loup Fork formation: Cope, 49.

Lucero Mesa: Kelley, 3.

Luna County: Dutton, 14.

Madera limestone: Hasson; Johnson, R. B.; Keyes, 120.

Magdalena district: Koschmann, 2; Loughlin.

Magdalena group: Bisbee, 1, 2; Keyes, 119.

Magdalena Mountains: Gordon, C. H., 5; Herrick, C. L., 2, 4; Keyes, 19, 23.

Magdalena shales: Keyes, 137.

Manzano group: Lee, 12, 28; Keyes, 115, 116.

Manzano Mountains: Reiche, 6.

Mapping with aerial photos: Loel.

Mesaverde formation: Hendricks, 1, 2.

Mesaverde group: Keyes, 88.

Mesozoic: Dobrovolsky, 1; Heaton, 4; Marcon, 9; Stevenson, J. J., 9; White, C. A., 13.

Chama Valley: Colbert, 2.

Mica deposits: Jahns, 6.

Mimbres limestone: Keyes, 117.

Mississippiian: Gordon, C. H., 2; Laudon, 3, 4.

Bioherms: Bowsher.

Burlington limestone: Springer, F., 1.

Caballo novaculite: Baker, C. L., 7.

Lake Valley limestone: Cope, 40; Keyes, 23, 102, 104, 109; Laudon, 1.

Mogollon district: Ferguson, 1.

Mogollon Range: Henrich, 2.

Molas formation: Bradish, 2.

Monument oil field: Anderson, W. D.; England; Fulton, G. L.

Moreno Valley: Ray, L. L., 3; Smith, J. F., 1.

Morrison formation: Berry; Darton, 13; Lee, 1, 27; Mook, 2, 3; Stanton, 3; Stokes.

Mount Taylor region: Blodgett; Dutton, 2; Hunt, C. B., 1, 2, 4; Shimer, 1.

Mud deposits: Cope, 83.

Nacimiento series: Gardner, J. H., 9; Keyes, 81.

Nacimiento Mountains: Northrop, 14.

Navajo coal measures: Keyes, 130.

Navajo sandstone: Keyes, 95.

Newark system: Russell, I. C.


North-central New Mexico: Lee, 17.

Northeastern New Mexico: Baldwin; Garrett; Miller, B. F.; St. John.

Northern New Mexico: Conkling, 1, 2; Lesqueruehs, 6; Northrop, 16; Stevenson, J. J., 1, 5, 7.

Northwestern New Mexico: Darton, 5.

Ochoa series: Adams, J. E., 6; Donegan.

Ogallala formation: Bretz, 3; Cox, W. B.; Van Tuyl, 2.

Onondagan equivalents: Stevenson, F. V., 2.

Ordovician: Keyes, 87.

El Paso limestone: Kirk, E.

Simpson group: Bartley, 1.

Organ Mountains: Dunham, 1; Hunt, W. F., 1.
BIBLIOGRAPHY NEW MEXICO GEOLOGY

Ortiz Mountains: Keyes, 45; Ogilvie, 8.
Ouray limestone: Keyes, 121.
Paleocene: Brown, R. W., 3; Granger, 2; Sinclair, 1.
Paleogeography: Case, 9; McKee; Schuchert, 1.
Paleozoic: Bass, 2; Gordon, C. H., 1;
Heaton, 4; Keyes, 76; Nelson, L. A.
Central New Mexico: Lee, 9.
Correlation: Bass, 1.
Paleogeography: Case, 9.
Sedimentary basins: Read, 5.
Socorro County: Wilpolt.
Southern New Mexico: Darton, 18, 19.
Upper: Read, 3.
Pecos Mine: Stott.
Pecos Valley: Halibuton: Lang, W. T. B., 18; Roach; Robinson, T. W., 1;
Sennes; Sidwell, 3; Theis, C. V., 11.
Pediments:
Granite Gap: Bryan, K., 22.
Magdalena Mountains: Koschmann, 2; Smith, H. T. U., 2.
Rio Puerco: Bryan, K., 23.
Santa Fe area: Campbell, 1; Ogilvie, 2.
Socorro area: Bryan, K., 19.
 Peerless lead-zinc mine: Soule, 5.
Pegmatites: Hess, 4, 6, 7; Jahns, 3, 6, 7, 9; Just, 2; Kelley, 5; Page, 2.
Pennsylvanian: Halibuton: Henbest, 2, 5; Hollingsworth; Read, 1, 5;
Stevenson, F. V., 3; Thompson, M. L., 1, 2, 3; Young, J. A., 3, 4, 5.
Abo Canyon: Coleman.
Correlation: Brill; Moore, R. C., 2, 3; Needham, 7, 10.
Cyclothems: Young, J. A., 4.
Madera limestone: Hassen: Johnson, R. B.; Keyes, 120.
Magdalena group: Bisbee, 2; Keyes, 119.
Sandia formation: Keyes, 82.
Pennsylvania-Permian: Butler, R.;
Read, 1; Thompson, M. L., 2.
Percha shale: Keyes, 85, 113.
Permian: Adams, J. E., 2, 5; Archiac:
Baker, G. L., 5; Blanchard; Bybee, 1;
Cartwright: Cope, 28; Crandall; Darton, 27; DeFord, 2; Huene, 1;
King, F. B., 1, 3, 5; King, R. H., 2;
Lewis, J.; Needham, 12, 13; Read, 1;
Schneider; Teagle; Thompson,
M. L., 1, 2; Wheeler, R. R., 2;
Willis, 3.
Abo formation: Romer, 5; Bose.
Capitan limestone: Keyes, 106;
Capitan reef: Adams, J. E., 7; Link, 1, 2; Twenhofel, W. H.
Castile formation: Kroenelein; Lang, W. T. B., 21; Udden.
Chupadera formation: Keyes, 92;
Wells, R. C., 5.
Cimarron, red beds: Keyes, 99, 134.
Correlation: Baker, A. A., 1; Bass, 1;
Schuchert, 4; Skinner; Willis, R., 1.
Delaware formation: Keyes, 79.
Glorieta sandstone: Keyes, 91.
Guadalupe Mountains: Shumard, B. F., 1.
Guadalupe series: Beede, 2, 3; Darton, 26; Keyes, 93.
Manzano group: Keyes, 115, 116;
Lee, 12, 28.
Ochoa series: Adams, J. E., 6.
Pecos Valley: Adams, J. E., 7; Lang, W. T. B., 6; Wrathel.
Rustler Springs formation: Udden.
Salado formation: Lang, W. T. B., 8.
Salt deposits: Baker, C. L., 6; Darton, 23.
San Juan Basin: Read, 8.
Seven Rivers formation: Bates, 1.
Tansill formation: DeFord, 5.
West Texas: Adams, J. E., 2; Page, 1.
Yeso formation: Keyes, 79.
Permo-Carboniferous, northern New Mexico: Case, 3.
Pebbley mine area: Schmitt, 5.
Pleistocene, Portales Valley: Robbins, Sellards.
Pliocene: Cope, 5.
Pleco sandstone: Wells, R. C., 3.
Precambrian: Keyes, 16, 55.
Correlation: Van Hise.
Hamilton mine: Lindgren, 2.
Los Pinos Mountains: Hurst.
Pedernal Hills: Hurst.
San Juan Basin: Kelley, 11.
Prehistoric man: see Paleontology,
Man.
Pre-Moenkopi unconformity: Dake, 1.
Pre-Pennsylvania, northeastern New Mexico: Maher.
Historical Geology (continued)

Pre-San Andres formations: King, R. E., 3.

Puerco formation: Cope, 58; Dane, 1; Gardner, J. H., 9; Sinclair, 2.

Puerco area: Wells, E. H., 2.

Oligocene: Puertecito, Raton, Queita, Raton, Rattlesnake.

Redbeds: Recent.

Rio鲇河: Boulder County: H. E., 1

Rio Virgin formation: Recent.

Rocky Mountains: Uren.

Roswell area: Fisher, H., 9; Roosevelt County: Bryan, K., 25; Mertie, 1, 2, 11.

Sacramento Mountains: Northrop, 1.

Rustler formation: Bagg, 1; Ballmer, 2; Paige, 6, 11; Rickard, 1; Spencer, 2.

Santa Fe beds: Cope, 4, 10; Denny, 1, 3; Simpson, G. G., 1.

Santa Rita area: Bagg, 1; Ballmer, 2; Paige, 6, 11; Rickard, 1; Spencer, 2.

Santa Rosa sandstone: Gibson, D. T.; Roswell, 1.

Sediments from alaskite, Capitan Mountains: Sidwell, 7.

Salado formation: Lang, W. T. B., 8, 11, 20, 21.

Salina: Johnson, D. W., 1.

San Acacia area: Denny, 4.

San Andres formation: Keys, 12, Lewis, 2.

San Andres Mountains: Baker, C. L., 8; Herrick, C. L., 6.

San Agustin Plains: Powers, 2.

Sandia Cave: Bryan, K., 33; Hibben, 3, 4.

Sandia formation: Keyes, 82, 128.

Sandia Mountains, Ellis, 2; Herrick, C. L., 5.

Sand dunes:

Gypsum: Potter.

Modern sources, Rio Grande Valley: Rittenhouse, 3.

Sangre de Cristo Mountains: Keyes, 82, 128.

Sandia Mountains, Ellis, 2; Herrick, C. L., 5.

Sand dunes:

Gypsum: Potter.

Modern sources, Rio Grande Valley: Rittenhouse, 3.

Sangre de Cristo Mountains: Keyes, 82, 128.

Sandia Mountains, Ellis, 2; Herrick, C. L., 5.

Sand dunes:

Gypsum: Potter.

Modern sources, Rio Grande Valley: Rittenhouse, 3.

Sangre de Cristo Mountains: Keyes, 82, 128.
Correlation: Swartz.
Fusselmann limestone: Keyes, 108.
Wells, R. C., 3.
Silver City area: Hernon.
Silver City quadrangle: Paige, 7.
Simpson group: Bartley, 1.
Sloan Canyon formation: Stovall, 1.
Sly Gap formation: Stevenson, F. V., 1.
Socorro County: Herrick, C. L., 9.
Socorro Peak: Herrick, C. L., 4.
Southeastern New Mexico: Hoots;
Southern New Mexico: Darton, 16;
Endlich.
Southwestern New Mexico: Webster.
Tansill formation: DeFord, 5.
Terraces: Antevs, 4; Keyes, 61.
Aggraded: Keyes, 34.
Rio Puerco: Bryan, K., 23.
Tertiary: Cope, 5, 55; Dall, 2; Keyes, 35, 56; Matthew, 2; Stanton, 5.
Galisteo formation: Stearns, C. E., 2.
San Acacia area: Denny, 2.
San Juan Basin: Reeside, 2.
Tusas-Tres Piedras: Butler, A. P., 1.
Vallejo formation: Upson.
Tijeras Canyon: Keyes, 107.
Tijeras coal field: Lee, 16.
Tijeras quartzite: Keyes, 136.
Todillo limestone: Neef.
Torrejon formation: Dane, I; Gardner, J. H., 9; Sinclair, 2.
Triassic: Branson, E. B., 1, 3; Broad-
head: Drake: Huene, 1; Hyatt, 2; Keyes, 18; Mehl, 2; Teagle.
Dockum conglomerate: Roth, 2.
Newark system: Russell, I. C.
Pecos Valley: Lang, W. T. B., 18.
San Juan Basin: Wengerd.
Santa Rosa sandstone: Gibson, D. T.;
Sidwell, 2.
Southeastern New Mexico: Adams, J. E., 1; Sidwell, R. G., 5.
Trinity group: Lasky, 9.
Tucumcari Mountain: Cummins, I, 3;
Hill, R. T., 9; Keyes, 86.
Tucumcarian series: Keyes, 125.
Tularosa Basin: Calvin; Meineke, 3.
Tusas-Tres Piedras area: Butler, A. P., 1.
Twining district: Park, 2.
Upper Salt series: Coon.
Valencia County: Herrick, C. L., 9;
Johnson, D. W., 2.
Vallejo formation: Upson.
West Texas: DeFord, 4.
Triassic: Adams, J. E., 1.
White Oaks district: Smith, E. P.
White Rock Canyon: Emmanuel;
Frick, 1.
White Sands area: Botkin: Herrick, C. L., 11; Keyes, 100; Talmage, I, 2.
Woodford black shale: Ellison.
Yeso formation: Keyes, 79.
Zuni Plateau: Dutton, 2.

Mineralogy
Agates: Ellermeier; McCann, 2; Neely.
Jornada del Muerto: Manning.
Alunite: Hillebrand, 3.
Alunogen: Wells, R. C., 3.
Anhydrite: Adams, J. E., 2; Wells, R. C., 3.
Arsenopyrite, Tres Hermanas Moun-
tains: Smythe.
Atwood copper group: Huntington, M. G.
Auriachalcite, Magdalena district:
Keyes, 11.
Autunite, White Signal district: Leach,
F. I.
Azurite: Paul, F. P.; Ycates.
Barite: Clippinger, 5.
Bastnasite, Gallinas Mountains: Anon.,
28; Glass, 3.
Bauxite: Blake, 6.
Bentonite: Davis, C. W.; Ross, 1.
Beyerite: Heinrich, 2.
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Through 1930: Wootton, 2.
Bismuth minerals in pegmaties: Hein-
rich, 1, 2.
Bixbyite, Black Range: Fries, 2.
Blendeite: Schaller, 7.
Bromine in carnallite and sylvite: 
Lindberg.
Cadmium in smithsonite: Schaller, 8.
Calamine: Paul, F. P.
Organ Mountains: Ford.
Calcite: Schaller, 1, 10.
Optical: Anon., 27; Johnson, J. H.,
5, 4; Kelley, 1; Van Amringe.
Water Canyon, Socorro County:
Wells, R. C., 3.
Mineralogy (continued)
Caledonite, Las Cruces: Farrington, 1.
Caliche: Bretz, 4; Wells, R. C., 3.
Carbonate minerals, differential thermal analysis: Beck, 2; Faust, G. T.
Carbon dioxide gas: Germann, 1; Miller, J. C.; Russell, S.; Talmage, 6; Wells, E. H., 16; Wendland.
Carnallite, Eddy County: King, R. H., 1; Wells, R. C., 3.
Clay: Elkhorn:
Dona Ana County: Ellis, 2.
Eudialyte: Endlichite:
Fluorite, Luna County: Wells, 1; Glass, 2.
Gallinas County: Hillebrand, 3.
Gallinas district: Kelley, 6.
Gamma-ray studies, potassium salts: Spicer, 2.
Gems: Kay.
General: Bailey, J. W.; Brevoort; Lindgren, 6; Loew, 2; Stone, G. H., 3; U. S. Bur. Mines, 1, 2; U. S. Geol. Survey, 1.
Glass from atomic bomb: Ross, 5; Khan.
Glaucolite, Sandoval County: Wells, R. C., 3.
Globe pegmatite: Wright, L. A.
Grant County: Hillebrand, 1.
Graphite, Colfax County: Lakes, 4; Lee, 13, 19.
Gypsum: Brady, F. W., 2; Necilham, 1; Potter; Stone, R. W., 1, 2.
Halite: Ageton, 2; Darton, 3, 4.
Harding, pegmatite mine: Jahns, 3.
Lithium minerals: Soule, 3.
Muscovite, pink, analyses: Wells, R. C., 3.
Tantalum minerals: Montgomery; Soule, 3.
Headstone district: Benjovsky, 2.

Hedenbergite, Hanover: Wells, R. C., 3.
Helvite:
Iron Mountain district: Glass, 1, 2; Gruner, 2; Jahns, 2, 5; Strock, 1.
Grandview zinc mine: Weissenborn.
Hematite: Foshag, 1.
Huckelberry spar mine: Sur, 2.
Iceland spar: Johnson, J. H., 3, 4; Kelley, 1; Van Amringe.
Iodite, Lake Valley: Genth, 2.
Iron, oolitic ore: Kelley, 9.
Jarosite: Hillebrand, 3.
Johannsenite, Hanover: Schaller, 9; Wells, R. C., 3.
Kainite, Eddy County: Wells, R. C., 3.
Kaolinite, Tyrole: Wells, R. C., 5.
Lake Valley manganese deposits: Apell.
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Lead-silver ore: Gordon, R. E.
Leonite, Eddy County: Wells, R. C., 3.
Lepidolite: Ross, Stevens.
Limonite, Magdalena district: Wells, R. C., 3.
Little Hatchet Mountains: Lasky, 10, 13.
Lordsburg district: Lasky, 8.
Magdalena district: Loughlin.
Magnesite: Talt.
Magnetite: Keyes, 101.
Manganese minerals: Lasky, 11.
Manganiferous iron ore, Boston Hill: Entwistle, 1, 2.
Meerschaum: Sterrett, 1, 2.
Melanotekite, Hillsboro: Warren.
Meteorites: Brady, L. F., Farrington, 2; Foshag, 2; Genth, 1; Heineman; Henderson, E. F., 1, 2; Khan; Leard; Merrill, 3; Nininger, 1, 2, 3, 4, 5, 6.
Albuquerque: Beck, 1; Eakins.
Beetham: Leard.
Bonanza: Shepard.
Breece: Goldsmith.
Canoncito: Kunz, 1.
Costilla: Hills, R. C., 2.
El Capitan Mountains: Howell, 2.
Four Corners: Merrill, 4.
Glorieta Mountain: Cohen, 1, 2; Davis, G. L.; Hills, R. C., 4; Kunz, 3, 4, 5; Nininger, 8; Stevenson, R. G.
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Pojpaque: Brady, L. F.; Nininger, 2, 3.
Puesto-Ladron: LaPaz, 1, 2; Nininger, 9, 10; Smith, C. H.
Roy: Heineman; Nininger, 5.
Sacramento Mountains: Foote.
Sandia Mountains: Nininger, 1.
Santa Fe: Henderson, E. P., 1; Nininger, 8.
Mica deposits: Jahns, 6.
Mimetite: Harding mine: Hirsch, 2; Montgomery; Soule, 3.
Mimetite: Bowman; Paul, F. P.
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Monazite: Muench, I.
Montmorillonite: Dixon: Wells, R. C., 3.
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Taos County, purple: Schaller, 2.
New Mexico minerals: McGuiness, L.; Mikami; Northrop, 9.
Nickel-skutterudite, Grant County: Waller.
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Pecos mine: Stott.
Pencatite: Hunt, W. F., 1.
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Plumboboroasite: Hillebrand, 3.
Polyhalite, Lea County: Davison; Wells, R. C., 3.
Potash minerals: Ageton, 2; Schaller, 3, 4, 5, 6.
Potash deposits: Harley, 3; Storms, 3.
Potassium salts: Spicer, 2.
Pseudobrookite, Black Range: Fries, 2.
Pseudomorphs: Copper after azurite: Yeates.
Cubic quartz: Tarr, 2.
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Quartz: Tarr, 1, 2.
Near Las Vegas: Hobbs.
Pegmatitic: Jahns, 9.
Radioactive minerals: Hershey.
Salt: see Halite
Samarskite, Petaca: Hess, 6; Wells, R. C., 3.
Santa Rita mine: Hydrothermal alteration: Kerr, P. F.
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Sierra County: Harley, 1.
Silver City area: Packard: Wuestner.
Silver ore: Krieger, 2.
Skutterudite: Waller.
Stauber copper mine: Helmonquist, 2.
Staurolite: Branson, O. T.
Sulfur, Jemez Canyon: Mansfield, 1, 2; Wells, R. C., 3.
Talc: Carlsbad: Pierce, R. A.
Tellurium minerals: Ballmer, 1; Crawford, W. P.
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Thulite: Northrop, 6.
Tin, Black Range: Fries, 1; Volin.
Torbernite, White Signal district: Leach, F. L.
Tremolite in limestone: Patton, 1.
Turquoise: Anon., 1; Blake, 3; Clarke, 2; Cowan; Dinsmore, 3; Fender-
son; Jones, F. A., 10, 14; Kunz, 6; Lakes, 3; Penfield, 4; Pogue; Silli-
man, 2, 3; Sterrett, 3, 4, 5.
Burro Mountains: Anon., 3, 10;
Dinsmore, 2; Hidden; Knaus, 1;
Paige, 5; Snow, 1; Zalinski, 1, 2.
Cerrillos Hills: Anon., 1; Harring-
ton, E. R., 5; Johnson, D. W., 3.
Uranium minerals: Hershey; Keyes, 72.
Uranium: Penfield, 2.
Vanadate, Lake Valley: Genth, 3.
Vanadinite: Bowman; Paul, F. P.; Pen-
field, 1; Keyes, 76.
Vesuvianite: Moses.
Willemite: Lindgren, 4; Penfield, 3;
Pough.
Wulfenite: Ingersoll.
Zeolites: Needham, 5.
Zoisite: Schaller, 1.

Mineral Technology
Appraisal, mines: Finlay, 2.
Bayard mill: Brough.
Black Hawk concentrator, Hanover:
Wright, I. L., 2.
Mineral Technology (continued)

Blasting, Santa Rita: Ballmer, 3.

Coking properties, coal: Reynolds, D.

Concentration: Engel.

Barite: Fine.

Black Hawk concentrator: Wright, I.

Cyanide process in New Mexico:

Clark, V. V.

Lead-zinc: Brough: Jackson, I; Johnson, W. M.

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Manganese ores: Dean, K. S.; Dean, R. S.; DeVaneY, 2; Schack.

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Molybdenum: Carman, 2; Horton; Schilling.

Near Silver City: Brinsmade, 4.

Potash: Barr, J. A.; Coghill; Davison; Delarau; DeVaneY, 1; Harley, 5; Hubbell; Storch; Wilson, W. P.

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Conservation, oil: Dow, 2; Fell; Spurrer; Staley.

Construction materials, Tucumcari project: Irwin.

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Development:

Oil and gas: see Oil and gas developments

Potash mines: Ageton, I; Smith, H.

San Pedro: Brinsmade, 3.

Drilling:

Kearney mine, tungsten-carbide bits: Taylor, J. H.

Oil and gas: Barnes, K. B.; Coulter; Fagin, K. M.; Johnston, D.; Lahee, S., 4, 5.

Deep wells: Daniels, 1, 2; Darton, 1, 2; Fuller, M. L., 2, 3.

Permian Basin: Johnston, D; Schabarum.

San Juan Basin: Lilly

Potash reserves: Storms, 3.

Santa Rita, blast holes: Ballmer, 3.

Tungsten-carbide bits, Kearney mine: Taylor, J. H.

Dusting, coal mines: Bowles, 2.

Engineering, petroleum: Bulnes, 1; Carpenter, C. B.; Flood; Kinney, 2, 5; Lamb, N. R., 5.

Acidizing: Kastrop.

Flotation, langbeinite: DeVaney, 1.

Ground Hog mine: Richardson, F. W.

Gypsum industry: Santmyers, 1.

Haulage:

Clan and Seven Sisters mine: Goodier.

Santa Rita mine: Morris.

Irrigation: Sullivan.

Gila River: Black, 2.

Rio Grande: Barker, F. C.

San Juan Basin: Barrows.

Laws, mineral industries:

Placer mining, federal: Jackson, 2.

State: Fowler, 1, 2.

Tax, state: Ripley.

Leaching, nonultrate copper ores: Van Barneveld.

Lightweight aggregates: Anon., 32.

Benjovsky, I; Clippinger, 1, 2; Ingram.

"Lost mines": Parker, R. L.; Poage; Richardson, 2.

Marketing, oil and gas: Thompson, V.

Micrologging: Morazani.

Milling: see Concentration

Mineral production: see Mining statistics and Oil and gas development

Mining: Berliner, 1; Birnie; Brevoort; Henderson, C. W.; Luak.

Atwood copper mine: Storms, 5.

Barite: Anon., 34.

Bentonite: Davis, C. W.

Bayard area: Duriez.

Burro Mountains: Bush, 1.

Coal: Parry, V. G.; Sheridan, J. E.

Cooney district: Andersen, 1.

Copper: Gardner, E. D.; Storms, 5.

Eighty-Five mine: Youtz.

Elizabethtown: Claussen, 2.

Florida Mountains: Becker.

Fluorite: Lado.

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Harding pegmatite mine: Roos.

Headstone district: Benjovsky, 2.

Lead: Jackson, 1; Richardson, F. W.; Storms, 6, 7.

Mechanization, potash: Harley, 4; Smith, H. I., 2.

Mogollon district: Bush, 3; Kidder.

Near Silver City: Brinsmade, 4.

Organ Mountains: Trumbo.

Pinos Altos district: Bush, 2; Storms, 7.
Placer methods: Jackson, 2.
Potash: Anon., 31; Harley, 4, 5, 7; Haworth, 1; Hubbell; McGraw;
Storms, 4.
Questa molybdenum mine: Carmen, 1; Schilling.
Red River district: Bush, 4.
San Pedro: Berryman.
Santa Rita mine: Ballmer, 3; Clifford, 2; Dinsmore, 2; Harrington, E. R., 30; Luther; MacDonald, D. F.; Morris: Thorne.
Turquoise: Anon., 6; Blake, 8; Fenderson; Harrington, E. R., 6; Jones, F. A., 10; Pogue.
Zinc: Brinsmade, 1; Haddon; Jackson, 1; Storms, 6, 7.

Mining statistics:
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1870: Raymond, 2.
1872: Raymond, 3.
1873: Raymond, 4, 5.
1874: Raymond, 7.
1877: Raymond, 9.
1891: Prince.
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1897: Otero, 1.
1899: Fleming, 1; Otero, 2.
1900: Fleming, 2; Otero, 3.
1901: Otero, 4.
1902: Otero, 5.
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1907: Smith, R. V.
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1946: Anderson, E. C., 1; Bracewell, 14; Wright, I. L., 3.
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1949: Anderson, E. C., 5, 6; Callaghan, 1; Garcia, 3.
1950: Callaghan, 2; Garcia, 4.

Oil and gas developments:
General:
1923: Ellis, 3.
1931: Lang, W. T. B., 4.
1933: Shoefelt, 1.
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1938: Andrews, 1, 2; Miser.
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Permian Basin:
1925: Wallin, A. R.
1929: Rettger, 1.
1932: Vietti.
1936: Bybee, 2.
1937: Bybee, 3.
1938: Bybee, 4.
1939: Secor.
1940: Cole.
1942: Dickey, 3.
1943: Winter.
1944: Giesey.
1946: Boss.
1947: Cantrell.
1948: Henderson, C. F.
1949: Galley.
Rocky Mountain region: see San Juan Basin
San Juan Basin:
1925: Wood, F. E., 1.
1926: Wood, F. E., 2.
1927: Grinsfelder.
Mineral Technology (continued)
1928: Winchester, 3.
1929: Hintze.
1930: Coffin, 2.
1932: Johnson, C. D.
1942: Larsen, R. M., 1.
1943: Larsen, R. M., 2.
1945: Nates, 6.
1946: Nates, 8, 10.
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Cumulative through 1949: Kinney, 3.
Southeastern New Mexico: see Permian Basin
Oil and gas engineering: see Engineering, petroleum
Pipelines, Permian Basin: Logan.
Potash industry: Pierce, J. 2; Pierce, R. A.
Processing:
Pumice: Anon., 33.
Production: see Mineral Yearbooks, U. S. Bur. Mines
Potash: Cramer, White, N. C.
Metals: see Mining statistics
Nonmetals: see Mining statistics
Oil and gas: see Oil and gas developments
Salt: Phalen, 1.
Properties of petroleum: Bartram;
Dobbin, 1; Lane, E. C.; Smith, N. A. C.
Prospecting:
Potash: Harley, 3.
Uranium: Anon., 38.
Pumping, water wells: Barker, F. C.;
Darton, 8, 9; Meinzer, 1, 2, 3;
Slichter, 1, 2; Turner, S. F., 2.
Purification, natural gas: Anon., 36.
Quarrying, sandstone: Bowles, 1.
Questa molybdenum mine: Carman, 2;
Schilling.
Refining, manganese: Jacobs.
Reservoir characteristics: Bulnes, 1;
Hinson, 1, 2; Miller, H. C.
Reservoir technology: see Engineering, petroleum
Santa Rita mine: Ballmer, 3; Clifford, 2;
Dinsmore, 2; Harrington, E. R., 30;
Luther; MacDonald, D. F.;
Morris; Thorne.
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Coal: Belden.
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Utilization:
Coal: Parry, V. G.
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Paleontology
Abo Canyon section: Hawkins.
Abo formation: Branson, E. B., 4;
Bose; Romer, 5.
Aegirocharis occelata: Shufeldt.
Alamosaurus, Ojo Alamo formation:
Gilmore, 1.
Algae:
Permian, Gaudalupe Mountains:
Johnson, J. H., 2, 5, 6; Ruedemann.
Allognathosuchus mooki: Simpson, G., 2.
Ammonite, Albian, Mount Taylor:
Haas, O.
Ammonoids:
Abo sandstone: Bose.
Hueco formation: Miller, A. K., 5.
Lower Permian: Miller, A. K., 7.
Amphibians, Abo formation: Langston.
Animasaurus carinatus: Case, 2.
Animas formation flora: Knowlton, 9.
Antelope:
Quaternary: Stock, 1, 5.
Santa Fe beds: Cope, 10.
Antiquity of man: Cook, 1, 2; Stock, 4.
Araucarioxylon: Knowlton, 1.
Artifacts: Bryan, K., 27; Cotter, 1, 2;
Hay, 7; Howard, E. B., 1, 3; McCann, 2.
Ashmunella: Cockerell, 1.
Belodon: Cope, 27.
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Through 1930: Wootton, 2.
Bioherms:
Mississippian, Sacramento Mountains: Bowsher.
Permian: Link, 1, 2.
Birds:
Cave deposits: Howard, E. B., 1; Howard, H., 3; Wetmore, 2.
Eocene: Cope, 18.
Bishops Cap cave: Bryan, W. A.
Bison: Cotter, 2; Hay, 5; Howard, E. B., 1, 3.
Blastoids: Cline.
Brachiopods: Young, J. A., 1.
Percha shale: Stainbrook, 2.
Bryozoans: Condra.
Burlington limestone: Springer, F., 1.
Burnet Cave fauna: Schultz.
Carnarasaurus: Moenk, 1.
Caninia, Lower Carboniferous: Jef-fords.
Capitan reef, Permian: Adams, J. E., 7; Twenhofel, W. H.
Carboniferous fauna: Hill, J., 1; Keys, 13; Newberry, 5; White, C. A., 4.
Carnivora: Cope, 17.
Cave deposits: Bryan, W. A.; Fosberg; Howard, E. B., 5; Howard, H., 1, 3; Miller, A. H.; Schultz; Stock, 2, 3; Wetmore, 1, 2.
Cephalopods: Reeside, 3.
Cretaceous: Scott, G., 1, 2.
Mississippian: Miller, A. K., 4.
Permian: Clifton, 2; Miller, A. K., 3, 5, 6.
Pennsylvanian: Miller, A. K., 1, 2, 7; Young, J. A., 2.
Ceratopsia: Wiman, 1.
Cerro Pedernal fauna: Bryan, K., 28.
Chaco Canyon, Upper Cretaceous fauna: Vann, 1.
Champsosaurus: Cope, 24.
Chara: Knowlton, 2.
Cheliceratrid bryozoa: Moore, R. C., 4.
Chinle fauna: Colbert, 2.
Chirox: Cope, 60.
Clovis area, man: Antevs, 1; Clark, W. T., Jr.; Cotter, 2; Figgins; Howard, E. B., 2, 3; Lohman; Patrick; Stock, 5.
Coelophysis: Cope, 64.
Colorado group fauna: Rankin; Stan-ton, 1.
Conchoeclyus admirabilis: Hay, 2.
Corals, Lower Pennsylvanian: Moore, R. C., 5.
Cotylorhynchus: Welles, 2.
Cretaceous:
Fauna: Conrad; Cope, 5; Meek, 2.
Flora: Gress; Lesquereux, 3.
San Juan Basin: Colbert, 2.
Crinoid, Sagenocrinus: Springer, F., 2.
Crocodile: Mook, 5, 6; Wiman, 3.
Cryptoblastus: Cline.
Cryptoglaux funerea: Howard, H., 2.
Cycadeoids: Wieland, 1, 3, 4.
Ctenostomatus bryozoa: Condra.
Deer: Cope, 10.
Devonian fauna: Stainbrook, 1; Stevens-son, F. V., 4.
Diodectes lentus: Case, 2.
Diatoms: Lohman; Patrick.
Dicytoldenous flora: Knowlton, 8.
Dinosaurs: Colbert, 1; Cope, 62; Gilmore, 5, 4; Mook, 4; Reeside, 1; Russell, L. S.; Simpson, G. G., 6; Strawn, 1.
Edaphosaurus: Williston, 5.
Eocene: Granger, 1.
Bird: Cope, 18.
Faunas: Cope, 19.
Mammalia: Cope, 22, 25; Wiman, 3.
Vertebrata: Cope, 6, 20, 30.
Eryopsidae: Douthitt.
Fish:
Cretaceous: Brown, R. W., 1, 2.
Jurassic: Koerner.
Paleozoic: Newberry, 7.
Folsom deposits: Bryan, K., 24; Cook, 2; Howard, E. B., 3.
Yuma artifacts: Renaud, 1.
Footprints, Abo formation: Branson, E. B., 4.
Forbesiocrinus: Springer, F., 2.
Fusulinids: Clair; Needham, 4.
Pennsylvanian: Thompson, M. L., 1, 2, 5, 6.
Permian: Dunbar, 1, 2.
Galisteo formation: Stearns, C. E., 2.
Gastropods:
Carboniferous: Girty, 4, 5.
Tertiary: Cockey, 5.
Girvanella: Johnson, J. H., 1.
Ctenostomatus bifidus: Wiman, 3.
Gran Quivira quadrangle: Bates, 9.
Ground sloth: Eames; Lull, 2, 3.
Gryphaea pitching: Marcou, 8.
Paleontology (continued)
Guadalupe Mountains: Shumard, B. F., 2, 3, 5.
Guadalupian fauna: Beede, 2; Girty, 2.
Haploconus: Cope, 36.
Hemicydoninae: Frick, 2.
Hemiganus: Cope, 38, 55.
Hyracops socialis: Thorpe, 1.
Hydarchotherium: Wortman, 1.
Ictiderid: Miller, A. H.
Insects: Brues; Cockerell, 6.
Insectivores: Matthew, 4; Reynolds, T. E., 1, 2.
Invertebrate:
Fauna: Clifton, 1; Cope, 34.
Mesozoic: Whitney.
Kritosaurs: Brown, B., 1.
Lemuroids: Cope, 53.
Lepidodendra: Keyes, 83.
Limnoscelis: Williston, 3.
Little Hatchet Mountains: Lasky, 13.
Macraeopsopus: Stovall, 1.
Magdalena group: Bibeec, 1, 2.
Mammals: Burnet; Cope, 22, 25, 29, 44, 45, 53, 54; Cotter, 1; Frick, 3;
Gazin; Granger, 3; Hay, 5; Matthew, 3, 8; Osborn, H. F., 1, 3;
Reynolds, T. E., 3; Simpson, G. G., 3, 4; Stock, 1, 3; Wilson, R. W., 1;
Wood, A. E.; Wortman, 3.
Mammals: Burnet; Cotter, 1; Frick, 3; Howard, E. B., 1.
Man: Bryan, K., 27, 28, 29, 32, 35; Burnet; Cook, 1, 2; Cotter, 1; Eiseley;
Figgens; Hay, 7; Hibben, 1, 2;
Howard, E. B., 3, 4; Judson, 1;
Roberts; Sellards; Thorne.
Marmots: Stearns, C. E., 1.
Marsupials: Cope, 37, 50, 60.
Mastodons: Burnet; Cope, 9, 16; Cotter, 1; Frick, 3, 4; Jones, F. A., 11;
Leidy, 1.
Meniscotherium robustum: Thorpe, 1.
Mississippiian fauna: Cline.
Mizzius: Johnson, J. H., 5.
Mollusca: Clark, W. T., Jr., 1; Cockerell, 3, 4, 5; White, C. A., 7, 8, 11, 19.
Morrison formation: Berry; Stanton, 5.
Flora: Berry; Knowlton, 7.
Multituberculata: Granger, 5.
Nautiloids: Miller, A. K., 2, 3, 6.
Naupasuchus: Mock, 6.
Nathlodectes: Matthew, 7.
Nubercularia: Johnson, J. H., 1.
Ochoa series: Donegan.
Onondagan fauna: Stevenson, F. V., 2.
Ostracods: Toditio limestone: Swain.
Ostreidae, Cretaceous: Stephenson.
Ovis canadensis: Stovall, 2.
Owl, great horned: Wetmore, 1.
Paleocene fauna: Cooper, C. F.; Matthews, 9.
Paleozoic faunas: Bridge.
Parasaurolophus tubicen: Wiman, 2.
Pennsylvanian fauna: Brill.
Perissodactyla: Wortman, 1.
Permian:
Amphibia: Case, 1.
Faunas: Clifton, R. L., 2; Cope, 28;
Hills, J. M., 1; King, F. B., 5; King, R. E., 1; Shumard, B. J., 4, 5.
Reptilia: Cope, 21; Williston, 2, 9.
Vertebrates: Camp, 2; Williston, 1.
Perno-Carboniferous vertebrates: Case, 5.
Petrified forest near Cerrillos: Northrop, 1; Harrington, E. R., 4.
Physa: Springer, A.
Phytonomorpha: Cope, 2.
Phytosaurs: Camp, 1; Mehl, 3; Stovall, 1.
Plagiogalacidae: Cope, 58.
Plants: Lesquereux, 1, 2, 6; Newberry, 6.
Cenozoic: Knowlton, 7; LaMotte; Lesquereux, 3, 4, 5.
Mesoic: Knowlton, 7; LaMotte; Lesquereux, 3, 4, 5.
Shelter Cave deposits: Fosberg.
Pelestocene:
Snails: Cockerell, 2.
Vetebrates: Sellards.
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Fossil formations: Wilson, R. W., 2.
Pterodactylia: Haas, O.
Pseudocrocodil: Denison, R. H.
Ptychotherium: Cope, 59.
Furco vertebrate fauna: Cope, 37, 41, 43, 45, 46, 50, 54, 56, 61, 62; Earle;
Matthew, 1; Osborn, H. F., 1;
Simpson, G. G., 3.
Pyrolohamphus: Miller, A. H.
Reefs, faunas: Mills, J. M.
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Rhinoceros: Cope, 51.

Road-runner: Howard, H., 1.

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

Ruminants: Frick, 5; Gidley; Thorpe, 2.

Rustler formation: Donegan.

Sacramento Mountains:

Mississippian: Laudon, 3.

Upper Pennsylvanian: Penn.

Sagenoramus: Springer, F., 2.

Sandia man: Eiseley; Hibben, 1, 2, 3, 4.

San Jose culture: Bryan, K., 35.

San Juan Basin: Gilmore, 5.


Paleocene: Wilson, R. W., 2.


San Juan County:

Fruittland and Kirtland formations, flora: Knowlton, 5.

Nonmarine Cretaceous: Stanton, 6.

Vertebrates: Gilmore, 1.

Sauropod dinosaurs: Gilmore, 3, 4; Lull, 1; Mook, 4.

Scaphopoda:

Carboniferous: Young, J. A., 2.

Pennsylvanian: Young, J. A., 2.

Schizoblastus: Gline.

Schizophoria: Northrop, 12.

Scoliomus puercensis: Williston, 6.

Sly Gap fauna: Stainbrook, 3.

Snails: Cockerell, 2.

Physa: Springer, A.

Sphenocodon: Williston, 11.

Spirifer organensis: Greger, D. K., 1.

Spirifer rockymontanus: Williams, J. S.

Stegosauroids: Lull, 1.

Steneofiber: Cope, 9.

Tertiary: Conrad.

Flora: Lesquereux, 3, 4, 5; Newberry, 6.

Mollusca: Cockerell, 3, 4, 5.

Tetrapoda: Romer, 1, 5; Williston, 10.

Triassic:

Flora: Daugherty; Fontaine.

Reptiles: Mehl, 1.

Triasodon: Cope, 23, 47.

Turtles: Hay, 4; Wiman, 4.

Turkeys: Needham, 5; Shufeldt.

Ungulates: Cope, E. D., 11; Earle, 1.

Vermejo and Raton floras: Knowlton, 6.

Vertebrates: Camp, 2, 3; Case, 5, 6, 7; Colbert, 3; Cope, 3, 5, 6, 7, 19, 20, 30, 31, 48, 61, 62, 63, 65, 66; Dean, B.; Hay, 1, 6, 7; Leidy, 2; Matthew, 5; Needham, 3; Welles; Williston, 8.

Wasatch fauna: Cope, 17; Matthew, 6.

Woodford black shale: Ellenio.

Xiphodon, insect larva (?): Cockerell, 6.

Yuma artifacts: Renaud.

Zalambdodont insectivore: Matthew, 4.

Petrology

Abiquiu quadrangle: Wells, R. C., 3.

Alakite, Capitan Mountain: Sidwell, 7.

Analbite camptonite: Ogilvie, 1.

Analyses: see Rock analyses

Andesite, artifacts: Bryan, K., 29.

Camptonite: Ogilvie, 1.

Capitan quadrangle: Patton, 2.

Dikes: Sidwell, 6.

Cerrillos Hills: Johnson, D. W., 3.

Cerro Colorado, extinct volcano:

Cort, H. E., 1.

Cimarron Range: Smith, J. F., 3.

Dacite, Colfax County: Stobbie, 3.

Deming quadrangle, latites, analyses:

Wells, R. C., 3.

Dikes:

Capitan quadrangle: Sidwell, 6.

Otero County: Clabaugh, 2.

Donna County: Dunham, 1.

Eastern New Mexico: McCullough.

Eudalite-bearing dikes, Otero County:

Clabaugh, 2.

Extrusives, northeastern New Mexico:

Collins, R. F., 1.

Gallinas Mountains: Kelley, 4, 6.

General: Lindgren, 6; Loew, 1, 2.

Globe pegmatite: Wright, L. A.

Granite in wells: Gould, 1; Lee, 29.

Harding pegmatite: Johns, 3; Montgomery; Soule, 3.

Headstone district: Benjovsky, 2.

Laughlin Peak, dacite: Stobbie, 3.


Las Vegas quadrangle: Williamson.

Lavite, analyses: Wells, R. C., 3.

Little Hatchet Mountains: Lasky, 13.

Lordsburg district: Lasky, 8.

Los Pinos Mountains: Stark, 3.

Lucero Mesa: Kelley, 3.

McCarty’s basalt flow, Valencia County:

Nichols, 8.
Petrology (continued)

Magdalena district: Loughlin; Wells, R. C., 3.
Manzano Mountains: Reiche, 6.
Monzonite, Magdalena district, analysis: Wells, R. C., 5.
Moonstone pegmatite, Black Range: Kelley, 5.
Northeastern New Mexico, volcanics: Stobbe, 1, 2.
Northern New Mexico: Conkling, 2; Northrop, 16.
Organ Mountains: Dunham, 1.
Orriz Mountains: Ogilvie, 3.
Pegmatites: Heinrich, 1, 2; Jahns, 3, 5, 7, 9; Landes, 1, 2.
Globe: Wright, L. A.
Harding: Jahns, 5; Montgomery; Soule, 3.
Moonstone: Kelley, 5.
Petaca: Jahns, 6.
Pegmatitic quartz; Jahns, 9.
Precambrian, Sangre de Cristo Mountains: Sidwell, 9.
Pumice: Benjovsky, 1.
Pyroxenic rocks, Gila River: Merrill, 1.
Quartz molybdenum mine: Larsen, E. S., 1; Schilling; Vanderwilt, 2.
Raton area: Mertie, 1, 2, 3.
Red River district: Park, 2; Sidwell, 4.
Rock analyses: Clarke, 5.
Abiquiu quadrangle: Wells, R. C., 3.
Deming quadrangle, latites: Wells, R. C., 3.
Magdalena district, monzonite: Wells, R. C., 3.
San Juan Basin: Wells, R. C., 3.
San Agustin Plains, volcanics: Powers, 2.
San Juan Basin: Bowen; Wells, R. C., 3.
San Juan Mountains, Tertiary volcanics: Larsen, E. S., 2.
Scoria: Benjovsky, 1.
Sierra Cuchillo: Jahns, 1.
Tertiary:
Pecos Valley, intrusives: Semmes.
San Juan Mountains, volcanics: Larsen, E. S., 2.
Tewan Mountains, volcanics: Iddings.
Virginia district: Lasky, 7.
Volcanics:
Cerro Colorado: Wright, H. E., 1.
McCarty's basalt flow: Nichols, 8.

Northeastern New Mexico: Collins, R. F., 2; Stobbe, 1, 2.
San Agustin Plains: Powers, 2.
San Juan Mountains: Larsen, E. S., 2.
Tewan Mountains: Iddings.
Xenoliths, Organ batholith: Dunham, 2.

Physical Geology

Abiquiu quadrangle: Smith, H. T. U., 1, 4, 6.
Albuquerque area: Bryan, K., 1; Herrick, C. L., 3.
Apache mica mine: Holmquist, 3.
Arid regions, geologic processes: Keyes, 43.
Arroyo cutting: Bryan, K., 30.
Artesia oil field: Davis, M. J.
Atwood copper group: Huntington, M. G.
Barker Creek dome: Pishel.
Basin and range structures: Longwell; Sauer.
Bayard area: Lasky, 6.
Bedding-slips, Los Pinos Mountains: Stark, 2.
Bernalillo County: Bryan, K., 1.

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Through 1930: Wootton, 2.
Bishop Cap fluor spar prospect: Sur, 1.
Black Range: Fries, 1; Gordon, C. H., 5.
Block mountains: Darton, 20, 22; Herrick, C. L., 17; Johnson, D. W., 4.
Bolons: Keyes, 1, 7, 14, 22; Tight.
Brilliant quadrangle: Lee, 31; Mertie, 3.
Buttress structure, volcanic plugs: Branson, E. B., 2.
Caballo Mountains: Allen, C. A.; Clift ford, 1; Larsh, 1.
Cabezon Peak area: Freeman.
Caldera, Jemez (Valle): Ross, 2, 4.
Canadian River: Hill, R. T., 1.
Capitan Mountains: Knapp.
Capitan quadrangle, dikes: Sidwell, 6.
Carlsbad Caverns: Bretz, 2; Haas, W. H.; Hess, 5; Lee, 34, 37, 38.
Carrizo lava flow: Just, 1.
Caves: Bretz, 1.
Bat Cave: Brady, F. W., 1.
Carlsbad Caverns: Bretz, 2; Haas, W. H.; Hess, 5; Lee, 34, 37, 38.
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Cerro Colorado volcano: Wright, H. E., 1.
Correllos Hills: Johnson, D. W., 3.
Cerro Colorado volcano: Wright, H. E., 1.
Channel changes, Rio Puerco: Bryan, K., 12.
Chaves County: Merritt.
Cima Range: Smith, J. F., 2, 3.
Clastic plugs and dikes: Parker, B. H., 1, 2.
Coal fields: Kirk, C. T., 2.
Colorado Plateau: Moore, R. C., 1.
Conchas dam: Crosby.
Cone, volcanic: Marcou, 13.
Contact manganese mine: Russell, P. L., 1.
Cornudas Mountains: Clabaugh, 1.
Concretions: Gardner, J. H., 1.
Contact: Zapp.
Craners, volcanic: Keyes, 32.
South-central New Mexico: Perkins.
Dam sites: Bryan, K., 15.
Cactus Flat: Nye, 1.
Conchas: Crosby.
No. 3 Reservoir site, Carlsbad project: Meiner, 5.
Red River: Powell, W. C., 2.
State Line: Bryan, K., 11.
Zuni: Anon., 12.
Deming quadrangle: Darton, 17.
Dona Ana County: Dunham, 1.
Drying cracks, Animas Valley: Lang, W. T. B., 14.
Earthquakes: Bagg, 2; Northrop, 10, 15; Reid, H. F.; Thomas.
Elk Mountain mica deposit: Holquist, 1.
Eolian dam, Tucumcari: Dobrovolsky, 2.
Erosion:
Arid regions: Bryan, K., 10, 16, 31; Church; Keyes, 41, 42, 43, 44, 46, 49, 51, 53, 54, 58, 84; Rich, J. L.; Zoeller.
Arroyo cutting: Bryan, K., 4, 30; Arroyo meanderling: Leighly.
Channel cutting: Bryan, K., 9, 12; Rich, J. L.; 2; Stevenson, J. J., 7.
Deflation: Keyes, 49, 51.
Eolian: Blackwelder; Bryan, K., 34; Keyes, 42, 44, 46; Stunzi.
Gravel as resistant rock: Paige, 4; Rich, J. L., 1.
Pedicaments: Bryan, K., 19, 22, 23; Campbell, J.; Church; Koschmann, J.; McCann, J.; Ogilvie, 2, 3; Smith, H. T. U., 2.
Solution and fill: Lee, 55, 56.
Stream cutting: Bryan, K., 4, 9, 12, 30; Rich, J. L., 2; Stevenson, J. J., 7.
Tereses: Antevs, 4; Bryan, K., 23.
Espanola Valley: Denny, 5.
Estancia Valley: Keyes, 40; Meineker, 1.
Explosion craters: Darton, 15.
Faults:
Post-bolson: Dake, 2.
Recent, Organ Mountains: Reiche, 1.
Sangre de Cristo Mountains: Cabot.
Southwest of Los Pinos Mountains:
Stark, 2.
Southwestern New Mexico: Darton, 15.
Tularosa Basin: Talmage, 3.
Fault scarps:
Organ Mountains: Reiche, 1.
Sangre de Cristo Mountains: Cabot.
Tularosa Valley: Talmage, 3.
Florida Mountains: Becker.
Flow: see Lava flows
Folding:
Lincoln County, Chupadera beds:
Talmage, 4.
Northeastern New Mexico: Van Diest, 12, 2.
Permian:
Wheeler, R. R., 2.
Fracture in potash beds: Cathcart.
Frost marks: Lang, W. T. B., 15.
Gallinas Mountains: Case, 4; Kelley, 4, 6.
General:
Abert; Antevs; Blake, 1, 2; Conkling, 1, 3; Cope, 12, 15; Dana; Darton, 12, 31, 33; Davis, W. M.; Emmons, S. F., 1, 2, 3; Emory, 1, 2, 3, Gilbert, 1, 2; Gordon, C. H., 4; Griffin; Hayden, 1, 3, 4; Herrick, C. L., 4; Hill, R. T., 2, 4; Howell, 1; Jewett; Johnson, D. W., 5; Jones, F. A., 12; Keyes, 63, 130; King, P. B., 2; Leconte, 1; Loew, 1, 3; Long; MacFarlane, J.; Marcou, 1, 2, 3, 4, 5; McRae; Newberry, 1, 3, 4; Stevenson, J. J., 1; Wheeler, G. M., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11; Wissolius.
Physical Geology (continued)

Gila region: Blake, 6; Merrill, 1.

Glaciation: Ellis, 8, 11; Ray, L. L., 2; Siebenthal, 1; Smith, H. T. U., 7; Stone, G. H., 1, 4.

Gran Quivira quadrangle: Bates, 9.

Ground Hog mine: Lasky, 12.

Guadalupe County, asphalt deposits: Gorman.

Guadalupe Mountains: Baker, C. L., 3; Tarr, R. S., 3; Wheeler, R. R., 2.

Harding pegmatite mine: Jahns, 3, 7; Soule, 3.

Heavy minerals:

Transportation and deposition:  
Ritenhouse, 2.

White Sands: Needham, 9.

Ice caves: Harrington, E. R., 1, 9; Harrison, C.; Lee, 39; MacClary; Peck.

Iron Mountain district: Jahns, 2, 5; Storms, 1, 2.

Jemez (Valle) caldera: Ross, 2, 4.

Jemez Mountains: Church.


Jornada del Muerto: Keyes, 14, 22; Shumard, G. G., 2.

Kilbourne Hole: Reiche, 3.

Koehler quadrangle: Lee, 31; Mertie, 3.

Laccoliths: Keyes, 65.

Ladron Mountains: Noble.

Lake Valley manganese deposits: Apell.

Lake Otero: Herrick, C. L., 16.

Lake San Agustin: Powers, 1.

Lakes, ephemeral: Keyes, 2.

Landslides: Cross, 1.

Caused by lightning: Workman.

Chaco Canyon: Dodge.

Periglacial: Smith, H. T. U., 3.


Las Vegas quadrangle: Swanson.

Lava flows:

Banding: Nichols, 5.

Collapse-depressions: Nichols, 7.

Grooved surfaces: Nichols, 4.

Pressure-ridges: Nichols, 7.

Recent: Harrington, E. R., 5; Just, 1; Keyes, 90; Nichols, 3, 4, 5, 6, 7; Storms, 5, 2.

Squeeze-ups: Nichols, 3.

Units: Nichols, 2.

Viscosity: Nichols, 6; Ross, 3.

Little Florida Mountains: Lasky, 11.

Little Hatchet Mountains: Lasky, 10, 15.

Lincoln County: Knapp.

Llano Estacado: Baker, C. L., 1; Cumnins, 1; Price, W. A., 3.

Lordsburg district: Lasky, 4.

Los Pinos Mountains: Stark, 1, 2, 3.

Lucero Mesa: Kelley, 3.

Luna County: Darton, 14.

McCarty's lava flow: Nichols, 7, 8.

Magdalena district: Loughlin.


Manzano Mountains: Reiche, 6.

Mapping with aerial photos: Loel.

Meteorite crater: LaPaz, 3.

Moonstone pegmatites: Kelley, 5.

Moreno Valley: Ray, L. L., 1, 3; Smith, J. F., 1.

Mount Taylor region: Dutton, 2; Harrington, E. R., 2; Hunt, C. B., 1, 3, 4; Johnson, D. W., 6.

Mud deposits: Cope, 33.

Mud balls, armoured: Bell.

Nacimiento Mountains: Northrop, 14.

Necks: see Plugs and necks


Northeastern New Mexico: Baldwin; Garrett: Harley, 2; St. John; Sternberg.

Northern New Mexico: Conkling, 1, 2; Northrop, 16; Stevenson, J. J., 5.

Oil and gas traps: Barnes, F. C., 5; Bartley, 2.

Oolites, Carlsbad Caverns: Hess, 5.

Ore deposits as related to structures: Billingsley; Newhouse, 1, 2.

Organ Mountains: Dunham, 1, 2.

Peres mine: Stott.

Pecos Valley: Morgan, 2; Theis, C. V., 11.

Pedestal rocks: Bryan, K., 2, 3, 8.

Pediments:

Granite Gap: Bryan, K., 22.

Magdalena Mountains: Koschmann, 1; Smith, H. T. U., 2.

Rio Puerco: Bryan, K., 23.

Santa Fe area: Campbell, 1; Ogilvie, 2.

Socorro area: Bryan, K., 19.

Peerless lead-cinc mine: Soule, 5.

Pegmatites: Hess, 4, 6, 7; Hirschi, 1; Jahns, 3, 6, 7, 9; Just, 2; Kelley, 5; Landes, 1.

Pewabic mine area: Schmitt, 5.

Pisolites, spring deposits: Northrop, 2, 3.
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Plugs and necks, volcanic: Branson, E.
B., 2; Harrington, E. R., 2; Hunt, C. B., 4; Johnson, D. W., 6.
Polished rocks, Cornudas Mountains:
Lang, W. T. B., 16.
Post-bolson faulting: Dake, 2.
Potholes, high level: Peters, J. R.
Puertecito area: Wells, E. H., 2.
Questa molybdenum mine: Schilling:
Vanderbilt, 2.
Raton Mesa: Lee, 25, 30; Mertie, 1.
Raton quadrangle: Lee, 31; Mertie, 3.
Red River dam sites: Powell, W. C., 2.
Rio Grande depression: Bryan, K., 26;
Needham, 8; Northrop, 4; Simpson, G. G., 9.
Rio Puerco area: Bryan, K., 23; Renick, 2; Wright, H. E., 2.
Rio Salado, channel cutting: Bryan, K., 9.
Rock slide: Workman.
Sacramento Mountains: Pray.
San Acacia area: Denny, 2, 4.
San Agustin Plains: Powers, 2.
San Andres Mountains: Baker, C. L., 8.
Sand dunes: Bryan, K., 36.
Sandia Mountains: Ellis, 2; Harrington, E. R., 17; Keys, 98.
Sands, modern sources, Rio Grande Valley: Rittenhouse, 3.
Sangre de Cristo Mountains: Cabot; Conkling, 1; Dana; Gruner, 1.
San Juan Basin: Barnes, F. C., 1, 2, 3, 4, 5; Cope, 7; Cross, 5; Dana, 4;
Darton, 5, 6; Gregory, 1, 2; Harrington, E. R., 23; Hunt, C. B., 5; Kelley, 12; Kirk, C. T., 1; Sears, J. D., 2; Silver, 3; Simpson, J. H.
Oil and gas fields: Colton.
San Miguel County: Allison.
Santa Fe area: Blake, 5.
Santa Rita area: Ballmer, 2; Paige, 11; Spencer.
Sedimentation: Brown, C. B.
Lakes: Bryan, K., 16; Robinson, H. F., 1, 2.
Pecos River: Sidwell, 3.
Recent: Rittenhouse, 2, 3.
Rio Grande: Flock; Happ, 1, 2; Stabler; Rittenhouse, 2, 3.
South Canadian River: Sidwell, 1.
Zuni watershed: Bryan, K., 10.
Sediments, source of:
Alaskite: Sidwell, 7.
Basalts: Sidwell, 8.
Precambrian rocks: Sidwell, 9, 10.
Shiprock: Vokes.
Sierra Cuchillo: Jahns, 1.
Sierra del Oro: Keyes, 62.
Silver City area: Hemon; Paige, 4, 7.
Sinkholes, south-central New Mexico:
Perkins.
Soil: Means.
Pecos Valley: Means.
Solution and fill: Lee, 25, 56.
Solution, Pecos Basin: Morgan, 3.
State line dam site: Bryan, K., 11.
Stream trenching, Silver City area:
Rich, J. L., 2.
Subsurface mapping: Dahm.
Tectonics: Darton, 28, 35.
Terraces: Antevs, 4; Bryan, K., 23;
Keyes, 61.
Aggraded: Keyes, 54.
Traps, structural: Dobbin, 2.
Tularosa Basin: Calvin.
Tuas-Tyres Piedras area: Butler, A. P., 1, 2.
Valle (Jemez) caldera: Ross, 2, 4.
Ventifacts: Needham, 2.
Virginia district: Lasky, 7.
Volcanoes: Harrington, E. R., 5; Herrick, C. L., 4; Hill, R. T., 10; Hunt, C. B., 4; Lee, 18; Marrcou, 13; Williams, H.; Wright, H. E., 1.
Weathering processes and products:
Reiche, 5.
White Eagle fluorspar mine: Soule, 2.
White Rock Canyon: Emmanuel.
White Sands area: Botkin; Herrick, C. L., 11; Keyes, 100.
Wind erosion: Blackwelder; Keyes, 42, 44, 46; Stuntz.
Wind-polished rocks: Bryan, K., 34.
Zuni dam: Eckel, E. B.

Physiographic Geology

Afton craters: Lee, 8.
Aggraded terraces, Rio Grande: Keyes, 34.
Albuquerque region: Herrick, C. L., 10.
Arroyo cutting: Bryan, K., 4, 30.
Bernalillo County: Bryan, K., 1.
Physiographic Geology (continued)
Block mountains: Herrick, C. L., 17;
Johnson, D. W., 4; Keyes, 6.
Bolson plains: Keyes, 1, 7, 39; Tight.
Canyons, northeastern New Mexico:
Lee, 3.
Carlsbad Caverns: Horberg.
Caves, Guadalupe Mountains: Baker,
C. L., 3; Bretz, 2.
Ceja del Río Puerco: Bryan, 25.
Cerro Blanco, southernmost glaciated
mountain: Smith, H. T. U., 7.
Channel changes, Río Puerco: Bryan,
K., 12.
Channel cutting, Río Puerco: Bryan,
K., 4, 9.
Climatic variations: Antevs, 3, 4; Hunt-
ington, E.
Clinopains, Río Grande: Herrick, C.
L., 15.
Clovis site: Price, W. A., 2.
Craters: Darton, 15; Perkins.
Curry County: Theis, 1.
Depressions, High Plains: Judson, 2.
Drainage systems: Tarr, R. S., 1.
Earth patterns: Turley, 1.
Eastern New Mexico: Hill, R. T., 4;
Turley, 1.
Eolian dam, Tucumcari: Dobrovolsky,
2.
Ephemeral lakes: Keyes, 2.
Erosion:
Arid regions: Bryan, K., 10, 31;
Church: Keyes, 41, 42, 45, 44, 46,
49, 51, 53, 54, 58, 84; Reiche, 4.
Channel cutting: Bryan, K., 4, 9, 12,
30; Leighly: Rich, J. L., 2; Steven-
son, J. J., 7.
Eolian: Blackwelder: Bryan, K., 54;
Keyes, 42, 44, 46; Stuntz.
Gravel as resistant rock: Paige, 4;
Rich, J. L., 1.
Surfaces: Church; McCann, 1. See
also Pediments
Estancia Plains: Keyes, 40.
Fault scarps:
Organ Mountains: Reiche, 1.
Tularosa Valley: Talmage, 3.
Folsom area: Brown, B., 3.
Gallina quadrangle: Case, 4.
General: Davis, W. M.; Dutton, 1; Fair-
banks; Gilbert: Hill, R. T., 3;
Howell, 1; Huntingdon, E.; Jewett;
Johnson, D. W., 5; Keyes, 29, 55.

Glaciation: Ellis, 11; Smith, H. T. U.,
7; Stone, G. H., 4.
Gran Quivira quadrangle: Bates, 9.
Gravel plains: Rich, J. L., 1.
Gypsum dunes: Keyes, 100; Talmage,
1.
High Plains: Johnson, W. D.
Jornada del Muerto: Keyes, 22.
Lake basins, eolian origin: Keyes, 42.
Lakes, ephemeral: Keyes, 2.
Lake San Agustin: Powers, 1.
Landslides, periglacial: Smith, H. T.
U., 3.
Little Hatchet Mountains: Lasky, 13.
Luna County: Darton, 14.
Magdalena district: Koschmann, 1;
Loughlin.
Meandering arroyos: Leighly.
Mesa de Maya: Keyes, 37.
Meteoritic scars: Turley, 2.
Monadnocks: Keyes, 41.
Moreno Valley: Ray, L. L., 1, 3.
Mount Taylor area: Dutton, 2; Hunt,
C. B., 4; Johnson, D. W., 6.
Navajo Reservation: Gregory, 1, 2.
Northern New Mexico: Lee, 18; St.
John.
Northern New Mexico: Northrop, 16;
Stevenson, J. J., 5, 7.
Oritz Mountains: Ogilvie, 2.
Otero salt basin: Herrick, C. L., 16.
Pecos Valley: Lee, 5; Theis, 11.
Pedestal rocks: Bryan, K., 2, 3, 8.
Pediments:
Granite Gap: Bryan, K., 22.
Magdalena Mountains: Koschmann,
1; Smith, H. T. U., 2.
Río Puerco: Bryan, K., 23.
Santa Fe area: Campbell, 1.
Secorro area: Bryan, K., 19.
Physiographic provinces: Keyes, 78.
Raton Mesa: Lee, 30; Levings.
Re-eroded channel: Stevenson, J. J., 7.
Río Grande Valley: Bryan, K., 26;
Henderson, J.
Río Puerco area: Bryan, K., 12, 23;
Wright, H. E., 2.
Roosevelt County: Theis, 1.
San Acacia area: Denny, 2, 4.
San Andres Mountains: Baker, C. L., 8.
Sand dunes: Bryan, K., 30; Melton, 4.
Sandia Mountains, depressions: Rea-
gan, 4.
San Jose Valley: Nichols, 1.
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San Juan Mountains: Atwood, W. W., 2.
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Santa Fe peneplain: Campbell, I.
Silver City quadrangle: Paige, 4, 7;
Rich, J. L., 2.
Sinkholes: Perkins.
Patterns: Melton, 3.
Slope retreat: Bryan, K., 30.
Southern New Mexico: Fairbanks.
Southwestern New Mexico: Schwennesen.

Stream profiles:
Gila River: Herron, 2.
Mora River: Herron, 1.
Pecos River: Herron, 1.
Rio Grande: Herron, 1.

Terraces: Antevs, 4; Bryan, K., 25;
Keys, 34, 61.
Tularosa Basin: Meinzer, 5.
Tusas-Tres Piedras area: Butler, A. P., 1, 2.
Valencia County: Johnson, D. W., 2.
Valles (Jemez) caldera: Ross, 2.
Volcanic craters: Keys, 32.
Volcanos: Hill, R. T., 10.
White Rock Canyon: Emmanuel.
White Sands area: Herrick, C. L., 11.
Zuni Mountains: Keys, 80, 84.
Zuni Plateau: Dutton, 2.
Zuni Salt Lake: Darton, 4, 54.

Water
Albuquerque area, ground water: Lee, 6.
Animas Valley, ground water: McClure, 1; Schwennesen, 1.
Artesian water: Carpenter, L. G.; Fiedler, 1, 5, 6, 7; Fisher, 2; Gregory, 1; Hill, R. T., 7; Keys, 14; Lee, 6;
Meinzer, 3; Paige, 7; Renick, 1;
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Schwennesen, 1; Sears, J. D., 1.
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Bernalillo County, ground water: Ugrinic.

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Borings, deep: Darton, 1, 2.
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Canadian River basin:
Floods: Murphy, E. C., 1.
Ground water: Yeo, 1.
Quality, surface water: Collins, W. D., 1, 2; U. S. Geol. Survey, 14.
Stream measurements: Dalrymple;
French, 1, 2, 3, 4, 5, 6, 7, 8, 9; Hinderlider, 1, 2; Hoyt, 1, 4; Neel, 1,
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Chloride in water: Burr.
Colfax County, ground water: Griggs.
Cottonwood Creek, stream investigations: Neel, 7.
Curry County, ground water: Theis, 1.
De Baca County, ground water: Bryan, K., 6.
Deming area, ground water: Darton, 9, 14, 17.
Duncan-Virden Valley, ground water:
Morrison, 2; Turner, S. F., 1, 2, 3; U. S. Geol. Survey, 15.
Earth tides, well water: Robinson, T. W., 2.
Eastern New Mexico, ground water:
Eddy County, ground water: Fuller, M. L., 3.
Encino Valley, ground water: Meinzer, 2.
Estancia Valley, ground water: Meinzer, 1, 2.
Fluctuations, ground-water levels during earthquakes: Thomas.
Fluorine in water: Clark, J. D., 2.
General: Elmendorf; Fiedler, 2; Hill, R. T., 5; Piper, 1, 2.
Water (continued)

Gila River basin:
- Quality, surface water: Collins, W. D., 1, 2; U. S. Geol. Survey, 14.
- Stream investigations: Black, 2; U. S. Bur. Reclamation.
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- Gran Quivira quadrangle, ground water: Baten, 9.
- Grant County, ground water: Schwenennesen, 1.
- Grant County, ground water: listed under various areas.
- Hachita Valley, ground water: Schwenennesen, 1.
- Hidalgo County, ground water: Morrison, 2; Turner, S. F., 1, 2, 3; U. S. Geol. Survey, 13.
- High Plains, ground-water recharge: Theis, 5.
- Hot Springs basin, ground water: Powell, W. C., 3.
- Infiltration ditches: Meinzer, 3; Morrison, 1, 2.
- Jemez Plateau, springs: Kelly, C.
- Jornada del Muerto, ground water: Keys, 14; Lee, 6.
- La Jara Creek, stream investigations: Neel, 6.
- La Mesa area, ground water: Lee, 6.
- Las Palomas-Monticello area, stream investigations: Neel, 3.
- Lea County, ground water: Nye, 2, 3; Theis, 7.
- Level changes, ground water: Bryan, K., 14.
- Little Hatchet Mountains, ground water: Lasky, 13.
- Llano Estacado, ground water: Baker, C. L., 1.
- Lordsburg district, ground water: Lasky, 8.
- Luna County, ground water: Darton, 8, 9, 14, 17; White, W. N., 2.
- Major Johnson springs: Theis, 9.
- Mesilla area, ground water: Barker, F. C.; Lee, 6; Slichter, 1, 2.
- Mimbres Valley, ground water: Darton, 8, 9, 14, 17; Fiedler, 4; Theis, 8; White, W. N., 1, 2.
- Mora River, stream investigations: Neel, 2.
- Navajo Reservation, ground water: Gregory, 1.
- Ocate River, stream investigations: McClure, 3.
- Ogallala formation, Llano Estacado: Theis, 3.
- Ojo Caliente, hot springs: Lindgren, 7.
- Pecos River basin:
  - Floods: Murphy, E. C., 1, 2.
  - Ground water: Fisher, 2; McClure, 4; Morgan, 2, 3; Robinson, T. W., 1; Sayre, 1, 2; Stafford; Theis, 11, 12.
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- Playas Valley, ground water: Schwenennesen, 1.
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- Public water supply: Meinzer, 3; Renick, 1; Schwenennesen, 1.
- Pumping: Barker, F. C.; Darton, 8, 9; Meinzer, 1, 2.
- Tests: Darton, 9; Meinzer, 3; Slichter, 1, 2; Turner, S. F. 2.
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- Quality, spring water: Clarke, 6.
- Quality, surface water: see Canadian River basin; Gila River basin; Pecos River basin; Rio Grande basin; San Francisco River basin; San Juan River basin.
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Rio Puerco basin:
Ground water: Wright, H. E., 2, 3.
Stream investigations: Neel, 4.
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Roosevelt County, ground water: Theis, 1.
Roswell Artesian Basin, ground water:
Brown, R. H.; Fiedler, 1, 2, 3, 5, 6, 7, 8, 9; Fisher, 2; McClure, 2; Meinzer, 8; Morgan, 1; U. S. Geol. Survey, 12.
Salt water: Darton, 23; Meiner, 2; Phalen, 2; Renick, 2; Robinson, T. W., 1; Theis, 12.
Sandoval County, ground water: Renick, 1, 2, 4.
San Francisco River basin:
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San Juan Basin, ground water:
Barrows; Darton, 5, 6; Gregory, 1; Sears, J. D., 1; Waring, 1.
San Juan River basin:
Quality, surface water: Collins, W. D., 1, 2; U. S. Geol. Survey, 14.
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Socorro County, ground water: Black, 1; Bryan, K., 5.
South-central New Mexico, ground water:
Meinzer, 3; Sayre, 3; Slichter, 2.
Southeastern New Mexico, ground water:
Hoots; Lee, 35, 36; Theis, 5.
Southern New Mexico, ground water:
Sloats, C. T.; Theis, 9, 12; White, W. N., 1; Winchester, 2.
Saline: Clark, J. D., 1.
Thermal: Lindgren, 6; Paige, 7; Peale; Powell, W. C., 1; Renick, 1; Stearns, N. D.
Stream investigations:
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Water (continued)

Survey, 2.
Rio Puerco: Neel, 4.
San Francisco River: Black, 2; U. S. Bur. Reclamation.
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Sunshine Valley: Healy.
Stream measurements: see Canadian River basin; Gaging stations; Gila River basin; Pecos River basin; Rio Grande basin; Rio Puerco basin; San Francisco River basin; San Juan River basin; Tularosa Basin; and Zuni River basin.
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Torrance County, ground water: Black, 1; Fuller, M. L., 3; Meinzer, 1, 2.
Tularosa Basin:
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Maps
by Robert H. Weber

INTRODUCTORY NOTE

In addition to the geologic maps indexed in the preceding section, several other types of maps have been issued that may be of value in studies relating to the geology of the State. Maps of this category are listed in the following section under the headings described below.

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

*Mineral resources maps* show the occurrences of specific mineral commodities. For some commodities, features related to their exploration, preparation, and transportation are depicted.

*Topographic maps* show, by means of contours, the shape and elevation of the land surface; drainage and the works of man are generally shown also.

*Aerial photographs and mosaics* are finding increasing use as substitutes for conventional maps of areas for which adequate map coverage is unavailable, or where the greater detail of surface features provided by photographs is required.

BASE MAPS

State Maps

State of New Mexico. Scale 1:500,000 (about 8 miles to 1 inch); 1922. (2 sheets.) U. S. Geological Survey, Washington, D. C.

State of New Mexico. Scale 12 miles to 1 inch; 1936. General Land Office, Washington, D. C. A geographic map in six colors, showing national forests, parks, monuments, land grants, Indian reservations, military reservations, reclamation projects, mountain ranges, and drainage. (Out of print. A new edition is scheduled for release in 1955.)

State of New Mexico. Scale 12 miles to 1 inch; revised to September 1, 1953. New Mexico State Highway Department, Santa Fe. A geographic map, showing roads, railroads, towns, national forests, grants, range network, and drainage.

County Maps

Issued as ozalid prints by the New Mexico State Highway Department, Santa Fe, New Mexico. Maps showing the roads of all classes, drainage, and land boundaries including townships and sections, are available for all counties at scales of from 1 mile to 2 miles to 1 inch.
Quadrangle Maps

Planimetric maps of 15-minute quadrangles are issued as ozalid prints by the U. S. Forest Service, and by the U. S. Soil Conservation Service, Albuquerque, New Mexico. Forest Service maps are at a scale of 1½ mile to 1 inch; Soil Conservation Service maps are at a scale of 1½ mile to 1 inch for some quadrangles, and 1 mile to 1 inch for others. Features shown include drainage; sections, townships and other land boundaries; and principal topographic features locally indicated by hachures. Indices to available maps are on file at the Albuquerque offices of the two agencies.

Mineral Resources Maps

State Maps

Map of New Mexico showing location of gold, silver, copper, lead and zinc districts. Scale about 32½ miles to 1 inch. Lasky, S. G., and Wootton, T. P., The metal resources of New Mexico and their economic features; State Bureau of Mines and Mineral Resources, Bulletin No. 7, Plate 1, 1933.

Nonmetallic minerals in New Mexico. Scale about 16 miles to 1 inch. Talmage, S. B., and Wootton, T. P., The non-metallic mineral resources of New Mexico and their economic features (exclusive of fuels); State Bureau of Mines and Mineral Resources, Bulletin No. 12, Plate 1, 1937.

Oil and gas map of New Mexico, by Dean E. Winchester. Scale about 10½ miles to 1 inch; 1931. Revised by Robert L. Bates to June 30, 1942. Revised and enlarged by Richard C. Northup and Donald C. Forrey to January 1, 1949. State Bureau of Mines and Mineral Resources. Shows key wildcat locations, principal pool outlines, pipelines, refineries, gasoline plants, and CO₂ ice plants.

Topographic Maps

State Maps

Topographic map of New Mexico. Scale 1:500,000 (about 8 miles to 1 inch); contour interval 100 meters (328 feet). 1925. (2 sheets.) U. S. Geological Survey, Washington, D. C. (A new topographic map of New Mexico that also shows the highway net is scheduled for release in 1955.)

Quadrangle Maps

Issued by U. S. Geological Survey, Washington, D. C. Through 1950 a total of 154 standard quadrangle maps had been issued for New
Mexico. Individual maps are listed in: Index to topographic mapping in New Mexico; U. S. Geological Survey, Washington, D. C.

The Army Map Service has issued quadrangle maps for certain military reservation areas in New Mexico. Although these maps are not readily available to the public, they are being modified by the U. S. Geological Survey for unrestricted distribution.

**SPECIAL MAPS**

In addition to the standard quadrangle maps, a number of special topographic maps, issued by the U. S. Geological Survey, Washington, D. C., illustrate local features of national parks, national monuments, mining districts, national forests, and principal river courses. See: Index to topographic mapping in New Mexico; U. S. Geological Survey, Washington, D. C.

**AERIAL PHOTOGRAPHS AND MOSAICS**

Aerial photographs covering a major portion of the State have been prepared for several federal agencies, among which are the U. S. Soil Conservation Service, the U. S. Forest Service, the U. S. Geological Survey, and the U. S. Corps of Engineers. Most of these photographs are 10- by 10-inch contact prints at scales of from 1:15,840 to 1:60,000. The Soil Conservation Service also issues controlled 1:4-minute and 15-minute mosaics at scales of 1:31,680 (1/2 mile to 1 inch) and 1:62,500 (1 mile to 1 inch).

Photo indices on file at the offices of the Cartographic Division, U. S. Soil Conservation Service, Albuquerque, New Mexico, and the Mapping and Cartography Division, U. S. Forest Service, Albuquerque, New Mexico, may be viewed by the public for selecting aerial photographic coverage available from these agencies.

**SOURCES OF MAPS AND MAP INFORMATION**

Maps published by the U. S. Geological Survey may be ordered from the Geological Survey, Federal Center, Denver, Colorado, and from the New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico. Inquiries concerning maps issued by the State Highway Department should be addressed to the department at Santa Fe. The county maps prepared by that department are also sold by the New Mexico Bureau of Mines and Mineral Resources.

Publications for Sale by
NEW MEXICO BUREAU OF MINES & MINERAL RESOURCES
CAMPUS STATION — SOCORRO, NEW MEXICO
(Revised July 1, 1955)

PUBLICATIONS OF THE MINERAL RESOURCES SURVEY

<table>
<thead>
<tr>
<th>No.</th>
<th>Title and Author</th>
<th>Date</th>
<th>Price</th>
</tr>
</thead>
<tbody>
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<tr>
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</tr>
</tbody>
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<table>
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</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Fluorspar in New Mexico; W. D. Johnston, Jr. (Superseded by Bulletin 21)</td>
<td>1928</td>
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</tr>
<tr>
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<td>The Non-Metallic Mineral Resources of New Mexico and their Economic Features (Exclusive of Fuels); S. B. Talmage and T. P. Wootton</td>
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</tr>
<tr>
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<td>1937</td>
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</tr>
<tr>
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<td>The Geology and Ore Deposits of Northeastern New Mexico (Exclusive of Colfax County); G. Townsend Harley</td>
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<tr>
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<td>1942</td>
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<td>17</td>
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<td>Manganiferous Iron-ore Deposits near Silver City, New Mexico; Lawson P. Entwistle</td>
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<tr>
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<th>Title</th>
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<td>32</td>
<td>Compilation of State Tax Law Relating to Oil, Gas and Mining Properties in New Mexico; E. P. Ripley (Supersedes Circular 13)</td>
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</tr>
<tr>
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<tr>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Date</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
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* Prepared under contract for the Bureau of Indian Affairs.
** Prepared in cooperation with the U. S. Geological Survey and the State Engineer of New Mexico.
NEW MEXICO BUREAU OF MINES AND MINERAL RESOURCES

- Geology and Ground-Water Resources of Eddy County, New Mexico; G. E. Hendrickson and R. S. Jones 1952 2.50
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<th>Number</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>4-A</td>
<td>New Mexico Oil and Gas Statistical Data for 1948; compiled by E. E. Kinney, Lea County Operators Committee, and New Mexico Oil Conservation Commission</td>
<td>1949</td>
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<tr>
<td>4-B</td>
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<tr>
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<tr>
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<th>Number</th>
<th>Title</th>
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</tr>
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<th>Year</th>
<th>Charge</th>
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</tr>
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</tr>
<tr>
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<tr>
<td>24</td>
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<td>31</td>
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MAPS

Oil and Gas Map of New Mexico; revised and enlarged to Jan. 1, 1949, by Richard C. Northup and Donald D. Forrey. Scale about 10½ miles to 1 inch ........................................ 1949 1.50
Map showing location of wells and springs and the availability of ground water in San Miguel County, New Mexico. (This map is included in Ground-Water Report 2) ........................................ 1951 .55
Geology of San Miguel County. (This map is included in Ground-Water Report 2) ........................................ 1951 .55
Geologic Map and Section of the Thoreau Quadrangle, New Mexico. (This map is included in Bulletin 31) ........................................ 1953 .75
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Geologic Map and Sections of Lake Valley Quadrangle, New Mexico. (This map is included in Bulletin 37) ........................................ 1954 .80

PETROLEUM EXPLORATION MAPS

These maps show the location of all tests for oil and gas (both completed and in the process of drilling), section lines, and the larger towns; published as blue line prints at a scale of two miles to the inch; prepared by Robert A. Bieberman and Roy W. Foster—Counties available: Colfax, Curry, DeBaca, Guadalupe, Harding, Quay, Roosevelt, and Socorro ........................................ 1955 1.00 (each county)

WELL LOGS

More than 6,950 typed drillers' logs of wells drilled in New Mexico ........................................ Prices on request

GUIDEBOOKS

Santa Fe, New Mexico (Scenic Trips to the Geologic Past No. 1); Brewster Baldwin and Frank E. Kottlowski ........................................ 1955 No charge
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1009-B Identification and Occurrence of Uranium and Vanadium Minerals from the Colorado Plateaus; A. D. Weeks and M. E. Thompson ................................................. 1954 25

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1230 Ground-water Conditions in the Rincon and Mesilla Valleys and Adjacent Areas in New Mexico; Prepared in cooperation with the Elephant Butte Irrigation District 1954 1.50

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Base Map of New Mexico, Scale about 8 miles to 1 inch ................................................. 1922 .25
Reconnaissance and Elevation Map of Southeastern New Mexico; Walter B. Lang, Scale 4 miles to 1 inch ................................................. 1953 1.50
Stratigraphic Distribution of the Pennsylvanian Fusulinidae in a Part of the Sierra Nacimiento of Sandoval and Rio Arriba Counties, New Mexico; Lloyd G. Henbest and others, Preliminary Chart 2, Oil and Gas Investigations ................................................. 1944 .25
Maps Showing Thickness and General Character of the Cretaceous Deposits in the Western Interior of the United States: J. B. Reeside, Jr. About 8 miles to 1 inch; contour interval 100. Scale 25 miles to 1 inch, Preliminary Map 10, Oil and Gas Investigations ................................................. 1944 .25
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* Prepared in cooperation with the New Mexico Bureau of Mines and Mineral Resources.
Stratigraphic Relations of Eocene, Paleocene, and Latest Cretaceous Formations of Eastern Side of San Juan Basin, New Mexico; C. H. Dane. *Preliminary Chart 24, Oil and Gas Investigations* ............................................... 1946 .35

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