BIBLIOGRAPHY OF THE GEOLOGY AND MINERAL RESOURCES OF ARIZONA

1848–1964

By

Richard T. Moore and Eldred D. Wilson

THE ARIZONA BUREAU OF MINES

Bulletin 173
1965

THE UNIVERSITY OF ARIZONA PRESS TUCSON

BIBLIOGRAPHY OF THE GEOLOGY AND MINERAL RESOURCES OF ARIZONA

1848–1964

By

Richard T. Moore and Eldred D. Wilson

THE ARIZONA BUREAU OF MINES

Bulletin 173
1965

BUREAU OF GEOLOGY
AND MINERAL TECHNOLOGY

THE UNIVERSITY OF ARIZONA PRESS TUCSON

Copyright © 1965

The Board of Regents of the Universities and
State College of Arizona. All rights reserved.

Library of Congress Catalogue Card number: 65-64421

CONTENTS

Introduction 1
Bibliography 7
Index 213

INTRODUCTION

This bulletin presents a comprehensive listing of the literature on the geology and mineral resources of Arizona released through December, 1964.

In compiling the list, the authors have used freely the several bibliographies of North American geology, issued as bulletins by the U.S. Geological Survey, and Arizona Bureau of Mines Bulletins 146 and 161, two previously realeased bibliographies, which are now out of print. In addition, many serials and irregularly issued publications have been examined and applicable articles noted.

In departure from the procedure frequently followed in the preparation of bibliographies, the authors have not restricted the listing to published items. Thus, many theses and open-file reports have been included because, even though they may not be readily available, often they represent the only source of data on a particular area or problem.

The usefulness of a bibliography is directly dependent upon the care with which the index is prepared. For this reason, considerable space has been devoted to a thoroughly cross-referenced index which is divided into several main headings that are felt to be particularly applicable to Arizona. Therefore, a short time spent in becoming familiar with the organization of the index should greatly increase the value of the bibliography to the reader.

A number of abbreviations are used in citing the references to the serial publications given in the bibliography and the following list defines these abbreviations:

AAPG Bull. — American Association of Petroleum Geologists Bulletin. Tulsa, Oklahoma.

Acad. Nat. Sci. Phila. Proc. — Academy of Natural Sciences of Philadelphia Proceedings. Philadelphia, Pennsylvania.

Acad. Sci. Paris, Comptes rendus — Comptes Rendus de l'Académie des Sciences. Paris, France.

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

AIME Bull.; Soc. Min. Engr. Preprint; Trans. — American Institute of Mining, Metallurgical, and Petroleum Engineers Bulletin; Society of Mining Engineers Preprint; Tranactions. New York, New York.

Am. Anthropologist — American Anthropologist. American Anthropological Society. Washington, D. C.

Am. Antiquity — American Antiquity. Society for American Archeology. Washington, D. C.

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

Am. Bot. — American Botanist. Indianapolis, Indiana.

Am. Geog. Soc. Bull. — American Geographic Society Bulletin. New York, New York.

Am. Geol. — American Geologist. Minneapolis, Minnesota.

Am. Geophys. Union Trans. — American Geophysical Union Transactions. Washington, D. C.

Am. Jour. Botany — American Journal of Botany. Botanical Society of America. Baltimore, Maryland.

Am. Jour. Sci. — American Journal of Science. New Haven, Connecticut.

Am. Mineral. — American Mineralogist. Mineralogical Society of America. Washington, D. C.

Am. Mus. Jour. — American Museum Journal. American Museum of Natural History. New York, New York.

Am. Mus. Nat. Hist. Bull. — American Museum of Natural History Bulletin. New York, New York.

Am. Mus. Novitates — American Museum Novitates. American Museum of Natural History. New York, New York.

Am. Naturalist — American Naturalist. Arizona State University. Tempe, Arizona.

Am. Philo. Soc. Proc. — American Philosophical Society Proceedings. Philadelphia, Pennsylvania.

Am. Soc. Civil Engr. Proc.; Trans. — American Society of Civil Engineers Proceedings; Transactions. New York, New York.

Am. Water Works Assoc. Jour. — American Water Works Association Journal. Birmingham, Alabama.

Ann. de Geog. — Annales de géographie. Paris, France.

Ariz. Acad. Sci. Jour. — Arizona Academy of Science Journal. Tucson, Arizona.

Ariz. Dept. Miner. Res. — Arizona Department of Mineral Resources. Phoenix, Arizona.

Ariz. Geol. Soc. Dig. — Arizona Geological Society Digest. Tucson, Arizona.

Ariz. Highways — Arizona Highways. Arizona Highway Department. Phoenix, Arizona.

Ariz. Labor Jour. — Arizona Labor Journal. Phoenix, Arizona.

Ariz. Min. Jour. — Arizona Mining Journal. Phoenix, Arizona.

Arizona and the West — Arizona and the West. University of Arizona Press. Tucson, Arizona.

Arizoniana — Arizoniana. Arizona Pioneers' Historical Society. Tucson, Arizona.

Ariz. State Land Dept. Water Res. Rep. — Arizona State Land Department Water Resources Report. Phoenix, Arizona.

Assoc. Am. Geog. Annals — Association of American Geographers Annals. Washington, D. C.

Astron. Soc. Pacific Pub. — Astronomical Society of the Pacific Publications. San Francisco, California.

Boston Soc. Nat. Hist. Proc. — Boston Society of Natural History Proceedings. Boston, Massachusetts.

Brit. Assoc. Adv. Sci. Rep. — British Association for the Advancement of Science Report. London, England.

Calif. Acad. Sci. Proc. — California Academy of Sciences Proceedings. San Francisco, California.

Calif. Inst. Tech. Contrib. — California Institute of Technology, Technical Contributions. Pasadena, California.

Can. Min. Inst. Jour.; Quart. Bull. — Canadian Mining Institute Journal; Quarterly Bulletin. Montreal, Canada.

Carnegie Inst. Wash. Pub.; Yearbook — Carnegie Institution of Washington Publication; Yearbook. Washington, D.C.

Geol. Assoc. London Proc. — Geologist's Association London Proceedings. London, England.

Civil Engr. — Civil Engineering. Easton, Pennsylvania.

Colo. Sch. Mines Quart. — Colorado School of Mines Mineral Industries Bulletin *and* Quarterly of the Colorado School of Mines. Golden, Colorado.

Colo. Sci. Soc. Proc. — Colorado Scientific Society Proceedings. Denver, Colorado.

Columbia Univ., Contrib. Geol. Dept. — Columbia University Contributions of the Geology Department. Columbia University. New York, New York.

Columbia Univ., Sch. Mines Quart. — Columbia University, School of Mines Quarterly. Columbia University. New York, New York.

Denison Univ. Sci. Lab. Jour. — Denison University Journal of the Scientific Laboratories. Granville, Ohio.

Desert Mag. — Desert Magazine. Palm Desert, California.

Earth Sci. Dig. — Earth Science Digest. Chicago, Illinois.

Econ. Geol. — Economic Geology. Society of Economic Geologists. Urbana, Illinois.

Elisha Mitchell Sci. Soc. Jour. — Journal of the Elisha Mitchell Scientific Society. Chapel Hill, North Carolina.

Engr. Min. Jour. — Engineering and Mining Journal. McGraw-Hill Publishing Company. New York, New York.

Engr. Min. Jour.-Press. — Engineering and Mining Journal Press. New York.

Explosives Engr. — The Explosives Engineer. Wilmington, Delaware.

Field and Lab. — Field and Laboratory. Dallas, Texas.

Foote Prints. — Foote Prints. Foote Mineral Company. Philadelphia, Pennsylvania.

Four Corners Geol. Soc., Guidebook — Four Corners Geological Society, Guidebook. Durango, Colorado.

Geog. Jour. — Royal Geographical Journal. Royal Geographical Society. London, England.

Geog. Rev. — Geographical Review. American Geographical Society of New York. New York, New York.

Geog. Soc. Phila. Bull. — Geographical Society of Philadelphia Bulletin. Philadelphia, Pennsylvania.

Geol. Mag. — Geological Magazine, London, England.

Geol. Soc. Am. Bull.; Mem.; Sp. Paper — Geological Society of America Bulletin; Memoir; Special Paper. New York, New York.

Geophysics — Geophysics. Society of Exploration Geophysicists. Tulsa, Oklahoma.

Geophysics Case Hist. — Geophysical Case Histories. Menasha, Wisconsin.

Grand Canyon Nat. Hist. Assoc. Bull. — Grand Canyon Natural History Association Bulletin. Grand Canyon, Arizona.

Grand Canyon Nature Notes — Grand Canyon Nature Notes. Grand Canyon National Park, Arizona.

Harvard Coll., Mus. Comp. Zool. Bull. — Bulletin of the Museum of Comparative Zoology at Harvard College. Cambridge, Massachusetts.

Indiana Acad. Sci. Proc. — Indiana Academy of Science Proceedings. Indianapolis, Indiana.

Inst. Min. Met. London Trans. — Bulletin of the Institution of Mining and Metallurgy Transactions. London, England.

Intermountain Assoc. Pet. Geol., Guidebook — Intermountain Association of Petroleum Geologists, Guidebook. Salt Lake City, Utah.
Iowa Acad. Sci. Proc. — Iowa Academy of Science Proceedings. Des Moines, Iowa.
Jour. Geog. — Journal of Geography. Menasha, Wisconsin.
Jour. Geol. — Journal of Geology. University of Chicago Press. Chicago, Illinois.
Jour. Geomorph. — Journal of Geomorphology. New York, New York.
Jour. Geophys. Research — Journal of Geophysical Research. American Geophysical Union. Washington, D. C.
Jour. Mammalogy — Journal of Mammalogy. American Society of Mammalogists. Lawrence, Kansas.
Jour. Paleo. — Journal of Paleontology. Society of Economic Paleontologists and Mineralogists. Tulsa, Oklahoma.
Jour. Sed. Pet. — Journal of Sedimentary Petrology. Society of Economic Paleontologists and Mineralogists. Tulsa, Oklahoma.
Jour. Soil and Water Conserv. — Journal of Soil and Water Conservation. Soil Conservation Society of America. Baltimore, Maryland.
Kansas Acad. Sci. Trans. — Kansas Academy of Science Transactions. Lawrence, Kansas.
Kiva — The Kiva. Arizona Archaeological and Historical Society. Arizona State Museum, Tucson, Arizona.
K.-K. naturh. Hofmus. Ann. — Kaiserlichkönigliche naturhistorische Hofmuseum, Annalen. Wein.
Liverpool Geol. Assoc. Jour. — Liverpool Geologist's Association Journal. Liverpool, England.
Liverpool Geol. Soc. Proc. — Liverpool Geological Society Proceedings. Liverpool, England.
Metal Min. and Process. — Metal Mining and Processing. Maclean-Hunter Publishing Corporation. Chicago, Illinois.
Meteoritics—Meteoritics. Albuquerque, New Mexico.
Meteor. Soc. Contrib. — Contributions of the Meteoritical Society. University of California. Los Angeles, California.
Mich. Acad. Sci. Papers — Michigan Academy of Science, Arts, and Letters Papers. Ann Arbor, Michigan.
Micropaleo. — Micropaleontology. American Museum of Natural History. New York, New York.
Min. Cong. Jour. — Mining Congress Journal. American Mining Congress. Washington, D. C.
Min. Engr. — Mining Engineering. American Institute of Mining, Metallurgical, and Petroleum Engineers. New York, New York.
Min. Engr. World — Mining Engineering World. Chicago, Illinois (Merged with Engineering and Mining Journal).
Mineral Industry — Mineral Industry. McGraw-Hill Publishing Co. New York, New York.
Mineral Mag. — Mineralogical Magazine, Mineralogical Society. London, England.
Mineralogist — Mineralogist. Mentone, California.
Mines and Methods — Mines and Methods. Salt Lake City, Utah.
Mines and Minerals — Mines and Minerals. Denver, Colorado.
Mines Mag. — Mines Magazine. Colorado School of Mines Alumni Association. Golden, Colorado.
Min. Jour. — Mining Journal. Phoenix, Arizona.
Min. Mag. — Mining Magazine. Mining Journal Limited. London, England.
Min. Met. — Mining and Metallurgy. American Institute of Mining and Metallurgical Engineers. New York, New York.
Min. Met. Soc. Am. Bull. — Mining and Metallurgical Society of America Bulletin. New York, New York.
Min. Reporter — Mining Reporter. Denver, Colorado.

Min. Sci. — Mining Science. Denver, Colorado.
Min. Sci. Press — Mining and Scientific Press. San Francisco, California.
Min. Tech., Tech. Paper — Mining Technology, Technical Paper. The American Institute of Mining, Metallurgical and Petroleum Engineers. New York, New York.
Min. World — Mining World. San Francisco, California.
Mus. N. Ariz. Bull.; Mus. Notes — Museum of Northern Arizona Bulletin; Museum Notes. Flagstaff, Arizona.
Nat. Hist. — Natural History. American Museum of Natural History. New York, New York.
Natl. Geog. Mag. — National Geographic Magazine. National Geographic Society. Washington, D. C.
Nat. Sci. — Natural Science. London, England.
Nautilus — The Nautilus. American Malocological Union. Philadelphia, Pennsylvania.
N. Mex. Bur. Mines Miner. Res. Bull.; Mem. — New Mexico Bureau of Mines and Mineral Resources Bulletin; Memoir. Socorro, New Mexico.
N. Mex. Geol. Soc., Guidebook — New Mexico Geological Society, Guidebook. Albuquerque, New Mexico.
N. Y. Acad. Sci. Annals; Trans. — New York Academy of Sciences Annals; Transactions. New York, New York.
Ohio Acad. Sci. Proc. — Ohio Academy of Science Proceedings. Columbus, Ohio.
Ohio Jour. Sci. — Ohio Journal of Science. Ohio State University. Columbus, Ohio.
Oil and Gas. Jour. — Oil and Gas Journal. Petroleum Publishing Company. Tulsa, Oklahoma.
Pacific Disc. — Pacific Discovery. California Academy of Sciences. Berkeley, California.
Pan-Am. Geol. — Pan-American Geologist. Des Moines, Iowa.
Pay Dirt — Pay Dirt. Arizona Small Mine Operators Association. Phoenix, Arizona.
Philo. Soc. Wash. Bull. — Philosophical Society of Washington Bulletin. Washington, D. C.
Photogramm. Engr. — Photogrammetric Engineering. American Society of Photogrammetry. Washington, D. C.
Plateau — Plateau. Northern Arizona Society of Science and Art. Flagstaff, Arizona.
Pop. Astron. — Popular Astronomy. Northfield, Minnesota.
Pop. Sci. Monthly — Popular Science Monthly. New York, New York.
Prog. Ariz. — Progressive Arizona. Phoenix, Arizona.
Quart. Jour. Geol. Soc. London — Quarterly Journal of the Geological Society of London. London, England.
Rocks and Minerals — Rocks and Minerals. Peekskill, New York.
San Diego Soc. Nat. Hist. Trans. — San Diego Society of Natural History Transactions. San Diego, California.
S. Calif. Acad. Sci. Bull. — Southern California Academy of Sciences Bulletin. Los Angeles, California.
Sci. Am. — Scientific American. Scientific American, Inc. New York, New York.
Science — Science. American Association for the Advancement of Science. Washington, D. C.
Sci. Monthly — Scientific Monthly. Washington, D. C.
Scottish Geog. Mag. — Scottish Geographical Magazine. Royal Scottish Geographical Society. Edinburgh, Scotland.
Seismol. Soc. Am. Bull. — Seismological Society of America Bulletin. Berkeley, California.
Smithsonian Inst., Bur. Am. Ethn., Anthro. Paper — Smithsonian Institution, Bureau of American Ethnology, Anthropology Paper. Washington, D. C.
Smithsonian Inst. Contrib. Astrophys.; Pub. — Smithsonian Institution Contributions to Astrophysics; Publications. Washington, D. C.

Smithsonian Misc. Collections — Smithsonian Miscellaneous Collections. Smithsonian Institution. Washington, D. C.

Soc. Geol. France Bull. — Bulletin de la Société Géologique de France. Paris, France.

Soc. Research Meteor. Contrib. — Contributions of the Society for Research on Meteorites. University of California. Los Angeles, California.

Tech. Quart. — Technology Quarterly and Proceedings of the Society of Arts. Massachusetts Institute of Technology. Boston, Massachusetts.

Tulsa Geol. Soc. Dig. — Tulsa Geological Society Digest. Tulsa, Oklahoma.

Univ. Ariz., Ariz. Bur. Mines Bull.; Circ.; Map. — University of Arizona, Arizona Bureau of Mines Bulletin; Circular; Map. Tucson, Arizona.

Univ. Ariz. Bull.; Gen. Bull.; Monthly — University of Arizona Bulletin; General Bulletin; Monthly. Tucson, Arizona.

Univ. Ariz., Coll. Agr. Exp. Sta. Bull. — University of Arizona, College of Agriculture Experiment Station Bulletin. Tucson, Arizona.

Univ. Calif., Dept. Geol. (Sci.) Bull. — University of California Department of Geological Sciences Bulletin. Berkeley, California.

Univ. Calif. Mem.; Pub. Geog. — University of California Memoirs; Publications in Geography. Berkeley, California.

Univ. Mo. Studies — University of Missouri Studies. University of Missouri, Columbia, Missouri.

Univ. N. Mex. Bull.; Geol. Pub.; Pub. — University of New Mexico Bulletin; Geological Publication; Publication. University of New Mexico. Albuquerque, New Mexico.

Univ. Okla, Bull., new ser., — University of Oklahoma Bulletins, new series. Norman, Oklahoma.

USAEC — United States Atomic Energy Commission. Washington, D. C.

USBM Bull.; IC; RI; Tech. Paper — United States Bureau of Mines Bulletin; Information Circular; Report of Investigations; Technical Paper. Washington, D. C.

U.S. Bur. Census — United States Bureau of the Census. Washington, D. C.

U.S. Dept. Agr., Field Oper. Bur. Soils — United States Department of Agriculture, Field Operations of the Bureau of Soils. Washington, D. C.

USGS Bull.; Circ.; Map; Open-file Rep.; Prof. Paper; Water-Supply Paper — United States Geological Survey Bulletin; Circular; Map; Open-file Report; Professional Paper; Water-Supply Paper. Washington, D. C.

U.S. Natl. Mus. Proc. — United States National Museum Proceedings. Washington, D. C.

Utah Geol. Soc., Guidebook — Utah Geological Society, Guidebook. Salt Lake City, Utah.

Wagner Free Inst. Sci. Bull. — Wagner Free Institute of Science Bulletin. Philadelphia, Pennsylvania.

Wash. Acad. Sci. Jour. — Washington Academy of Sciences Journal. Washington, D. C.

Wash. Geol. Soc. — Geological Society of Washington. Washington, D. C.

Western Engr. — Western Engineering. San Francisco, California.

Wisc. Acad. Sci. Trans. — Wisconsin Academy of Sciences Transactions. Madison, Wisconsin.

World Oil — World Oil. Gulf Publishing Company. Houston, Texas.

Wyo. Hist. Geol. Soc. Proc. and Coll. — Wyoming Historical and Geological Society, Proceedings and Collections. Wilkesbarre, Pennsylvania.

Wyoming Univ., Dept. Geol. Contrib. Geol. — Wyoming University. Department of Geology Contributions to Geology. Laramie, Wyoming.

Zeitschr. Kryst. — Zeitschrift für Kristallographie. Akamenische Verlags-Gesellschaft. Frankfurt am Main, Germany.

BIBLIOGRAPHY

ABDEL-GAWAD, A. (*see also* Kerr, P. F., 7)

1. Alteration features associated with some basal Chinle uranium deposits: Columbia Univ., PhD Thesis (1960)
2. (and Kerr, P. F.) Alteration of Chinle siltstone and uranium emplacement, Arizona and Utah: Geol. Soc. Am. Bull., v. 74, no. 1, p. 23-46 (1963)

ACKER, C. J.

Geologic interpretations of a siliceous breccia in the Colossal Cave area, Pima County, Arizona: Univ. Ariz., MS Thesis, 50 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 47 (1958)

ADAMS, J. W. (*see* Olson, J. C., 2; Walker, G. W., 4)

ADAMS, W. R. (*see* Sloan, R. E.)

ADLER, H. H.

Concepts of genesis of sandstone-type uranium ore deposits: Econ. Geol., v. 58, no. 6, p. 839-852 (1963)

ADLER, I.

(and Dwornik, E. J.) Electronprobe analysis of schreibersite (rhabdite) in the Canyon Diablo meteorite: USGS Prof. Paper 424-B, p. 263-265 (1961)

AGENBROAD, L. D.

The geology of the Atlas mine area, Pima County: Univ. Ariz., MS Thesis, 37 p. (1962)

AGEY, W. W. (*see also* Dean, K. C.)

(and Batty, J. V., and Knutson, E. G.) Operations of manganese ore-purchasing depots at Deming, New Mexico, and Wenden, Arizona: USBM, RI 5462, 18 p. (1959)

AITKENS, I.

Garnets (gem stones): USBM, IC 6518, 11 p. (1931)

AKERS, J. P. (*see also* Callahan, J. T., 2; Cooley, M. E., 8, 15; Foster, R. W.; Irwin, J. H., 1, 2)

1. (and Cooley, M. E., and Repenning, C. A.) Moenkopi and Chinle formations of Black Mesa and adjacent areas: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 88-94, illus. (1958)
2. (and Harshbarger, J. W.) Ground water in Black Mesa basin and adjacent areas: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 172-183, illus. (1958); USGS Mimeo. Rep., 19 p., illus. (1958)
3. (and McClymonds, N. E., and Harshbarger, J. W.) Preliminary report on the availability of water in the Red Lake area, Navajo Indian Reservation, Arizona and New Mexico: USGS Ground-Water Branch Mimeo Rep., 22 p., maps (1959)
4. The Chinle formation of the Paria Plateau area, Arizona and Utah: Univ. Ariz., MS Thesis, 83 p. (1960)
5. Ground water in the Red Lake area, Navajo Indian Reservation, Arizona and New Mexico: Ariz. Geol. Soc. Dig., v. 3, p. 41-42 (1960)
6. Geology of the Cameron and Leupp quadrangles, Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 43-44 (1960)

7. Current assistance in water development programs of Navajo Tribe, Arizona and New Mexico: Ariz. Geol. Soc. Dig., v. 3, p. 45 (1960)
8. The geology of the central part of Apache County, Arizona—a preliminary report: Ariz. Geol. Soc. Dig., v. 4, p. 49-57 (1961)
9. Relation of faulting to the occurrence of ground water in the Flagstaff area, Arizona: USGS Prof. Paper 450-B, p. 97-98 (1962)
10. (and McClymonds, N. E., and Harshbarger, J. W.) Geology and ground water of the Red Lake area, Navajo Indian Reservation, Arizona and New Mexico: USGS Water-Supply Paper 1576-B, 12 p. (1962)
11. (and Irwin, J. H., Stevens, P. R., McClymonds, N. E., and Chenoweth, W. L.) Geology of the Cameron quadrangle, Arizona: USGS Map GQ-162 (1962)
12. Geology and ground water in the central part of Apache County, Arizona: USGS Open-file Rep. (1962)

ALBEE, H. F. (*see* Stewart, J. H., 2)

ALBERDING, Herbert

The geology of the northern Empire Mountains, Arizona: Univ. Ariz., PhD Thesis, 107 p., map (1938)

ALBRITTON, C. C. (*see* Boon, J. D., 2)

ALDRICH, L. T. (*see also* Tilton, G. R.)

1. (and Wetherill, G. W., and Davis, G. L.) Occurrence of 1350 million-year-old granitic rocks in western United States: Geol. Soc. Am. Bull., v. 68, p. 655-656 (1957)
2. (and Wetherill, G. W., Davis, G. L., and Tilton, G. R.) Radioactive ages of micas from granitic rocks by Rb-Sr and K-Ar methods: Am. Geophys. Union Trans., v. 39, p. 1123-1134 (1958)

ALEXIS, C. O.

1. The geology of the Lead Mountain area, Pima County, Arizona: Univ. Ariz., MS Thesis, 60 p., maps (1940)
2. The geology of the northern part of the Huachuca Mountains, Arizona: Univ. Ariz., PhD Thesis, 74 p., maps (1949)

ALF, Raymond M.

Possible fossils from the early Proterozoic Bass formation, Grand Canyon: Plateau, v. 31, no. 3, p. 60-63 (1959)

ALFORD, M. (*see* Lance, J. F., 12)

ALLEN, A. W.

Ajo enterprise of the New Cornelia Copper Company: Engr. Min. Jour.-Press, v. 113, p. 952-956, 1003-1008 (1922)

ALLEN, J. A.

A fossil porcupine from Arizona: Am. Mus. Nat. Hist. Bull. 20, p. 383-384 (1904)

ALLEN, J. E.

(and Balk, R.) Mineral resources of Fort Defiance and Tohatchi quadrangles, Arizona and New Mexico: N. Mex. Bur. Mines Miner. Res. Bull. 36, 192 p., illus., map (1954)

ALLEN, M. A. (*see also* Butler, G. M., 15, 16)

1. (and Butler, G. M.) Manganese: Univ. Ariz., Ariz. Bur. Mines Bull. 91, 32 p. (1918)
2. Mines of Pima County: Ariz. Min. Jour., v. 3, no. 1, p. 76-77 (1919)
3. (and Butler, G. M.) Barytes: Univ. Ariz., Ariz. Bur. Mines Bull. 99, 18 p. (1919)
4. The southern section of the Amole mining district: Univ. Ariz., Ariz. Bur. Mines Bull. 106, p. 19-25 (1920)
5. (and Butler, G. M.) Asbestos: Univ. Ariz., Ariz. Bur. Mines Bull. 113, 31 p. (1921)
6. (and Butler, G. M.) Fluorspar: Univ. Ariz., Ariz. Bur. Mines Bull. 114, 19 p. (1921)

7. (and Butler, G. M.) Vanadium: Univ. Ariz., Ariz. Bur. Mines Bull. 115, 23 p. (1921)
8. Arizona gold placers: Univ. Ariz., Ariz. Bur. Mines Bull. 118, 24 p. (1922)
9. History and present status of Arizona's gold placers: Ariz. Min. Jour., v. 7, no. 2, p. 5-7, 40; no. 3, p. 6, 7, 25 (1923)

ALLEN, V. T.
Triassic bentonite of the Painted Desert: Am. Jour. Sci., 5th Ser., v. 19, p. 283-288 (1930)

ALLSMAN, P. T. (*see* Schoder, J.)

ALMOND, H. (*see* Lovering, T. S., 3)

AMERICAN APPRAISAL COMPANY
Anhydrous sodium sulphate deposits: Ariz. Min. Jour., v. 7, no. 12, p. 13, 23-24 (1923)

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS
1. Industrial minerals and rocks: Seeley, W. Mudd Ser., 955 p. (1937); 2nd ed.: 1156 p. (1949); 3rd ed.: 834 p. (1960)
2. Annual review—mining, Southwestern operations: Min. Engr., v. 10, no. 2, p. 189-195, illus. (1958)

AMUEDO, C. L. (*see* Doeringsfeld, W. W.)

ANDERSON, A. D.
The silver country of the great southwest; A review of the mineral wealth. . . of the former Kingdom of New Spain: Putnam's Sons, New York, 221 p. (1877)

ANDERSON, Charles A. (*see also* Creasey, S. C., 2)
1. Voltaite from Jerome, Arizona: Am. Mineral., v. 12, p. 287-290 (1927); [abst.]: Geol. Soc. Am. Bull., v. 37, p. 209 (1926)
2. Report on the Loma Prieta mine (copper and molybdenum), Copper Basin, Yavapai County, Arizona: USGS Open-file Rep., 6 p., maps (1943)
3. (and Kupfer, D. H.) Report on the properties of the Amargosa Molybdenum and Copper Corporation, Pima County, Arizona: USGS Open-file Rep., 20 p., maps (1943)
4. (and Scholz, E. A., and Strobell, J. D., Jr.) Pre-Cambrian geology of the Bagdad area, Arizona [abst.]: Geol. Soc. Am. Bull., v. 57, no. 12, pt. 2, p, 1249 (1946)
5. Structural control of copper mineralization, Bagdad, Arizona: Min. Tech., v. 12, no. 2, Tech. Paper 2352, 11 p., illus., maps (1948); AIME Trans., v. 178, p. 170-180 (1948)
6. Alteration and metallization in the Bagdad porphyry copper deposit, Arizona: Econ. Geol., v. 45, p. 609-628, illus. (1950)
7. Lead-zinc deposits, Bagdad area, Yavapai County, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull., 156, p. 122-138, illus., maps (1950)
8. Older Precambrian structure in Arizona: Geol. Soc. Am. Bull., v. 62, no. 11, p. 1331-1346, maps (1951); [abst.]: Geol. Soc. Am. Bull., v. 60, no. 12, pt. 2, p. 1870 (1949)
9. (and Scholz, E. A., and Strobell, J. D., Jr.) Geology and ore deposits of the Bagdad area, Yavapai County, Arizona: USGS Prof. Paper 278, 103 p., illus., maps (1955)
10. (and Creasey, S. C.) Geology and ore deposits of the Jerome area, Yavapai County, Arizona (with sections on the United Verde Extension mine by G. W. H. Norman, and on the Cherry Creek mining district by R. E. Lehner): USGS Prof. Paper 308, 185 p., illus., maps (1958)
11. Preliminary geologic map of the NW quarter of the Mayer quadrangle, Yavapai County, Arizona: USGS Map MF-228 (1959)
12. (and Blacet, P. M.) Preliminary geologic map of the NE quarter of the Mount Union quadrangle, Yavapai County, Arizona: USGS Open-file Rep. (1962)

ANDERSON, C. C.
(and Hinson, H. H) Helium-bearing natural gases of the United States (analyses and analytical methods): USBM Bull. 486, 141 p. (1951)

ANDERSON, F. G.
(and Selvig, W. A., Baur, G. S., Colbassani, P. J., and Bank, W.) Composition of perlite: USBM, RI 5199, 13 p. (1956)

ANDERSON, J. C. (*see also* Schrader, F. C., 11)
1. The future of mining in southwestern Arizona: Min. and Oil Bull. (Aug., 1920)
2. Economic application of zonal theory of primary deposition of ores (with discussion): AIME Trans., v. 69, p. 22-35 (1923); [abst.]: Min. Met., v. 4, no. 193, p. 31 (1923)

ANDERSON, R. L. (*see* Young, W. H., 1, 2)

ANDERSON, R. Y.
1. Uranium accumulation in plants: Univ. Ariz., MS Thesis, 44 p. (1955)
2. (and Kurtz, E. B., Jr.) Biogeochemical reconnaissance of the Annie Laurie uranium prospect, Santa Cruz County, Arizona: Econ. Geol., v. 50, no. 2, p. 227-232, illus. (1955)
3. Cenozoic climate in the arid Southwest: Ariz. Geol. Soc. Dig., v. 5, p. 25-34 (1962)

ANDREASEN, G. E.
(and Pitkin, J. A.) Aeromagnetic map of the Twin Buttes area, Pima and Santa Cruz Counties, Arizona: USGS Map GP-426 (1963)

ANDREWS, David A.
1. Ground water in the Avra-Altar Valley, Arizona: USGS Water-Supply Paper 796, p. 163-180 (1937)
2. (and Hendricks, T. A., and Huddle, J. W.) The coal fields of Arizona, California, Idaho, Nevada, and Oregon: USBM Tech. Paper 696, p. 1-12, illus. (1947)

ANTEVS, Ernst V.
1. Age of the Cochise Culture: *in* The Cochise Culture; privately printed for Gila Pueblo, Globe, Arizona, Medallion Paper 29, p. 31-56, illus. (1941)
2. Arroyo cutting and filling [abst.]: Geol. Soc. Am. Bull., v. 62, p. 1495-1496 (1951)
3. Age of the Clovis fluted points with the Naco mammoth: Am. Antiquity, v. 19, no. 1, p. 15-17, illus. (1953)
4. Geological age of the Lehner mammoth site: Am. Antiquity, v. 25, no. 1, p. 31-34 (1959)
5. Late Quaternary climates in Arizona: Am. Antiquity, v. 28, no. 2, p. 193-198 (1962)

ANTHONY, John W. (*see also* Dubois, R. L., 2; Feth, J. H., 3; Galbraith, F. W., 8; Kiersch, G. A., 8)
1. Radioactive uranium and thorium: Univ. Ariz., Ariz. Bur. Mines Circ. 13, 23 p. (1948); 2nd ed.: (1950)
2. Geology of the Montosa-Cottonwood Canyon area, Santa Cruz County, Arizona: Univ. Ariz., MS Thesis, 84 p., maps (1951)
3. (and Wilson, E. D., and Moore, R. T.) Bibliography of the geology and mineral resources of Arizona, 1939-1952: Univ. Ariz., Ariz. Bur. Mines Bull. 161, 62 p. (1953)
4. (and DuBois, R. L., and Krumlauf, H. E.) [Reports on gypsum]: *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 2, p. 78-83, maps, illus., Univ. Ariz. Press, Tucson (1955)
5. A note on the probability of assimilation of rocks intruded by the central Arizona diabase: Ariz. Geol. Soc. Dig., v. 3, p. 99-102 (1960)

ANTISELL, Thomas

United States Pacific Railroad Exploration: Geol. Rep., v. 7, pt. 2, p. 139-166, Washington (1857)

APPLEDORN, C. R.

(and Wright, H. E., Jr.) Volcanic structures in the Chuska Mountains, Navajo Reservation, Arizona-New Mexico: Geol. Soc. Am. Bull., v. 68, no. 4, p. 445-467, illus., maps (1957)

ARGALL, G. O., Jr.

The occurrence and production of vanadium: Colo. Sch. Mines Quart., v. 38, no. 4, 56 p., maps (1943)

ARIZONA BUREAU OF MINES, UNIVERSITY OF ARIZONA

1. The mineral resources of Arizona (prepared primarily for high-school students): Bull. 159, 15 p., index map (1951)
2. Mineral production of Arizona (Open-file statistical charts) (1959)

Copper, gold, silver, lead, and zinc:

Chart A-1. Arizona: Compiled by Eldred D. Wilson and Fred J. McCrory
C-1. Cochise County: Compiled by Eldred D. Wilson and Fred J. McCrory
C-2. Coconino County: Compiled by John W. Anthony and Fred J. McCrory
C-3. Gila County: Compiled by Richard T. Moore and Fred J. McCrory
C-4. Graham County: Compiled by Eldred D. Wilson and Fred J. McCrory
C-5. Greenlee County: Compiled by Eldred D. Wilson, Richard T. Moore, and Fred J. McCrory
C-6. Maricopa County: Compiled by Eldred D. Wilson and Fred J. McCrory
C-7. Mohave County: Compiled by John W. Anthony and Fred J. McCrory
C-8. Pima County: Compiled by John W. Anthony and Fred J. McCrory
C-9. Pinal County: Compiled by Eldred D. Wilson and Fred J. McCrory
C-10. Santa Cruz County: Compiled by Richard T. Moore and Fred J. McCrory
C-11. Yavapai County: Compiled by Eldred D. Wilson and Fred J. McCrory
C-12. Yuma County: Compiled by Eldred D. Wilson and Fred J. McCrory
D-4. Ajo District: Compiled by Eldred D. Wilson
D-9. Aravaipa District: Compiled by John W. Anthony
D-15. Banner District: Compiled by Eldred D. Wilson and Richard T. Moore
D-29. Bunker Hill District: Compiled by Eldred D. Wilson, Richard T. Moore, and Fred J. McCrory
D-31. California or Chiricahua District: Compiled by Eldred D. Wilson and Richard T. Moore
D-38. Castle Dome District: Compiled by Eldred D. Wilson and Richard T. Moore
D-52. Cochise or Johnson District: Compiled by Eldred D. Wilson
D-55. Copper Mountain or Morenci District: Compiled by Eldred D. Wilson and Richard T. Moore
D-70. Empire District: Compiled by John W. Anthony and Richard T. Moore
D-71. Eureka or Bagdad District: Compiled by Eldred D. Wilson and Richard T. Moore
D-79. Globe-Miami District: Compiled by Eldred D. Wilson and Richard T. Moore
D-96. Hartford or Huachuca District: Compiled by John W. Anthony
D-99. Helvetia-Rosemont District: Compiled by Eldred D. Wilson and Richard T. Moore
D-107. La Paz or Weaver District: Compiled by Richard T. Moore
D-117. Mammoth or Old Hat District: Compiled by Eldred D. Wilson and Fred J. McCrory
D-125. Mineral Creek or Ray District: Compiled by John W. Anthony and Fred J. McCrory
D-141. Oro Blanco District: Compiled by John W. Anthony
D-150. Patagonia District: Compiled by Richard T. Moore
D-160. Pine Grove and Tiger Districts: Compiled by Eldred D. Wilson
D-162. Pioneer or Superior District: Compiled by John W. Anthony and Fred J. McCrory
D-192. Silver or Eureka District: Compiled by Eldred D. Wilson
D-193. Silver Bell District: Compiled by Eldred D. Wilson and Richard T. Moore
D-203. Swisshelm District: Compiled by John W. Anthony
D-209. Tombstone District: Compiled by Eldred D. Wilson
D-215. Tyndall District: Compiled by Eldred D. Wilson and Richard T. Moore
D-219. Verde or Jerome District: Compiled by Eldred D. Wilson and Richard T. Moore
D-224. Wallapai District: Compiled by Eldred D. Wilson and Richard T. Moore
D-226. Warren or Bisbee District: Compiled by John W. Anthony

Molybdenum, tungsten, manganese, quicksilver, and vanadium:

Chart A-2. Arizona: Compiled by Eldred D. Wilson

Nonmetallics (including lime, clay products, and cement):

Chart A-3. Arizona: Compiled by Eldred D. Wilson

3. Geologic map of Yavapai County, Arizona, scale 1:375,000 (1958)
4. Geologic map of Cochise County, Arizona, scale 1:375,000 (1959)
5. Folio of geologic and mineral maps of Arizona (1962)

6. Map of outcrops of Tertiary and Quaternary igneous rocks in Arizona, scale 1:1,000,000 (1962)
7. Map of outcrops of Paleozoic and Mesozoic rocks in Arizona, scale 1:1,000,000 (1962)
8. Map of outcrops of Precambrian rocks in Arizona, scale 1:1,000,000 (1962)
9. Map of outcrops of Laramide (Cretaceous-Tertiary) rocks in Arizona, scale 1:1,000,000 (1962)

ARIZONA DEPARTMENT OF MINERAL RESOURCES

1. Production possibilities of the marginal copper mines in Arizona: (1941)
2. Six years of mine property taxation in Arizona, 1945-1950: 5 p. (1951)
3. Story of Bagdad mine: 4 p. (1952)
4. Story of Morenci orebody: 8 p. (1952)
5. Story of New Cornelia: 4 p. (1952)
6. Story of the Miami-Inspiration copper district: 7 p. (1952)
7. Story of the Ray mine: 5 p. (1952)
8. Story of the conversion of copper rock to copper metal: 3 p. (1952)
9. New porphyry development; Silver Bell, Lavender Pit, and San Manuel: 9 p. (1954)
10. Addenda to the stories of the major Arizona porphyries: Ray, Miami, Inspiration, Castle Dome, New Cornelia, Morenci: 6 p. (1954)
11. Mining taxes in Arizona—six-year totals and averages: 9 p. (1955)
12. Arizona land survey: 7 p. (1955)
13. Final valuation of all properties assessed to producing mining companies for the year 1955: 2 p. (1955)
14. Assessed valuations of each class of property in Arizona; by years from 1951 to 1955 inclusive: 3 p. (1956)
15. Arizona mine tax laws—past and present: 3 p. (1958)
16. Mine taxation in Arizona: 10 p. (1958)
17. Assessed valuation of all Arizona properties of producing mining companies—July 1958: 2 p. (1958)
18. Uranium in Arizona: 3rd ed., revised, 7 p. (1958)
19. Mining in Arizona—its past—its present—its future: 28 p. (1958); 2nd ed., revised: (1961)
20. Final valuation of all properties assessed to producing mining companies for year 1960—by counties: 2 p. (1960)
21. Mine taxation in Arizona—five years, 1956-1960 inclusive: 2 p. (1960)
22. Mine taxation in Arizona—four years, 1959-1962 inclusive: 11 p. (1962)
23. Arizona wage statistics and copper out-put, base period 1947-1949 compared with period 1961-1963: May, 14 p. (1964)
24. Arizona's part in the economy of the copper industry: August, 6 p. (1964)
25. Mine taxation in Arizona, four fiscal years 1961-1964, statistical analysis for year 1964: October, 11 p. (1964)

ARIZONA GEOLOGICAL SOCIETY

1. Guidebook for field trip excursions in Southern Arizona, Cordilleran Section, Geological Society of America, April 10-14, 1952, Tucson, Arizona: 150 p., illus., road logs, maps (1952)
2. Gudiebook II for field trip excursions in Southern Arizona, Cordilleran Section, Geological Society of America, April 2-6, 1959, Tucson, Arizona (combined with Arizona Geological Society Digest, v. 2): 290 p., illus., road logs, maps (1959)

ARIZONA HIGHWAYS

Petrified Forest National Monument: v. 21, no. 5, p. 18-26 (1945)

ARIZONA MINING JOURNAL

1. Some live prospects in the Chloride mining district: v. 4, no. 3, p. 15-17, 45 (1920)

2. World's Fair silver mine: v. 4, no. 5 (suppl.), p. 9-10 (1920)
3. Review of the mining situation: v. 4, no. 9, p. 11-12 (1921)
4. Recalling the days of the great Oatman boom in 1915: v. 5, no. 10, p. 21 (1921)
5. History of Tom Reed mine is story of success after failure: v. 5, no. 10, p. 24 (1921)
6. United Eastern Company pushing development work: v. 5, no. 10, p. 22 (1921)
7. Arizona Copper Company: v. 5, no. 13, p. 10, 36 (1921)
8. Calumet and Arizona: v. 5, no. 15, p. 10 (1922)
9. The Inspiration mine: v. 5, no. 17, p. 16, 34 (1922)
10. Miami Copper Company: v. 5, no. 18, p. 8 (1922)
11. New Cornelia Copper Company: v. 5, no. 19, p. 6, 28 (1922)
12. Old Dominion mine: v. 5, no. 20, p. 6, 23 (1922)
13. The Ray consolidated: v. 5, no. 21, p. 10 (1922)
14. The Shattuck-Arizona: v. 5, no. 22, p. 7 (1922)
15. Good showing made by Irene mining property: v. 5, no. 23, p. 32 (1922)
16. The United Verde Extension: v. 5, no. 24, p. 8-9, 20 (1922)
17. The United Verde Copper: v. 6, no. 1, p. 13, 41 (1922)
18. Silver Lillie Copper Mines of Arizona: v. 6, no. 2, p. 40 (1922)
19. Verde Jerome starts large scale work: v. 7, no. 15, p. 11, 30 (1924)
20. The United Verde Extension versus Magma Copper; a comparison from the standpoint of development, ore reserves, capital, and productive capacity: v. 8, no. 8, p. 9, 16-20 (1924)
21. Gift of $1,000,000 to (Central) Copper Company: v. 8, no. 9, p. 19-20 (1924); v. 9, no. 10, p. 26 (1925)
22. Kay finds new ore body: v. 8, no. 11, p. 7-9 (1924)
23. Indian claims discovery of "Mine with the Iron Door": v. 8, no. 13, p. 50-51 (1924)
24. The Mineral Basin Copper Company: v. 8, no. 14, p. 11 (1924)
25. Further exploration to be made at Meteor Mountain: v. 8, no. 14, p. 14-16 (1924)
26. Interest in Phoenix quicksilver increasing: v. 8, no. 15, p. 13-14, 38 (1925)
27. Interesting development at Bill Arp: v. 8, no. 16, p. 19 (1925)
28. Ancient records refer to lost mines in Arizona: v. 8, no. 18, p. 17-18 (1925)
29. Central Copper Company continues to open new ore: v. 8, no. 24, p. 16 (1925)
30. Third mine seems assured for the Jerome district: v. 8, no. 24, p. 25-26 (1925)
31. The Aravaipa and Stanley mining districts of Arizona: v. 9, no. 5, p. 55-56 (1925)
32. Annual report of Central Copper Company is issued: v. 9, no. 15, p. 13 (1925)
33. Extensive construction at Central Copper: v. 9, no. 19, p. 7-8, 42 (1926)
34. The Young Mines Company: v. 9, no. 19, p. 16-17 (1926)
35. Progress at Verde Central Mines: v. 9, no. 19, p. 18-19 (1926)
36. Superior and Boston issues report for fiscal year: v. 9, no. 19, p. 59-60 (1926)
37. Central Copper preparing for production in fall months: v. 10, no. 1, p. 50-51 (1926)
38. Discovery of the Tombstone, Arizona, district: v. 10, no. 4, p. 9 (1926)
39. Kay Copper shows great improvement: v. 10, no. 7, p. 9 (1926)

ARIZONA OIL REPORT

[Articles on leasing, developments, production]: v. 1-5, Phoenix, Arizona (1938-1962)

ARIZONA STATE DEVELOPMENT BOARD

Helium plant started at Pinta Dome: Ariz. State Dev. Board Newsletter, v. 2, no. 7 (1961)

ARIZONA STATE MINE INSPECTOR

Annual Report: issued annually from 1912

ARIZONA TAX COMMISSION
Taxation of the producing mines in Arizona: Ariz. Min. Jour., v. 8, no. 17, p. 13-15 (1925)

ARIZONA UNDERGROUND WATER COMMISSION
The underground water resources of Arizona: 174 p. (1953)

ARIZONA WATER RESOURCES COMMISSION—Arizona State Land Department
The Arizona watershed program in review: 6th Ann. Watershed Symposium Proceedings, 40 p. (1962)

ARIZONA WATER RESOURCES COMMITTEE
Arizona watershed program: Ariz. Watershed Management Div., 69 p. (1957)

ARMSTRONG, A. K.
1. The paleontology and stratigraphy of the Mississippian System of southwestern New Mexico and southeastern Arizona: Univ. Cincinnati, PhD Thesis (1960)
2. Mississippian System of southwestern New Mexico and southeastern Arizona [abst.]: Geol. Soc. Am. Bull., v. 71, no. 12, p. 1817 (1960)
3. Stratigraphy and paleontology of the Mississippian System in southwestern New Mexico and adjacent southeastern Arizona: N. Mex. Bur. Mines and Miner. Res. Mem. 8, 99 p. (1962)

ARMSTRONG, C. A. (*see also* Heindl, L. A., 21, 26, 31)
(and Yost, C. B., Jr.) Geology and groundwater resources of the Palomas Plain-Dendora Valley area, Maricopa and Yuma Counties, Arizona: Ariz. State Land Dept. Water Res. Rep. 4, 49 p., illus., map (1958)

ARNOLD, L. C.
Supergene mineralogy and processes in the San Xavier mine area, Pima County, Arizona: Univ. Ariz., MS Thesis, 63 p. (1964)

ARROWSMITH, R.
Mines of the old Southwest: Stagecoach Press, Santa Fe, New Mexico, 90 p. (1963)

ARUNDALE, J. C. (*see* Schreck, A. E.)

ASH, S. R. (*see* Read, C. B., 4)

ASHWILL, W. R. (*see* Reyner, M. L.)

ASSADI, S. M.
Structure of Golden Gate Mountain, Pima County, Arizona: Univ. Ariz., MS Thesis, 64 p. (1964)

ATWOOD, W. W.
1. Glaciation of San Francisco Mountain, Arizona: Jour. Geol., v. 13, p. 276-279, map (1905)
2. Red Mountain, Arizona—a dissected volcanic cone: Jour. Geol., v. 14, p. 138-146 (1906)

AULT, W. U.
(and Kulp, J. L.) Sulfur isotopes and ore deposits: Econ. Geol., v. 55, no. 1, pt. 1, p. 73-100 (1960)

AUSTIN, S. R.
1. Recent uranium redistribution in the Cameron, Arizona, deposits: *in* Advances in nuclear engineering, v. 2, Nuclear Engr. and Sci. Cong., Philadelphia, Proc. 2d Conf., p. 332-338 (1957)
2. Mineralogy of the Cameron area: USAEC, RME-99 (1957)

AUSTIN, W. L.
Ore deposits near igneous contacts [discussion of paper by W. H. Weed]: AIME Trans., v. 33, p. 1070-1077 (1903)

AVERITT, P.
1. (and others) Revisions in correlation and nomenclature of Triassic and Jurassic formations in southwestern Utah and northern Arizona: AAPG Bull., v. 39, no. 12, p. 2515-2524, illus. (1955)
2. Coal reserves of the United States—a progress report, January 1, 1960: USGS Bull. 1136, p. 85 (1961)

AVERY, R. B.
(and Conant, M. L., and Weissenborn, H. F.) Selected annotated bibliography of asbestos resources in the United States and Canada: USGS Bull. 1019-L, 42 p. (1958)

AXELROD, D. I.
Pliocene environment of the Great Basin [abst.]: Geol. Soc. Am. Bull., v. 58, no. 12. pt. 2, p. 1246 (1947)

AXELROD, Joseph M.
(and others) Uranium minerals from the Hillside mine, Yavapai County, Arizona: Am. Mineral., v. 36, p. 1-22 (1951); [abst.]: v. 34, p. 274 (1949)

AYERS, V. L.
Pyrite from Tucson, Arizona: Am. Mineral., v. 9, p. 91-92 (1924)

BAARS, D. L.
1. Permian blanket sandstone of the Colorado Plateau: *in* Geometry of Sandstone Bodies, AAPG, p. 179-207 (1961)
2. Permian System of Colorado Plateau: AAPG Bull., v. 46, no. 2, p. 149-218 (1962)

BABCOCK, H. M. (*see also* Morrison, R. B., 5)
1. (and Cushing, E. M.) Recharge to ground water from floods in a typical desert wash, Pinal County, Arizona: Am. Geophys. Union Trans. 1942, pt. 1, p. 49-56 (1942); Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 21-26 (1952); [absts.]: Geol. Soc. Am. Bull., v. 52, no. 12, pt. 2, p. 1993-1994 (1941); Pan-Am. Geol., v. 77, no. 3, p. 239-240 (1942)
2. (and Halpenny, L. C.) Queen Creek area, Maricopa and Pinal Counties, Arizona; records of wells, well logs, water analyses: Ariz. State Water Comm., 29 p., map (1942); USGS Ground-Water Branch Mimeo. Rep. 39 p., map (1942)
3. (and Brown, S. C., and Hem, J. D.) Geology and ground-water resources of the Wellton-Mohawk area, Yuma County, Arizona: USGS Mimeo. Rep., 22 p., maps (1947)
4. (and Brown, S. C.) Ground-water resources of Peeples Valley, Arizona: USGS Mimeo. Rep., 13 p., map (1947)
5. (and Snyder, C. T., and Hem, J. D.) Ground-water resources of the Holbrook area, Navajo County, Arizona: USGS Mimeo. Rep., 27 p., maps (1947)
6. (and Kendall, K. K., and Hem, J. D.) Geology and ground-water resources of the Gila Bend Basin, Maricopa County, Arizona: USGS Mimeo. Rep. (1948)
7. (and Brown, S. C.) Water supply of Date Creek area, Yavapai County, Arizona: USGS Mimeo. Rep., 6 p. (1948)
8. (and Sourdry, A. M.) Wellton-Mohawk area, Yuma County, Arizona; records of wells, well logs, water analyses, and maps showing locations of wells: USGS Mimeo. Rep., 39 p. (1948)
9. Memorandum on ground-water supply of the Joseph City Irrigation District, Arizona: USGS Mimeo. Rep., 8 p. (1948)

BABENROTH, D. L.
(and Strahler, A. N.) Geomorphology and structure of the East Kaibab monocline, Arizona and Utah: Geol. Soc. Am. Bull., v. 56, p. 107-150, maps (1945)

BABBITT, B. E.
Paleomagnetic chronology of the San Francisco volcanic field: *in* Contributions to the geology of northern Arizona, Mus. N. Ariz. Bull. 40, p. 11-14 (1964)

BACHELLER, W. D. (*see* Jones, S. M.)

BADGER, S. S.
The Chiricahua Mountains: Engr. Min. Jour., v. 91, p. 663 (1911)

BAGG, R. M.
Geological conditions in the Dragoon Mountains, Arizona: Practical Miner, St. Louis, Mo., v. 8 (July, 1904)

BAHR, C. W.
The Holbrook anticline, Navajo County, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 118-123, illus. (1962)

BAILEY, E. H.
Mercury in the United States: USGS Map MR-30 (1962)

BAILEY, G. E.
The desert; its resources, water supply and development: Min. World, v. 23, p. 471-473, map (1905)

BAILEY, I. W.
The problem of identifying the wood of Cretaceous and later dicotyledons; *Paraphyllanthoxylon arizonense:* Am. Bot., v. 38, p. 439-451 (1924)

BAILEY, J. S.
A stratigraphic analysis of Rico strata in the Four Corners region: Univ. Ariz., PhD Thesis, 88 p. (1955)

BAILEY, L. F. (*see* Carder, D. S., 3)

BAILEY, Vernon
Rock rivers: Nat. Hist., v. 20, no. 2, p. 169-272 (1920)

BAILEY, W. F.
Carbonic invertebrates from a Triassic conglomerate in Arizona [abst.]: Pan-Am. Geol., v. 45, p. 251 (1926)

BAIN, George W.
1. The age of the "Lower Cretaceous" from Bisbee, Arizona, uraninite: Econ. Geol., v. 47, p. 305-315 (1952)
2. Uranium deposits in southwestern Colorado Plateau: USAEC, RMO-982, 59 p. (1952)
3. Uranium in the Dirty Devil Shinarump channel deposit: USAEC, RMO-66, 66 p., map (1952)
4. Experimental simulation of Plateau type uranium deposits: USAEC, RMO-44, 210 p. (1953)
5. Patterns to ores in layered rocks: Econ. Geol., v. 55, No. 4, p. 695-731 (1960)

BAIN, H. F.
Lead and zinc resources of the United States: USGS Bull. 260 (Ariz., p. 254) (1904)

BAINS, T. H.
Location of future ores of the Southwest (discussion of red beds): Min. Jour., v. 11, no. 9, p. 5-7 (1927)

BAKER, A. A. (*see also* Reeside, J. B., Jr., 3)
1. (and Reeside, J. B., Jr.) Some features of Permian sedimentation in northern Arizona and southern Utah [abst.]: Wash. Acad. Sci. Jour., v. 19, p. 234 (1929)
2. (and Reeside, J. B., Jr.) Correlation of the Permian of southern Utah, northern Arizona, northwestern New Mexico, and southwestern Colorado: AAPG Bull., v. 13, p. 1413-1448 (1929)

3. (and Dane, C. H., and Reeside, J. B., Jr.) Correlation of the Jurassic formations of southern Utah, northern Arizona, northwestern New Mexico, and southwestern Colorado [abst.]: Pan-Am. Geol., v. 53, p. 131 (1930); Geol. Soc. Am. Bull., v. 41, p. 87 (1930)
4. (and Dane, C. H., and Reeside, J. B., Jr.) Correlation of the Jurassic formations of parts of Utah, Arizona, New Mexico, and Colorado: USGS Prof. Paper 183, 66 p., maps (1936)
5. Geology of Monument Valley-Navajo Mountain region, San Juan County, Utah: USGS Bull. 865, 106 p., maps (1936)
6. (and Williams, J. S.) Permian in parts of Rocky Mountain and Colorado Plateau regions: AAPG Bull., v. 24, no. 4, p. 617-635, map (1940)
7. (and Dane, C. H., and Reeside, J. B., Jr.) Revised correlation of Jurassic formations of parts of Utah, Arizona, New Mexico, and Colorado: AAPG Bull., v. 31, no. 9, p. 1664-1668 (1947)

BAKER, Arthur, 3rd
1. Localization of pyrometasomatic ore deposits at Johnson Camp, Arizona: Min. Engr., v. 5, no. 12, p. 1272-1277, illus. (1953); AIME Trans., v. 196 (1954)
2. Chalcopyrite blebs in sphalerite at Johnson Camp, Arizona: Econ. Geol., v. 55, no. 2, p. 387-398 (1960)

BAKER, D. R. (*see* Kohler, M. A.)

BAKER R. C.
The geology and ore deposits of the Patagonia Mountains, Santa Cruz County, Arizona: Univ. Mich., PhD Thesis (1962)

BALCHIN, W. G. V.
(and Pye, N.) Piedmont profiles in the arid cycle (Arizona-California): Geol. Assoc. London Proc., v. 66, p. 167-181, illus. (1956)

BALDWIN, R. W.
A decade of development in overvoltage surveying: AIME Trans. 1959, v. 214, p. 307-314 (1960)

BALK, Robert (*see also* Allen, J. E.)
1. Structural behavior of igneous rocks: Geol. Soc. Am. Mem. 5, 177 p. (1937)
2. Kimberlitic tuff plugs in northeastern Arizona [abst.]: Am. Geophys. Union Trans., v. 35, no. 2, p. 381 (1954)

BALL, M. W.
Petroleum withdrawals and restorations of the public domain: USGS Bull. 623, 427 p. (1916)

BALL, S. H.
1. (and Broderick, T. M.) Magmatic iron ore in Arizona: Engr. Min. Jour., v. 107, p. 353-354 (1919)
2. The mining of gems and ornamental stones by American Indians: Smithsonian Inst., Bur. Am. Ethn., Anthro. Paper 13, Bull. 128, p. xi-77 (1941)

BALLA, J. C.
The geology and geochemistry of beryllium in southern Arizona: Univ. Ariz., MS Thesis, 76 p. (1962)

BANCROFT, Howland
1. Notes on the occurrence of cinnabar in central-western Arizona: USGS Bull. 430, p. 151-153 (1910)
2. Occurrence of cinnabar in Arizona: Min. World, v. 33, no. 4, p. 144 (1910)
3. Mining in Yuma County, Arizona: Min. Engr. World, v. 35, p. 332 (1911)
4. Reconnaissance of the ore deposits in northern Yuma County, Arizona: USGS Bull. 451, 130 p., maps (1911); [abst.]: Wash. Acad. Sci. Jour., v. 1, p. 184 (1911)
5. Geology of Gold Road district (near Kingman, Arizona): Min. Sci. Press, v. 111, p. 21 (1915)

BANCROFT, H. H.
1. Map of California, Nevada, Utah, and Arizona: H. H. Bancroft & Co., San Francisco (1864)
2. History of Arizona and New Mexico, 1530-1888: The History Co., San Francisco, 829 p., map (1889)

BANERJEE, A. K.
Structural and petrological study of the Oracle granite: Univ. Ariz., PhD Thesis, 112 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 40 (1958)

BANK, W. (*see* Anderson, F. G.)

BANKS, D. M. (*see* Bowles, O., 2, 3, 5)

BARBER, G. A. (*see* Thomssen, R. W., 1)

BARKER, F. B. (*see* Scott, R. C., 1, 2)

BARNES, F. C. (*see* Umbach, P. H., 1, 2, 3)

BARNES, W. C.
1. The "discovery" of Meteor Crater: Mus. N. Ariz., Mus. Notes, v. 7, no. 2, p. 5-8 (1934)
2. Arizona place names: Univ. Ariz., Gen. Bull. 2, 503 p. (1935); revised by Granger, B. H., 519 p. (1960)

BARNES, W. H. (*see* Qurashi, M. M., 1, 2)

BARNETT, P. R. (*see* Coats, R. R., 2)

BARNEY, W. G.
The Silver Bell Mountains, Arizona: Engr. Min. Jour., v. 78, p. 755-756 (1904)

BAROCH, C. T.
Copper mines of the northern section of Arizona: Mines Mag., v. 27, no. 11, p. 54-56, 60, 74 (1937)

BARR, A. T. (*see* Ingham, G. R.)

BARRINGER, D. M.
1. Coon Mountain and its crater (Arizona): Acad. Nat. Sci. Phila. Proc., v. 57, pt. 3, p. 861-886 (1906)
2. (and Tilghman, B. C.) The geology of Coon Butte, Arizona [abst.]: Science, new ser., v. 24, p. 370-371 (1906); Am. Assoc. Adv. Sci. Proc., v. 56-67, p. 271 (1907)
3. Further notes on Meteor Crater, Arizona: Acad. Nat. Sci. Phila. Proc., v. 66, pt. 3, p. 556-565, maps (1915)
4. Further notes on Meteor Crater in northern central Arizona (no. 2): Acad. Nat. Sci. Phila. Proc., v. 76, p. 275-278 (1924)
5. Volcanoes or cosmic shell-holes: Sci. Am., v. 131, no. 1, p. 10-11, 62, 63; no. 2, p. 102, 142-144 (1924)

BARRINGER, D. M., Jr. (*see also* Trischka, C., 4)
1. The Barringer meteorite: Science, new ser., v. 73, p. 66-67 (1931)
2. From what direction did the meteorite come?: Foote Prints, v. 30, no. 2, p. 23-28, illus. (1958)

BARRINGTON, Johnathan (*see also* Kerr, P. F., 6)
1. (and Kerr, P. F.) Breccia pipe near Cameron, Arizona: Geol. Soc. Am. Bull., v. 72, no. 11, p. 1661-1674 (1961)
2. (and Kerr, P. F.) Alteration effects at Tuba dike, Cameron, Arizona: Geol. Soc. Am. Bull., v. 73, no. 1, p. 101-112 (1962)
3. (and Kerr, P. F.) Collapse feature and silica plugs near Cameron, Arizona: Geol. Soc. Am. Bull., v. 74, no. 10, p. 1237-1258 (1963)

BARROWS, D. P.
The Colorado desert (Arizona): Natl. Geog. Mag., v. 11, p. 337-351 (1900)

BARTER, C. F.
Geology of the Owl Head mining district, Pinal County: Univ. Ariz., MS Thesis, 73 p. (1962)

BARTH, C. G., Jr.
Mines of the Weaver and Martinez districts: Min. Jour., v. 24, no. 1, p. 2-4 (1940)

BARTLETT, Katherine
1. A prehistoric "mine" of red argillite, resembling pipestone, near Del Rio, Arizona: Mus. N. Ariz., Mus. Notes, v. 11, no. 12, p. 75-78 (1939)
2. Notes upon the routes of Espejo and Farfan to the mines of the sixteenth century: N. Mex. Hist. Review, p. 21-36 (1942)
3. A primitive stone industry of the Little Colorado Valley, Arizona: Am. Antiquity, v. 8, no. 3, p. 266-268, illus., map (1943)

BASS, N. W.
Correlation of basal Permian and older rocks in southwestern Colorado, northwestern New Mexico, northeastern Arizona, and eastern Utah: USGS Preliminary Chart 7 (1945); Accompanied by paper on Paleozoic stratigraphy as revealed by deep wells: 20 p. (1944)

BASSLER, Harvey (*see* Reeside, J. B., Jr., 1)

BASSLER, R. S. (*see also* Ulrich, E. D.)
A supposed jellyfish from the pre-Cambrian of the Grand Canyon: U. S. Natl. Mus. Proc., v. 89, no. 3104, p. 519-522 (1941)

BASTIN, E. S.
1. Primary native silver ores near Wickenburg, Arizona, and their bearing on the genesis of the silver ores of Cobalt, Ontario: USGS Bull. 735, p. 131-155 (1922); Ariz. Min. Jour., v. 6, no. 9, p. 7-8, 32-35; no. 11, p. 22-26 (1922)
2. Origin of certain rich silver ores near Chloride and Kingman, Arizona: USGS Bull. 750, p. 17-39 (1924)

BATEMAN, A. M.
1. An Arizona asbestos deposit: Econ. Geol., v. 18, p. 663-680 (discussion, p. 681-683) (1923)
2. Review of the Colorado delta, by G. G. Sykes, 1937: Econ. Geol., v. 33, no. 1, p. 119-120 (1938)
3. Economic mineral deposits: John Wiley & Sons, Inc., N. Y., 898 p., illus. (1942)

BATEMAN, P. C.
(and Erickson, M. P.) Geology of the Maudina and Morning Star tungsten mines, Pinal County, Arizona: USGS Open-file Rep., text on map sheets (1944)

BATES, R. C.
An application of statistical analysis to exploration for uranium on the Colorado Plateau: Econ. Geol., v. 54, no. 3, p. 449-466 (1959)

BATES, R. L.
1. [Oil] Developments in Arizona, western New Mexico, and northern New Mexico in 1945: AAPG Bull., v. 30, no. 6, p. 958-962 (1946)
2. [Oil] Developments in Arizona, western New Mexico, and northern New Mexico in 1946: AAPG Bull., v. 31, no. 6, p. 1039-1044 (1947)

BATSCHELET, C. E.
Areas of the United States: U. S. Bureau of Census, Wash., (1940)

BATTY, J. V. (*see* Agey, W. W.)

BAUER, H. L., Jr. (*see* Wilmarth, V. R.)

BAUR, G. S. (*see* Anderson, F. G.)

BEASLEY, W. L.
Copper Queen cave in New York: Engr. Min. Jour., v. 102, p. 379-380 (1916)

BECKER, G. F.
Geology; sketch of Arizona: Tenth Census, v. 3, p. 44-52 (1885)

BECKER, R. M. (*see* Wright, H. E., 2)

BECKETT, P. G.
The water problem at the Old Dominion mine, Globe, Arizona: AIME Trans., v. 55, p. 35-66 (1917)

BEESLEY, E. M. (*see* Wheeler, H. E., 2)

BEIKMAN, H. M. (*see* O'Sullivan, R. B., 2; Stipp, T. F.)

BEJNAR, Waldemere
Geology of the Ruin Basin area, Gila County, Arizona: Univ. Ariz., PhD Thesis, 135 p., maps, illus. (1950)

BELDEN, W. A.
The stratigraphy of the Toroweap formation, Aubrey Cliffs, Coconino County, Arizona: Univ. Ariz., MS Thesis, 77 p. (1954)

BELL, G. L.
Tunsten deposits near Morristown, Maricopa County, Arizona: USGS Open-file Rep., 5 p., maps (1946)

BELL, K. G.
Uranium in precipitates and evaporites: USGS Prof. Paper 300, p. 381-386 (1956)

BENEDICT, P. C. (*see* Fearing, J. L., Jr., 1)

BENNETT, P. J.
The geology and mineralization of the Sedimentary Hills area, Pima County, Arizona: Univ. Ariz., MS Thesis, 40 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 40-41 (1958)

BENNETT, R. R. (*see* Skibitzke, H. E., 3)

BERGENDAHL, M. H. (*see* Koschmann, A. H.)

BERGER, H. W.
1. Saving gold in cemented gravels: Min. Jour., v. 16, no. 14, p. 7, 28 (1932)
2. Deluge Wash section, Mohave County, Arizona: Min. Jour., v. 22, no. 6, p. 4-5, 32 (1938)

BERKEY, C. P. (*see also* Fairbanks, H. M.)
1. Critical geologic features of the Hoover Dam site [abst.]: Science, new ser., v. 75, p. 545-546 (1932)
2. Geology of Boulder and Norris Dam sites: Civil Engr., v. 5, no. 1, p. 24-28, illus. (1935)

BERONI, E. P. (*see* Wyant, D. G.)

BERRY, L. G. (*see also* Qurashi, M. M., 1)
Tyrolite, higginsite and cornwallite [abst.]: Geol. Soc. Am. Bull., v. 58, no. 12, pt. 2, p. 1168 (1947); Am. Mineral., v. 33, no. 3-4, p. 193 (1948)

BERRY, W. H.
Control of Keams Canyon Wash: Jour. Soil and Water Conserv., v. 11, no. 3, p. 117-120 (1956)

BEUS, S. S.
Fossils from the Kaibab formation at Bee Spring, Arizona: *in* Contributions to the geology of northern Arizona, Mus. N. Ariz. Bull. 40, p. 59-64 (1964)

BICKERMAN, Michael
1. A geologic-geochemical study of the Cat Mountain rhyolite: Univ. Ariz., MS Thesis, 43 p. (1962)
2. Origin of Cat Mountain rhyolite: Ariz. Geol. Soc. Dig., v. 6, p. 83-90 (1963)

BIDEAUX, R. A. (*see also* Thomssen, R. W., 2)
1. Wulfenite from the Glove mine near Amado, Arizona: Mineral Explorer, p. 3-6 (Oct.-Dec., 1959)
2. (and Williams, S. A.) Some new occurrences of minerals of Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 53-56 (1960)

BIEBERMAN, R. A.
Mineral resources of the San Juan Basin: N. Mex. Geol. Soc., Guidebook of San Juan Basin, p. 141-146, illus. (1951)

BILLINGS, M. P.
Structural geology: Prentice-Hall, Inc., 473 p., illus. (1942); 2nd ed.: 514 p., illus. (1954)

BILLINGSLEY, Paul
1. (and Locke, Augustus) Tectonic position of ore districts in the Rocky Mountain region: AIME Trans., v. 115 (Min. Geol.), p. 59-68 (1935)
2. (and Locke, Augustus) Problems of regional correlation of structural elements of western United States: Geol. Soc. Am. Bull., v. 50, p. 1900-1901 (1939)
3. (and Locke, Augustus) Regional correlation of structural elements—problems-western United States [abst.]: Geol. Soc. Am. Bull., v. 51, no. 12, pt. 1, p. 1955 (1940)
4. (and Locke, Augustus) Structure of ore districts in the continental framework (with discussion by E. H. Wisser): AIME Trans., v. 144, p. 9-64, illus., maps (1941)

BINGHAM, .W F.
Summary of findings from exploration, geophysical survey, and test-drilling at Meteor Crater, Arizona: Pan-Am. Geol., v. 68, p. 196-198 (1937); [abst.]: Geol. Soc. Am. Proc. 1937, p. 305 (1938)

BIRD, A. T.
1. Resources of Santa Cruz County: Univ. Ariz., Ariz. Bur. Mines Bull. 29, 27 p. (1916)
2. Santa Cruz mining and history are interwoven: Ariz. Min. Jour., v. 6, no. 18, p. 7-8 (1923)

BIRDSEYE, C. H.
(and Moore, R. C.) A boat voyage through the Grand Canyon of the Colorado: Geog. Rev., v. 14, no. 2, p. 177-196 (1924)

BIRDSEYE, H. S.
Uranium deposits in northern Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 161-163, illus. (1958)

BISHOP, H. J.
Phelps Dodge enters the lead business: Engr. Min. Jour., v. 126, p. 654-655 (1928)

BISHOP, O. M.
Geology and ore deposits of the Richmond Basin area, Gila County, Arizona: Univ. Ariz., MS Thesis, 50 p., maps (1935)

BISSELL, H. J.
1. Geology of the Cretaceous and Tertiary sedimentary rocks of the Utah-Arizona-Nevada corner: Utah Geol. Soc., Guidebook no. 7, p. 69-78, illus. (1952)
2. Eastern Great Basin Permo-Pennsylvanian strata—preliminary statement: AAPG Bull., v. 44, no. 8, p. 1424-1435 (1960)
3. Pensylvanian and Permian Systems of southwestern Utah: Intermountain Assoc. Pet. Geol., Guidebook, 12th Field Conf., p. 42-58 (1963)

BISSETT, D. H.
A survey of hydrothermal uranium occurrences in southeastern Arizona: Univ. Ariz., MS Thesis, 94 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 47 (1958)

BJORGE, G. N.
(and Shoemaker, A. H.) Applied geology at the Old Dominion mine, Globe, Gila County, Arizona: *in* Ore deposits of the Western States, AIME Lindgren Volume, p. 709-716 (1933)

BJORK, R. L.
Analysis of the formation of Meteor Crater, Arizona; a preliminary report: Jour. Geophys. Research, v. 66, no. 10, p. 3379-3389 (1961)

BLACET, P. M. (*see* Anderson, C. A., 12)

BLACK, D. M.
Natural dams of Havasu Canyon, Supai, Arizona: Science, v. 121, no. 3147, p. 611-612, illus. (1955)

BLACK, R. A. (*see also*, Pakiser, L. C., Jr.)
1. Geophysical exploration for uranium on the Colorado Plateau: USGS Prof. Paper 300, p. 721-726 (1956)
2. (and Frischknecht, F. C., Hazelwood, R. M., and Jackson, W. H.) Geophysical methods of exploring for buried channels in the Monument Valley area, Arizona and Utah: USGS Bull. 1083-F, 228 p. (1962)

BLACKWELDER, Eliot
1. Physiographic history of the Colorado River [abst.]: Geol. Soc. Am. Bull., v. 43, p. 229 (1932); Pan-Am. Geol., v. 55, p. 364-366 (1931)
2. Desert plains: Jour. Geol., v. 39, no. 2, p. 133-140 (1931)
3. The age of Meteor Crater: Science, new ser., v. 76, p. 557-560 (1932); [absts.]: Pan-Am. Geol., v. 58, p. 69-70 (1932); Geol. Soc. Am. Bull., v. 44, p. 156 (1933)
4. Terraces along the lower course of the Colorado River [abst.]: Geol. Soc. Am. Proc. 1933, p. 66-67 (1934)
5. Origin of the Colorado River: Geol. Soc. Am. Bull., v. 45, p. 551-566, maps (1934)

BLAKE, F. H.
Vanadinite in Pinal County, Arizona: Am. Jour. Sci., 3rd ser., v. 28, p. 145 (1884)

BLAKE, W. P. (*see also* Hitchcock, C. H., 1)
1. General report upon the geological collections (made on Whipple's reconnaissance near the 35th parallel): U. S. Pac. R. R. Expl., 33rd Cong., 2nd session, Sen. Ex. Doc. 78 and H. Ex. Doc. 91, v. 3, pt. 4, p. 1-119, map (1856)
2. Silver and copper mining in Arizona: Min. Mag., 2nd ser., v. 1, p. 1-15, map (1859)
3. Iron regions of Arizona: Am. Jour. Sci., 2nd ser., v. 40, p. 338 (1865)
4. Note on the abundance of iron ore in northern Arizona: Calif. Acad. Sci. Proc., v. 3, p. 206-207 (1866)
5. Castle Dome Mining and Smelting Company (private rep. to stockholders): Tuttle, Morehouse, and Taylor, New Haven (1880, 1881)
6. On the occurrence of vanadates of lead at the Castle Dome mines in Arizona: Am. Jour. Sci., 3rd ser., v. 22, p. 410-411 (1881)
7. Porphyry dike, Tombstone district, Arizona: Engr. Min. Jour., v. 34, p. 29-30 (1882)
8. The geology and veins of Tombstone, Arizona: AIME Trans., v. 10, p. 334-345 (1882); Engr. Min. Jour., v. 33, p. 145-146, 157, 231-232, 328; v. 34, p. 29-30 (1882)
9. New locality of the green turquoise: Am. Jour. Sci., 3rd ser., v. 25, p. 197-200 (1883)
10. Description of the Silver King mine of Arizona: New Haven, Conn., 48 p. (1883); [abst.]: Engr. Min. Jour., v. 35, p. 238-239, 254-256, 270-271 (1883)

11. The copper deposits of Copper Basin, Arizona, and their origin: AIME Trans., v. 17, p. 479-485 (1889)
12. Thenardite, mirabilite, glauberite, halite, and associates of the Verde Valley, Arizona Territory: Am. Jour. Sci., v. 39, p. 43-45 (1890)
13. Mines and mining: Rep. of Governor of Ariz. to Secretary of Interior, p. 32-44, Washington (1896)
14. Gypsum in southern Arizona: Am. Geol., v. 18, p. 394 (1896)
15. Mines and mining: Rep. of Governor of Ariz. to Secretary of Interior, p. 31-42, Washington (1897)
16. Gold in granite and plutonic rocks: AIME Trans., v. 26, p. 290-298 (1897)
17. The Fortuna gold mine, Arizona: Engr. Min. Jour., v. 63, p. 664-665 (1897)
18. Distribution of metallic wealth in Arizona: Rep. of Governor of Ariz. to Secretary of Interior, p. 19-86, Washington (1898)
19. Anthracite coal in Arizona: Am. Geol., v. 21, p. 345-346 (1898)
20. Remains of a species of Bos in the Quaternary of Arizona: Am. Geol., v. 22, p. 65-72 (1898)
21. *Bison latifrons* and *Bos arizonica*: Am. Geol., v. 22, p. 247-248 (1898)
22. Wolframite in Arizona: Engr. Min. Jour., v. 65, p. 607-608 (1898)
23. Historical sketch of mining in Arizona: Rep. of Governor of Ariz. to Secretary of Interior, p. 43-153, Washington (1899)
24. Hubnerite in Arizona: AIME Trans., v. 28, p. 543-546 (1899)
25. The occurrence and production of wolframite in Arizona: Mineral Industry, v. 7, p. 720-722 (1899)
26. Remains of the mammoth in Arizona: Am. Geol., v. 26, p. 257 (1900)
27. Does platinum occur in Arizona: Engr. Min. Jour., v. 69, p. 224 (1900)
28. Notes on the mining industry: Rep. of Governor of Ariz. to the Secretary of Interior, p. 99-112, Washington (1901)
29. Some salient features in the geology of Arizona, with evidences of shallow seas in Paleozoic time: Am. Geol., v. 27, p. 160-167 (1901); [abst.]: Geol. Soc. Am. Bull., v. 12, p. 493; Jour. Geol., v. 9, p. 67-69 (1901)
30. The caliche of southern Arizona: Engr. Min. Jour., v. 72, p. 601-602 (1901); AIME Trans., v. 31, p. 220-226 (1902)
31. (Mining in Arizona): Rep. of Governor of Ariz. to Secretary of Interior, p. 51-54, Washington (1902)
32. The geology of the Galiuro Mountains, Arizona, and of the gold-bearing ledge known as Gold Mountain: Engr. Min. Jour., v. 73, p. 546-547 (1902)
33. Lake Quiburis, an ancient Pliocene lake in Arizona: Univ. Ariz. Monthly, v. 4, p. 107-108 (1902); [abst.]: Science, new ser., v. 15, p. 413-414 (1902)
34. Tombstone and its mines; a report upon the past and present condition of the mines of Tombstone, Cochise County, Arizona, to the Development Company of America: 83 p., New York (1902)
35. Geology of Arizona: Rep. of Governor of Ariz. to Secretary of Interior, p. 126-135, Washington (1903)
36. Arizona diatomite: Wisc. Acad. Sci. Trans., v. 14, pt. 1, p. 107-111 (1903)
37. Diatom-earth in Arizona: AIME Trans., v. 33, p. 38-45 (1903)
38. Origin of pebble-covered plains in desert regions: Engr. Min. Jour., v. 75, p. 632, (1903); AIME Trans., v. 34, p. 161-162 (1904)
39. Geology of Arizona: Rep. of Governor of Ariz. to Secretary of Interior, p. 66-72, Washington (1904)
40. Tombstone and its mines: AIME Trans., v. 34, p. 668-670 (1904)
41. Copper ore and garnet in association: AIME Trans., v. 34, p. 886-890 (1904); Min. Sci. Press, v. 89, p. 72-73 (1904); Min. World, v. 21, p. 175 (1904)
42. Gypsum deposits in Arizona: USGS Bull. 223, p. 100-101 (1904)
43. Notes on the year's progress in mining: Rep. of Governor of Ariz. to Secretary of Interior, p. 35-42, Washington (1905)

44. Superficial blackening and discoloration of rocks, especially in the desert regions: AIME Trans., v. 35, p. 371-375 (1905)
45. Iodobromite in Arizona: Am. Jour. Sci., 4th ser., v. 19, p. 230 (1905)
46. Origin of the depression known as Montezuma's Well, Arizona: Science, new ser., v. 24, p. 568 (1906)
47. The flanking detrital slopes of the mountains of the Southwest: Science, new ser., v. 25, p. 975-978 (1907); [abst.]: p. 294 (1907)
48. Note upon the structure of the Santa Catalina gneiss, Arizona: Science, new ser., v. 28, p. 379-380, 382 (1908)
49. Geological sketch of the region of Tucson, Arizona: Carnegie Inst. Wash. Pub. 99, p. 45-68, map (1908)
50. Minerals of Arizona; their occurrence and association with notes on their composition: a report to the Governor of Ariz., 64 p. Tucson (1909)
51. Manganese ore in an unusual form: AIME Bull. 45, p. 763-765 (1910); Min. World, v. 33, p. 614 (1910); AIME Trans., v. 41, p. 647-649 (1911)
52. Sketch of Pima County, its mining districts, minerals, climate, agriculture and other resources: Tucson (1910)

BLANCHARD, Ralph C.
The geology of the western Buckskin Mountains, Yuma County, Arizona: Columbia Univ., Thesis, 80 p. (1913); Columbia Univ., Contrib. Geol. Dept., v. 26, no. 1 (1913)

BLANCHARD, Roland
Interpretation of leached outcrops: Chem., Met., Min. Soc. S. Africa Jour., p. 1-30 (May, 1939)

BLANDY, J. F.
1. The mining region around Prescott, Arizona: AIME Trans., v. 11, p. 286-291, map (1883); Engr. Min. Jour., v. 36, p. 33-34, map. (1883); [abst.]: Science, v. 2, p. 86 (1883)
2. The mines of Galena Gulch, Arizona: Engr. Min. Jour., v. 53, p. 445 (1892)
3. Some notes on the geology of Arizona: Engr. Min. Jour., v. 56, p. 473-474 (1893)
4. A peculiar case of stratification (in Grand Canyon, Arizona): Engr. Min. Jour., v. 56, p. 638 (1893)
5. The mines of Yavapai County, Arizona: Engr. Min. Jour., v. 63, p. 632-634 (1897)
6. An Arizona copper deposit: Engr. Min. Jour., v. 64, p. 97 (1897)
7. Mining in Yavapai County, Arizona: Engr. Min. Jour., v. 66, p. 547-548 (1898)

BLAUVELT, Harrington
1. The Reymert manganiferous lode, Arizona, and its formation: Engr. Min. Jour., v. 47, p. 139-140 (1889)
2. Mineral in basalt: Engr. Min. Jour., v. 61, p. 111 (1896)

BLISSENBACH, Erich
1. The geology of alluvial fans in Arizona: Univ. Ariz., MS Thesis, 101 p., maps (1951)
2. Relation of surface angle distribution to particle size distribution on alluvial fans: Jour. Sed. Pet., v. 22, p. 25-28, illus. (1952)
3. Geology of the Aubrey Valley, south of the Hualpai Indian Reservation, northwest Arizona: Plateau, v. 24, no. 4, p. 119-127, illus., map (1952)
4. Geology of alluvial fans in semi-arid regions: Geol. Soc. Am. Bull., v. 65, no. 2, p. 175-189, illus. (1954)

BLUHM, F. I. (*see also* McDonald, H. R., 2, 3, 5)
(and Wolcott, H. N.) Ground-water resources of Deer Valley, Maricopa County, Arizona, with a section on quality of water by J. D. Hem: USGS Mimeo. Rep., 34 p. (1949)

BOARDMAN, Leona (*see* Mansfield, G. R.)

BODLE, R. R.

United States earthquakes, 1939: U. S. Coast and Geodetic Survey ser. 637, iii, 69 p., illus., maps (1941); 1942: ser. 662, iv, 38 p., illus., maps (1944); 1943: ser. 672, iv, 47 p., illus., maps (1946); 1945: ser. 699, iv, 38 p., illus. maps (1947); 1946: (and Murphy, L. M.) ser. 714, iv, 48 p., illus., maps (1948)

BOERICKE, W. F.

Oatman today: Engr. Min. Jour., v. 113, p. 51-53 (1922)

BOGERT, John R.

Christmas mine development proceeds at fast pace: Min. World, v. 22, no. 8, p. 28 (1960)

BOLLIN, E. M.

1. The geology of the Kaibab formation, Marble Platform, Coconino County, Arizona: Univ. Ariz., MS Thesis, 105 p. (1955)
2. (and Kerr, P. F.) Uranium mineralization near Cameron, Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 164-168, illus. (1958)

BOLLINGER, E. E.

The Tom Reed-United Eastern decision: Engr. Min. Jour., v. 3, p. 747-748 (1921); Ariz. Min. Jour., v. 4, no. 11, p. 3-6 (1921)

BOND, Josiah

1. A silver-bearing diorite in southern Arizona: Engr. Min. Jour., v. 89, p. 1268-1269 (1910)
2. The Santa Cruz batholith of Arizona: Ariz. Min. Jour., v. 9, no. 8, p. 8-9, 23-24 (1925)

BONILLAS, Y. S.

(and Tenney, J. B., and Feuchére, Leon) Geology of the Warren mining district: AIME Bull. 117, p. 1397-1465, maps (1916); (with discussion by Ira B. Joralemon, F. L. Ransome, and L. C. Graton): Trans., v. 55, p. 284-355, maps (1917)

BOOHER, L. J. (*see* Smith, G. E. P., 5)

BOOHER, M. B. (*see also* Hardt, W. F., 1, 2, 3)

(and Morse, E. K.) Arizona: *in* Ground-water levels in the United States, 1956-1960, Southwestern States, USGS Water-Supply Paper 1770, p. 3-25 (1963)

BOON, J. D.

1. Established and supposed examples of meteoritic craters and structures: Field and Lab., v. 6, no. 2, p. 44-56 (1938)
2. (and Albritton, C. C.) Deformation of rock strata by explosions: Science, new ser., v. 96, p. 402-403 (1942)
3. More about "deformation of rock strata by explosions": Science, new ser., v. 97, p. 42-43 (1943)

BOONE, W. J., Jr.

Helium-bearing natural gases of the United States (analyses and analytical methods, supplement to Bull. 486): USBM Bull. 576, 117 p. (1958)

BOOT, D. H.

Meteor Mountain Arizona: Iowa Acad. Sci. Proc., v. 26, p. 379-383 (1920)

BORLAND, G. C. (*see* Lee, C. A.)

BOTINELLY, T.

1. (and Weeks, A. D.) Mineralogy and oxidation of the Colorado Plateau uranium ores: USGS Prof. Paper 300, p. 187-193 (1956)
2. (and Weeks, A. D.) Mineralogic classification of uranium-vanadium deposits of the Colorado Plateau: USGS Bull. 1074-A, 2 p. (1957)

BOTSFORD, C. A.

A possible Arizona oil field: Western Engr., v. 3, p. 187-189 (1913)

BOUTWELL, W. D.
The mysterious tomb of a giant meteorite: Natl. Geog. Mag., v. 53, p. 721-730 (1928)

BOWEN, E. R.
(and Turner, S. F.) Water supply, Army Air Force Flexible Gunnery School, Kingman, Arizona: USGS Ground-water Branch Open-file Rep., 7 p., illus. (1959)

BOWEN, N. L.
(and Wykoff, R. W. G.) A petrographic and X-ray study of the thermal dissociation of dumortierite: Wash. Acad. Sci. Jour., v. 16, p. 178-189 (1926)

BOWER, F. W.
1. Jerome to Phoenix country: Ariz. Min. Jour., v. 1, no. 4, p. 10-15 (1917)
2. Kay and adjacent properties: Ariz. Min. Jour., v. 2, no. 7, p. 28 (1918)

BOWIE, J. E. (*see* Hendricks, E. L., 1)

BOWLES, Oliver
1. Sandstone quarrying in the United States: USBM Bull. 124, 143 p. (1917)
2. (and Banks, D. M.) Limestone: USBM, IC 6723, 21 p. (1933)
3. (and Banks, D. M.) Onyx marble and travertine: USBM, IC 6751, 11 p. (1933)
4. Asbestos—domestic and foreign deposits: USBM, IC 6790, 24 p. (1934)
5. (and Banks, D. M.) Lime: USBM, IC 6884, 37 p. (1936)
6. Asbestos: USBM Bull. 403, 92 p. (1937)
7. Asbestos—a strategic mineral: Min. Met., v. 19, p. 442-445 (1938)
8. Asbestos—a minerals survey: USBM, IC 7880, 94 p., illus. (1959)

BOWMAN, A. B. (*see also* Storms, W. R.)
History, growth, and development of a small mining company: Min. Engr., v. 15, no. 6, p. 42-49 (1963)

BOWMAN, H. L.
Note on the refractive indices of pyromorphite, mimetite, and vanadinite: Mineral Mag., v. 13, p. 324-329 (1903)

BOWSHER, A. L.
The stratigraphic significance of a crinoid from the Redwall limestone of Arizona: Jour. Paleo., v. 28, no. 1, p. 113-116, illus. (1954)

BOYER, W. H. (*see* Gabelman, J. W., 2)

BOZION, C. N. (*see* Heyl, A. V.)

BRADISH, Beverly B.
(and Mills, N. K.) Generalized nomenclature chart (columnar sections of northeastern Arizona): N. Mex. Geol. Soc., Guidebook of the San Juan Basin, p. 48 (1950)

BRADLEY, Walter M. (*see* Ford, W. E., 2)

BRADLEY, William C.
Large-scale exfoliation in massive sandstones of the Colorado Plateau: Geol. Soc. Am. Bull., v. 74, no. 5, p. 519-528 (1963)

BRADLEY, Worthen
Shattuck Denn increased production: Engr. Min. Jour., v. 138, p. 227-228 (1937)

BRADY, L. F. (*see also* Breed, W. J., 2; Heineman, R. E. S., 2)
1. Prehistoric Arizona meteorite: Pan-Am. Geol., v. 51, p. 287-288 (1929)
2. New meteorite from northern Arizona [abst.]: Pan-Am. Geol., v. 53, p. 316 (1930)
3. Northern Arizona meteorites: Mus. N. Ariz., Mus. Notes, v. 3, no. 2, p. 1-3 (1930)
4. A suspected meteoritic specimen from northern Arizona: Am. Jour. Sci., 5th ser., v. 21, p. 173-177 (1931)

5. A mounted skeleton of a ground sloth: Mus. N. Ariz., Mus. Notes, v. 6, no. 4, p. 19-21 (1933)
6. New Devonic area in northern Arizona [abst.]: Pan-Am. Geol., v. 60, p. 303-304 (1933)
7. Elden Mountain: Mus. N. Ariz., Mus. Notes, v. 7, no. 3, p. 9-12 (1934)
8. Notes on the geology of northern Arizona; the Moenkopi sandstone: Mus. N. Ariz., Mus. Notes, v. 8, no. 2, p. 8-12 (1935)
9. Vertebrate and invertebrate tracks from Moenkopi sandstone [abst.]: Pan-Am. Geol., v. 65, p. 374-375 (1935)
10. Preliminary note on the occurrence of a primitive theropod in the Navajo: Am. Jour. Sci., 5th ser., v. 30, p. 210-215 (1935)
11. New theropod remains from Navajo (La Plata) sandstone [abst.]: Pan-Am. Geol., v. 64, p. 150 (1935)
12. A note concerning the fragmentary remains of a small theropod recovered from the Navajo sandstone in northern Arizona: Am. Jour. Sci., 5th ser., v. 31, p. 150 (1936)
13. The arroyo of the Rio de Flag; a study of an erosion cycle: Mus. N. Ariz., Mus. Notes, v. 9, no. 6, p. 33-37 (1936)
14. An unusual oxidized mass of Canyon Diablo, Arizona, iron [absts.]: Pop. Astron., v. 46, no. 2, p. 110 (1938); Soc. Research Meteor. Contrib., v. 2, no. 1, p. 14 (1938)
15. (and Greig, J. W.) Note on a temperature attained in burning coal seams: Am. Jour. Sci., v. 237, p. 116-119 (1939)
16. Occurrence of minute gastropods in a holocrystalline slag: Am. Jour. Sci., v. 237, p. 120-123 (1939)
17. Tracks in the Coconino sandstone compared with those of small living anthropoda: Plateau, v. 12, p. 32-34 (1939)
18. (and Webb, R. W.) Volcanic bombs from northern Arizona cinder cones [abst.]: Geol. Soc. Am. Bull., v. 50, no. 12, pt. 2, p. 1947 (1939)
19. (and Webb, R. W.) Cored bombs from Arizona and California volcanic cones: Jour. Geol., v. 51, no. 6, p. 398-410, maps (1943)
20. Coal Mine Canyon: Plateau, v. 19, no. 2, p. 17-20 (1946)
21. Invertebrate tracks from the Coconino sandstone of northern Arizona: Jour. Paleo., v. 21, no. 5, p. 466-472 (1947)
22. *Oniscoidichnus:* Jour. Paleo., v. 23, no. 5, p. 573 (1949)
23. Large gas bubbles preserved on a lava flow in northern Arizona [abst.]: Geol. Soc. Am. Bull., v. 63, p. 1322 (1952)
24. A large gas bubble on the Merriam Crater lava flow: Plateau, v. 26, no. 2, p. 84-85, illus. (1953)
25. Desmatosuchus in northern Arizona: Plateau, v. 27, no. 1, p. 19-21, illus. (1954)
26. Possible nautiloid mandibles from the Permian of Arizona: Jour. Paleo., v. 29, no. 1, p. 102-104, illus. (1955)
27. A note on the gamma member of the Kaibab: Plateau, v. 30, no. 3, p. 71-72 (1958)
28. New occurrence of Desmatosuchus in northern Arizona: Plateau, v. 30, no. 3, p. 61-63, illus. (1958)
29. Elephant Hill: Plateau, v. 31, no. 4, p. 80-82 (1959)
30. A new area of Kaibab limestone with silicified fossils: Plateau, v. 31, no. 4, p. 88-89 (1959)
31. Dinosaur tracks from the Navajo and Wingate sandstones: Plateau, v. 32, no. 4, p. 81-82 (1960)
32. A new species of *Palaeohelcura* Gilmore from the Permian of Northern Arizona: Jour. Paleo., v. 35, no. 1, p. 201-202 (1961)
33. Note on the "Alpha" member of the Kaibab Formation: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 92 (1962)

BRAMWELL, A. W.
1. In Ajo and Scheelite districts: Ariz. Min. Jour., v. 2, no. 7, p. 20 (1918)
2. News of Ajo and Gunsight districts: Ariz. Min. Jour., v. 2, no. 11, p. 24-25 (1919)

BRAND, D. D.
The natural landscape of northwestern Chihuahua: Univ. N. Mex. Bull. 316, Geol. ser., v. 5, no. 2, 74 p., illus. (1937)

BRANSFORD, W. S. (*see* Carpenter, E. J.)

BRATTON, D. H. (*see* Turner, S. F., 3)

BRATTSTROM, B. H.
Pliocene and Pleistocene amphibians and reptiles from southeastern Arizona: Jour. Paleo., v. 29, no. 1, p. 150-154, illus. (1955)

BREAZEALE, J. F.
(and Smith, H. V.) Caliche in Arizona: Univ. Ariz., Coll. Agr. Exp. Sta. Bull. 131, p. 419-441 (1930)

BREED, W. J. (*see also* Miller, H. W., Jr., 4, 6; Peirce, H. W., 4)
1. Road log; alternate route from mile 152-154 to Flagstaff via Black Canyon Highway: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 50-51 (1962)
2. (and Brady, L. F.) A new siderite from the Canyon Diablo fall: Plateau, v. 35, no. 3, p. 75-77 (1963)
3. Morphology and lineation of cinder cones in the San Franciscan volcanic field: *in* Contributions to the geology of northern Arizona, Mus. N. Ariz. Bull. 40, p. 65-71 (1964)

BREGER, I. A.
1. (and Duel, M.) The organic geochemistry of uranium: USGS Prof. Paper 300, p. 505-510 (1956)
2. Geochemistry of coal: Econ. Geol., v. 53, p. 823-841 (1958)

BRENNAN, D. J. (*see also* Galbraith, F. W., 10)
1. Geological reconnaissance of Cienega Valley, Pima County, Arizona: Univ. Ariz., PhD Thesis, 53 p. (1957)
2. Geological reconnaissance of Cienega Gap, Pima County, Arizona [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 41 (1958)
3. Tertiary sedimentary rocks and structures of the Cienega Gap area, Pima County, Arizona: Ariz. Geol. Soc. Dig., v. 5, p. 45-58 (1962)

BRILL, K. G., Jr.
1. Permo-Pennsylvanian stratigraphy in southeastern Nevada, western Utah, and northwestern Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1574 (1960)
2. Permo-Pennsylvanian stratigraphy of western Colorado Plateau and eastern Great Basin regions: Geol. Soc. Am. Bull., v. 74, no. 3, p. 307-330 (1963)

BRINSMADE, R. B.
1. Copper mining at Bisbee, Arizona: Mines and Minerals, v. 27, p. 289-293 (1907)
2. Copper in northern Arizona: Engr. Min. Jour., v. 84, p. 962 (1907)
3. Lead-silver deposits of Mowry, Arizona: Mines and Minerals, v. 27, no. 12, p. 529-531 (1907)
4. Tombstone, Arizona, restored: Mines and Minerals, v. 27, no. 8, p. 371-374 (1907)

BRISCOE R, J..
The two oldest trees, one dead and one living: 63 p., Riverside, Los Angeles, Calif. (1914)

BRITT, T. L.
Geology of the Twin Peaks area, Pima County, Arizona: Univ. Ariz., MS Thesis, 58 p. (1955)

BRITTAIN, R. L.
Geology and ore deposits of the western portion of the Hilltop mine area, Cochise County, Arizona: Univ. Ariz., MS Thesis, 97 p. (1954)

BROBST, D. A. (*see also* Dean, B. G.)
Barite resources of the United States: USGS Bull. 1072-B, 62 p. (1958)

BRODERICK, T. M. (*see* Ball, S. H., 1)

BROMFIELD, C. S. (*see also* Butler, B. S., 18)
1. Geology of the Maudina mine area, northern Santa Catalina Mountains, Pinal County, Arizona: Univ. Ariz., MS Thesis, 63 p., maps (1950)
2. Some geologic features of the Santa Catalina Mountains: Ariz. Geol. Soc.—Geol. Soc. Am., Guidebook Southern Ariz., p. 51-55, map (1952)
3. Mineral resources of the San Carlos Indian Reservation (with sections by A. F. Shride): USGS Open-file Rep., 113 p., illus. (1954)
4. (and Shride, A. F.) Mineral resources of the San Carlos Indian Reservation, Arizona: USGS Bull. 1027-N, p. 613-691, illus., maps (1956)

BROOKS, Baylor (*see* Davis, W. M., 14)

BROOKS, E. W.
Geology and mineralogy of London-Arizona mine, Arizona: Min. Reporter, v. 56, p. 117-118 (1907)

BROWN, Barnum
1. An ancestral crocodile: Am. Mus. Novitates, no. 638, 4 p. (1933); Science, new ser., v. 79, p. 80 (1934)
2. A new genus of Stegocephalia from the Triassic of Arizona: Am. Mus. Novitates, no. 640, 4 p. (1933)

BROWN, B. R. (*see* Picard, M. D., 1, 3)

BROWN, C. B. (*see* Thorp, E. M.)

BROWN, F. M.
The age of Meteor Crater: Science, new ser., v. 77, p. 239-240 (1933)

BROWN, R. H.
(and Harshbarger, J. W., and Thomas, H. E.) Analysis of basic data concerning groundwater in the Yuma area, Arizona: USGS Ground-water Branch Mimeo. Rep., 117 p., illus. (1956)

BROWN, R. L.
Geology and ore deposits of the Twin Buttes district: Univ. Ariz., MS Thesis, 40 p., maps (1926)

BROWN, S. C. (*see also* Babcock, H. M., 3, 4, 7; Halpenny, L. C., 4, 5; Kiersch, G. A., 14)
1. (and Halpenny, L. C.) Water-supply investigation at Tuba City, Navajo Indian Reservation, Arizona: USGS Ground-Water Branch Mimeo. Rep., 14 p. (1948)
2. (and Halpenny, L. C.) Water-supply investigations at Kayenta, Navajo Indian Reservation, Arizona: USGS Ground-Water Branch Mimeo. Rep., 3 p. (1948)
3. Water-supply investigation at Lukachukai, Navajo Indian Reservation, Arizona: USGS Ground-Water Branch Mimeo. Rep., 8 p. (1949)
4. (and Halpenny, L. C., and Whitcomb, H. A.) Water-supply investigation at Navajo Mountain, Navajo Indian Reservation, San Juan County, Utah: USGS Open-file Rep., 9 p. (1949)
5. Oil and gas possibilities of southern Arizona: *in* Geology Symposium of the Four Corners region, Four Corners Geol. Soc., p. 60-67, illus. (1952)
6. Arizona, a frontier area [abst.]: Oil and Gas Jour., v. 52, no. 50, p. 208 (1954)
7. Petroleum and natural gas potentialities: *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 1, p. 64-72, maps, Univ. Ariz. Press., Tucson (1956)

8. (and Lauth, R. E.) Oil and gas potentialities of northern Arizona: Four Corners Geol. Soc., Guidebook 2d Field Conf., p. 77-84, illus. (1957); N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 153-160, illus. (1958)
9. Northern Arizona has good oil, gas prospects: World Oil, v. 151, no. 4, p. 98-106, illus. (1960)
10. (and Lauth, R. E.) Northern Arizona, its oil, gas, and helium prospects: *in* Oil, gas, and helium in Arizona, Arizona Development Board *for* Arizona Oil and Gas Conservation Commission, p. 7 (1961)
11. Possibilities for future water-resources development at Fort Huachuca, Arizona: Proc. Ann. Watershed Symposium, p. 20-22, illus. (1962)

BROWN, W. H.
1. Arroyo running in the desert: Pan-Am. Geol., v. 51, no. 4, p. 279-280, illus. (1929)
2. Centripital concretions: Am. Jour. Sci., 5th ser., v. 18, p. 433-436, illus. (1929)
3. Tucson Mountains, an Arizona Basin Range type: Geol. Soc. Am. Bull., v. 50, p. 697-759, map (1939)

BROWNE, J. F.
The geology of the Cuprite mine area, Pima County, Arizona: Univ. Ariz., MS Thesis, 39 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 47-48 (1958)

BROWNE, J. R.
Report on the mineral resources of the States and Territories west of the Rocky Mountains: U. S. Treas. Dept., Washington (1868)

BROWNING, W. C.
(and Snow, F. W.) Geology and operations at the Magma mine (Superior district, Pinal County): Engr. Min. Jour.-Press, v. 119, p. 197-201 (1925)

BRUHN, H. F.
Some notes on the Apache group of the Santa Catalina Mountains and other sections in southeastern Arizona: Univ. Ariz., MS Thesis, 31 p., map (1927)

BRUSH, G. J.
1. Examination of meteoritic iron from Tucson, Arizona: Calif. Acad. Sci. Proc., v. 3, p. 30-32 (1863)
2. On a compact anglesite from Arizona: Am. Jour. Sci., 3rd ser., v. 5, p. 421-422 (1873)

BRYAN, J. J.
1. Pyrite concretions from the Chuar: Grand Canyon Nature Notes, v. 9, no. 9, p. 350-353, illus. (1934)
2. Barite deposits in the Redwall of Grand Canyon: Grand Canyon Nat. Hist. Assoc. Bull. 5, p. 23-26 (1936)

BRYAN, Kirk (*see also* Longwell, C. R., 2)
1. Geology and physiography of the Papago country, Arizona [abst.]: Wash. Acad. Sci. Jour., v. 10, no. 2, p. 52-53 (1920)
2. Mountain pediments; a discussion of the erosion of desert ranges [abst.]: Geol. Soc. Am. Bull., v. 31, no. 1, p. 152 (1920)
3. Origin of rock tanks and charcos: Am. Jour. Sci., 4th ser., v. 50, p. 186-206 (1920)
4. Erosion and sedimentation in the Papago country, Arizona; with a sketch of the geology: USGS Bull. 730, p. 19-90, map (1922)
5. Discussion on rock-filled dam, Lees Ferry, Arizona: Am. Soc. Civil Engr. Proc., v. 48, no. 7, p. 1615-1627 (1922)
6. Routes to desert watering places in the Papago country, Arizona; USGS Water-Supply Paper 490-D, p. 1-4, 317-429, maps (1922)
7. (Geological features of the Lees Ferry, Arizona, dam site): Am. Soc. Civil Engr. Trans., v. 86, p. 228-240, map (1923)

8. Wind erosion near Lees Ferry, Arizona: Am. Jour. Sci., 5th ser., v. 6, p. 291-307 (1923)
9. Pedestal rocks in the arid Southwest: USGS Bull. 760, p. 1-11 (1923)
10. The Papago country, Arizona; a geographic, geologic, and hydrologic reconnaissance with a guide to desert watering places: USGS Water-Supply Paper 499, 436 p., maps (1925)
11. Pedestal rocks: Engr. Min. Jour.-Press, v. 119, p. 172-173 (1925)
12. Date of channel trenching (arroyo cutting) in the arid Southwest: Science, new ser., v. 62, p. 338-344 (1925)
13. San Pedro Valley, Arizona, and the geographic cycle [absts.]: Geol. Soc. Am. Bull., v. 37, p. 169-170 (1926); Pan-Am. Geol., v. 45, p. 166 (1926)
14. (and Gidley, J. W.) Vertebrate fossils and their enclosing deposits from the shore of Pleistocene Lake Cochise, Arizona: Am. Jour. Sci., 5th ser., v. 11, p. 477-488 (1926)
15. Pedestal rocks formed by differential erosion: USGS Bull. 790, p. 1-15 (1926)
16. Glacial climate in non-glaciated regions: Am. Jour. Sci., 5th ser., v. 16, p. 162-164 (1928)
17. Changes in plant associations by change in ground-water level: Ecology, v. 9, p. 474-478 (1928)
18. Geomorphic processes at high altitudes: Geog. Rev., v. 24, p. 655-656 (1934)
19. (and Smith, G. E. P., and Waring, G. A.) Geology and water resources of the San Pedro Valley, Arizona: USGS Open-file Rep. (1934)
20. Physiography: *in* Geological Society of America 50th Anniversary Volume, p. 1-5 (1941)
21. The geology and fossil vertebrates of Ventana Cave: *in* Archaeology and Stratigraphy of Ventana Cave (Haury), Univ. Ariz. Press-Univ. N. Mex. Press, p. 75-126 (1950)

BRYANT, D. L.
1. The geology of the Mustang Mountains, Santa Cruz County, Arizona: Univ. Ariz., MS Thesis, 142 p., maps (1951)
2. Stratigraphy of a Pliocene vertebrate fossil locality near Prescott, Arizona [abst.]: Geol. Soc. Am. Bull., v. 62, p. 1496-1497 (1951)
3. (and Lance, J. F.) Paleozoic and Cretaceous stratigraphy of the Tucson Mountains: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 27-42, illus., map (1952)
4. (and Kinnison, J. E.) Lower Cretaceous age of the Amole arkose, Tucson Mountains, Arizona [abst.]: Geol. Soc. Am. Bull., v. 65, no. 12, p. 1235 (1954)
5. Stratigraphy of the Permian System in southern Arizona: Univ. Ariz., PhD Thesis, 209 p. (1955)
6. Marker zones in Permian formations of southern Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 38-42 (1959)
7. (and McClymonds, N. E.) Permian Concha limestone and Rainvalley formation, southeastern Arizona: AAPG Bull., v. 45, no. 8, p. 1324-1333 (1961)

BRYNER, L.
1. Geology of the South Comobabi Mountains and Ko Vaya Hills, Pima County, Arizona: Univ. Ariz., PhD Thesis, 156 p. (1959)
2. Fragmental acid intrusive igneous rocks of the South Comobabi Mountains and Ko Vaya Hills, Pima County, Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1710-1711 (1959)
3. Breccia and pebble columns associated with epigenetic ore deposits: Econ. Geol., v. 56, no. 3, p. 488-508 (1961)

BUCHANAN, J. F.
(and Buchella, F. H.) The history and development of the San Manuel mine: AIME, Soc. Min. Engr. Preprint 60AU90, 21 p., illus. (1960)

BUCHELLA, F. H. (*see also* Buchanan, J. F.)

BUCHELLA, F. H., Jr.

Aerial mapping at Esperanza: Min. Engr., v. 12, no. 6, p. 566-567, 577 (1960)

BUCK, K. L. (*see* Twenhofel, W. S.)

BUCK, Loren I.

Oil and gas possibilities of southeastern Arizona: *in* Oil, gas, and helium in Arizona, Arizona Development Board *for* Arizona Oil and Gas Conservation Commission, p. 22 (1961)

BUDD, H.

1. Development in Arizona and western New Mexico in 1957: AAPG Bull., v. 42, no. 6, p. 1384 (1958)
2. Exploratory drilling developments in Arizona and western New Mexico in 1958: AAPG Bull., v. 43, no. 6, p. 1379-1388 (1959)
3. Exploratory drilling in Arizona and western New Mexico 1959: AAPG Bull., v. 44, no. 6, p. 851-900, illus. (1960)
4. Exploratory drilling in Arizona and western New Mexico in 1960: AAPG Bull., v. 45, no. 6, p. 948-958, illus. (1961)

BUDDHUE, J. D.

1. Arizona obsidianites: Mineralogist, v. 5, no. 7, p. 14 (1937)
2. An analysis of lawrencite in the Mount Elden, Arizona, meteorite; Pop. Astron., v. 48, no. 10, p. 561 (1940); Soc. Research Meteor. Contrib., v. 2, no. 3, p. 233 (1940)
3. Some observations on the soil near the Canyon Diablo, Arizona, meteorite crater [abst.]: Pop. Astron., v. 53, no. 6, p. 287-289 (1945)
4. A sieve analysis of crushed sandstone from the Canyon Diablo, Arizona: Pop. Astron., v. 56, no. 7, p. 387-389 (1948); Meteor. Soc. Contrib., v. 4, no. 2, p. 134-135 (1948)
5. Reduced meteoritic iron oxide: Pop. Astron., v. 57, no. 6, p. 293-295 (1949); Meteor. Soc. Contrib., v. 4, no. 3, p. 197-199 (1949)
6. Miscellaneous notes on meteorites from Holbrook and Mt. Elden: Pop. Astron., v. 57, no. 8, p. 400-402, illus. (1949); Meteor. Soc. Contrib., v. 4, no. 3, p. 208-210, illus. (1949)
7. New chemical analysis of the Canyon Diablo, Arizona, and Arispe, Sonora, Mexico, siderites: Pop. Astron., v. 58, no. 4, p. 190 (1950); Meteor. Soc. Contrib., v. 4, no. 4, p. 258-259 (1950)
8. Synthetic schreibersite: Pop. Astron., v. 58, no. 8, p. 405-407 (1950); Meteor. Soc. Contrib., v. 4, no. 4, p. 290-291 (1950)

BUEHRER, T. F. (*see* Smith, H. V., 3)

BUERGER, M. J.

The unit cell and space group of claudetite. As_2O_3 [abst.]: Am. Mineral., v. 27, no. 3, p. 216 (1942)

BURCHARD, E. F.

1. Iron ore in Canyon Creek, Fort Apache Indian Reservation, Arizona: USGS Bull. 821, p. 51-75 (1931)
2. Fluorspar deposits in the western United States: AIME Trans., v. 109, p. 370-396, illus. (1934)

BURDEN, Douglas

Niznaz Boko, the great hole in the ground: Am. Mus. Nat. Hist. Jour., v. 26, p. 627-634 (1926)

BURDEN, J. W. (*see* Roosevelt, Q.)

BURGESS, Dean

1. Mining in the vicinity of Wickenburg: Ariz. Min. Jour., v. 8, no. 2, p. 26-28 (1924)
2. Extensive program for Blue Bird Company (Crown King area): Ariz. Min. Jour., v. 8, no. 3, p. 24-25 (1924)

3. The Bannie gold and copper mine: Ariz. Min. Jour., v. 8, no. 4, p. 5-6 (1924)
4. Mining activity around Mayer: Ariz. Min. Jour., v. 8, no. 5, p. 37 (1924)

BURGESS, J. A.
1. Secondary enrichment: Engr. Min. Jour., v. 76, p. 153 (1903)
2. United Eastern mine, Oatman, Arizona: Engr. Min. Jour., v. 102, p. 232-233 (1916)
3. United Eastern Mining Company: Ariz. Min. Jour., v. 4, no. 2, p. 41-43 (1920)

BURGESS, J. D.
Recent discoveries in Arizona: Engr. Min. Jour., v. 76, p. 936 (1903)

BURNETTE, C. R.
Geology of the Middle Canyon, Whetstone Mountains, Cochise County, Arizona: Univ. Ariz., MS Thesis, 54 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 41 (1958)

BURNHAM, C. W. (*see also* Putman, G. W., 1, 2)
Metallogenic provinces of the southwestern United States and northern Mexico: N. Mex. Bur. Mines and Miner. Res. Bull. 65, 76 p., illus. (1959)

BURROUGHS, R. L.
The structural geology of the Foy Ridge area, Twin Buttes, Arizona: Univ. Ariz., MS Thesis, 76 p. (1960)

BUSCH, J. E. (*see also* Ferris, H. A.)
1. Mining law affecting land titles: Pay Dirt, no. 89, p. 8-12 (1945)
2. Regulations governing mineral locations in Arizona: Ariz. Dept. Miner. Res., 44 p. (1946); 2nd ed., revised (1948)

BUSECK, P. R.
Contact metasomatic deposits at Concepcion del Oro, Mexico, Tem Piute, Nevada, and Silver Bell, Arizona: Columbia Univ., PhD Thesis, 254 p. (1962)

BUSH, A. L.
(and Stager, H. K.) Accuracy of ore-reserve estimates for uranium and vanadium deposits on the Colorado Plateau: USGS Bull. 1030-D, p. 131-148 (1956)

BUTLER, A. P., Jr. (*see also* Wilson, E. D., 46)
1. (and Schnabel, R. W.) Distribution and general features of uranium occurrences in the United States: USGS Prof. Paper 300, p. 27-40 (1956)
2. (and Finch, W. I., and Twenhofel, W. S.) Epigenetic uranium in the United States: USGS Map MR-21 (1962)

BUTLER, B. S. (*see also* Gardner, E. D., 3; Moore, B. N., 3; Tenney, J. B., 11)
1. The Morenci-Metcalf district: Min. Sci., v. 65, p. 154 (1912)
2. Potash in certain copper and gold ores: USGS Bull. 620, p. 227-236 (1916)
3. Relation of the ore deposits of the southern Rocky Mountain region to the Colorado Plateau: Colo. Sci. Soc. Proc., v. 12, p. 23-36, map (1929)
4. Influence of the replaced rock on replacement minerals associated with ore deposits: Econ. Geol., v. 27, no. 1, p. 1-24 (1932)
5. Ore deposits as related to stratigraphic, structural, and igneous geology in the western United States: *in* Ore deposits of the Western States, AIME Lindgren Volume, p. 198-240 (1933)
6. Ore deposits of the United States in their relation to geologic cycles: Econ. Geol., v. 28, p. 301-328 (1933)
7. Geology (Arizona and its heritage): Univ. Ariz. Bull., v. 7, no. 3, p. 11-19 (1936)
8. (and Wilson, Eldred D.) Structural control of ore deposits at Tombstone, Arizona [abst.]: Econ. Geol., v. 32, p. 196-197 (1937)
9. (and Wilson, Eldred D., and Rasor, C. A.) Geology and ore deposits of the Tombstone district, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 143, 114 p., supplement, maps (1938)

10. (and Wilson, Eldred D.) General features of some Arizona ore deposits: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 9-25 (1938)
11. (and Wilson, Eldred D.) Clifton-Morenci district: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 72-79, map (1938)
12. (and Wilson, Eldred D.) Bagdad mine, Eureka district: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 98-104, map (1938)
13. (and Wilson, Eldred D.) Structural control of the ore deposits at Tombstone, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 104-110, map (1938)
14. Geology of copper deposits of North America: USBM Bull. 405, p. 37-85 (1938)
15. (Review) Geology of the "Questa" molybdenite deposit, Taos County, New Mexico (Vanderwilt, J. W.); Childs-Aldwinkle mine, Copper Creek, Arizona (Kuhn, T. H.); the Mammoth mining camp area, Pinal County, Arizona (Peterson, N. P.): Econ. Geol., v. 34, p. 347-351 (1939)
16. (and Wilson, Eldred D.) Ore deposits at Tombstone, Arizona: *in* Ore deposits as related to structural features, p. 201-203, maps; Princeton Univ. Press (1942)
17. Setting of Arizona in Cordilleran structure [abst.]: Geol. Soc. Am. Bull., v. 60, p. 1877 (1949)
18. (and Grout, F. F., and Bromfield, C. S.) Santa Catalina Mountains metamorphic area: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 43-49, illus. (1952)

BUTLER, C. P.

(and Jenkins, R. J.) Thermal properties of meteoritic iron from -150° to 300° Celsius: Science, v. 139, no. 3554, p. 486-487 (1963)

BUTLER, G. M. (*see also* Allen, M. A., 1, 3, 5, 6, 7; Wilson, Eldred D., 10)

1. Effect of the draft law upon Arizona's mineral industries: Ariz. Min. Jour., v. 1, no. 7, p. 8-10 (1918)
2. The future in metals: Arizona Min. Jour., v. 1, no. 8, p. 3-4 (1918)
3. Some facts about oil: Ariz. Min. Jour., v. 3, no. 1, p. 33-36 (1919)
4. The Arizona Bureau of Mines: Ariz. Min. Jour., v. 3, no. 1, p. 40-41 (1919); v. 4, no. 1, p. 29 (1920)
5. The higher values with increased depth myth: Ariz. Min. Jour., v. 3, no. 4, p. 2-4 (1919)
6. Change of character of ore with increased depth myth: Ariz. Min. Jour., v. 3, no. 5, p. 3-4 (1919)
7. Myths relating to leaching: Ariz. Min. Jour., v. 3, no. 6, p. 7-8 (1919)
8. Myths related to secondary enrichment: Ariz. Min. Jour., v. 3, no. 7, p. 15-16 (1919)
9. The phonolite myth: Ariz. Min. Jour., v. 3, no. 8, p. 23-24 (1920)
10. Myths relating to outcrops: Ariz. Min. Jour., v. 3, no. 10, p. 18-19 (1920)
11. Mines thought dead or exhausted often come to life: Ariz. Min. Jour., v. 3, no. 11, p. 12 (1920)
12. The blowout myth: Ariz. Min. Jour., v. 3, no. 11, p. 20-21 (1920)
13. Myths relating to ore shoots: Ariz. Min. Jour., v. 4, no. 6, p. 13-14, 56 (1920)
14. A prospector's complaints of the mineral regulations: Ariz. Min. Jour., v. 5, no. 1, p. 13 (1921)
15. (and Allen, M. A.) Petroleum: Univ. Ariz., Ariz. Bur. Mines Bull. 116, 45 p. (1921); Ariz. Min. Jour., v. 5, no. 21, p. 5-7, no 22, p. 5, 14-16; no. 24, p. 8, 24-27 (1922)
16. (and Allen, M. A.) Uranium and radium: Univ. Ariz., Ariz. Bur. Mines Bull. 117, 26 p. (1921)
17. New ore-locating process of the Arizona Bureau of Mines: Ariz. Min. Jour., v. 5, no. 17, p. 11 (1922)
18. Instruments and processes for the location of ore deposits: Ariz. Min. Jour., v. 6, no. 1, p. 7-8 (1922)

19. Locating ore bodies by Chilson's new invention: Ariz. Min. Jour., v. 6, no. 24, p. 19-20 (1923)
20. The romance of mining: Ariz. Labor Jour., v. 15, p. 55-57 (1927)
21. History of mining in Yuma County, Arizona (data compiled by J. B. Tenney): Min. Jour., v. 12, no. 5, p. 7-9 (1928)
22. History of mining in Mohave County, Arizona (data compiled by J. B. Tenney): Min. Jour., v. 12, no. 10, p. 9-11, 28; no. 11, p. 9-11 (1928)
23. Asbestos minerals: Univ. Ariz., Ariz. Bur. Mines Bull. 126, p. 5-14 (1928)
24. Geophysical prospecting: Prof. Engr., v. 13, p. 4-6 (Aug., 1928)
25. Geological occurrence of Arizona asbestos: Pan-Am. Geol., v. 52, p. 19-26 (1929)
26. (and Tenney, J. B.) Petroleum: Univ. Ariz., Ariz. Bur. Mines Bull. 130, 50 p. (1931)
27. Laws, regulations, and court decisions in relation to the location and retention of gold placer claims in Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 132, p. 105-114 (1932); Bull. 135, p. 135-143 (1933); Bull. 142, p. 135-143 (1937)
28. The boom in gold prospecting and mining in the United States: The Gear of Theta Tau, v. 23, p. 7-13 (1933)
29. Laws, regulations, and court decisions bearing on the location and retention of lode claims, tunnel sites, and mill sites in Arizona: Univ. Ariz., Ariz. Bur. Mines. Bull. 137, p. 222-244 (1934)
30. Some hints on prospecting for gold: Univ. Ariz., Ariz. Bur. Mines Bull. 137, p. 245-253 (1934)
31. Large area withdrawn from mineral entry in Arizona: Min. Jour., v. 17, no. 22, p. 24 (1934)
32. Some facts about ore deposits: Univ. Ariz., Ariz. Bur. Mines Bull. 139, 99 p. (1935)
33. Mineral industries (Arizona and its heritage): Univ. Ariz. Bull., v. 7, no. 3, p. 156-163 (1936)
34. Petrology: Univ. Ariz., Ariz. Bur. Mines Bull. 166, 29 p. (1959)

BYERS, C..A
A petrified forest covering thousands of acres: Sci. Am., v. 92, p. 388 (1905)

BYERS, F. M., Jr. (*see* Shoemaker, E. M., 9)

CADELL, H. M.
The Colorado River of the West: Scottish Geog. Mag., v. 3, p. 441-460, map (1887)

CADIGAN, R. A.
1. Geologic interpretation of grain-size distribution measurements of Colorado Plateau sedimentary rocks: Jour. Geol., v. 70, no. 3, p. 376-378 (1962)
2. Tuffaceous sandstone in the Triassic Chinle formation, Colorado Plateau: USGS Prof. Paper 475-B, p. 48-51 (1963)

CAHILL, J. M. (*see also* Hardt, W. F., 1; Johnson, P. W., 4, 5)
1. (and Wolcott, H. N.) Further investigations of the ground-water resources of the Gila Bend and Dendora areas, Maricopa County, Arizona: USGS Ground-Water Branch Open-file Rep., 14 p., illus. (1960)
2. Supplemental memorandum on ground water in vicinity of Painted Rock damsite: USGS Ground-Water Branch Open-file Rep., 7 p. (1960)

CALKINS, F. E.
1. The Globe-Miami district—past, present, and future: Ariz. Min. Jour., v. 5, no. 23, p. 11 (1922)
2. The method of formation of deposits of copper ores: Ariz. Min. Jour., v. 6, no. 21, p. 3-4, 40-41 (1923)

CALLAGHAN, Eugene (*see also* Hewett, D. F., 6)
Distribution of intermediate and basic igneous rocks in the Tertiary of western United States [abst.]: Geol. Soc. Am. Bull., v. 62, no. 12, pt. 2, p. 1428 (1951)

CALLAHAN, J. T. (*see also* Harshbarger, J. W., 5, 13)
1. The geology of the Glen Canyon group of the Echo Cliffs region, Arizona: Univ. Ariz., MS Thesis, 100 p., maps (1951); [abst.]: Geol. Soc. Am. Bull., v. 62, p. 1498 (1951); Plateau, v. 23, no. 4, p. 49-57 (1951)
2. (and Kam, W., and Akers, J. P.) The occurrence of ground water in diatremes of the Hopi Buttes area, Arizona: USGS Ground-Water Branch Open-file Rep., 17 p., illus. (1958)

CALLAWAY, H. M.
Lead, a materials survey: USBM, IC 8083, 195 p. (1962)

CALUMET AND ARIZONA MINING COMPANY
Report for the year 1924 (Calumet and Arizona, New Cornelia, Eighty-Five, and Verde Central): Ariz. Min. Jour., v. 8, no. 22, p. 5-7, 45-47 (1925)

CAMERON, E. N. (*see* Warner, L. A.)

CAMP, C. L.
1. History of the Chinle Triassic formation in the Southwest [abst.]: Geol. Soc. Am. Bull., v. 40, p. 165 (1929)
2. Stratigraphic distribution of Arizona phytosaurs [abst.]: Geol. Soc. Am. Bull., v. 41, p. 213 (1930); Pan-Am. Geol., v. 52, p. 158 (1929)
3. A study of the phytosaurs with description of new material from western North America: Univ. Calif. Mem., v. 10, 174 p. (1930)
4. New reptile fauna from Chinle Triassic of Arizona [abst.]: Pan- Am. Geol., v. 59, p. 378 (1933); Geol. Soc. Am. Proc. 1933, p. 392-393 (1934)
5. (and Vander Hoff, V. L.) Small bipedal dinosaur from Jurassic of northern Arizona [absts.]: Pan-Am. Geol., v. 62, p. 70 (1934); Geol. Soc. Am. Proc. 1934, p. 384-385 (1935)
6. A new type of small bipedal dinosaur from the Navajo sandstone of Arizona: Univ. Calif., Dept. Geol. Sci. Bull., v. 24, no. 2, p. 39-55 (1936)
7. (and Welles, S. P.) North American dicynodont reptile *Placerias* and the distribution of the dicynodonts [abst.]: Geol. Soc. Am. Proc. 1937, p. 271 (1938)
8. (and Colbert, E. H., McKee, E. D., and Welles, S. P.) A guide to the continental Triassic of northern Arizona: Plateau, v. 20, p. 1-9 (1947)
9. (and Welles, S. P.) The North American genus *Placerias*, Pt. 1 of Triassic dicynodont reptiles: Univ. Calif. Mem., v. 13, no. 4, p. 255-304, illus. (1956)

CAMPBELL, Ian (*see also* Maxson, J. H., 1, 2, 3, 4, 5; Schroter, G. A.)
1. Some observations on the Archean metamorphics of the Grand Canyon: Natl. Acad. Sci. Proc., v. 19, no. 9, p. 806-809, illus. (1933); [abst.]: Science, new ser., v. 77, no. 2002, p. 460 (1933)
2. (and Maxson, J. H.) Geological studies of the Archean rocks at Grand Canyon: Carnegie Inst. Wash. Year Book 32, p. 305-306 (1933); 33, p. 284-285 (1934); 34, p. 323-326 (1935); 35, p. 329-331 (1936); 36, p. 345-346 (1937); 37, p. 359-364 (1938); 38, p. 328-330 (1939); [absts.]: Pan-Am. Geol., v. 54, no. 1, p. 37-39 (1930); Geol. Soc. Am. Bull., v. 49, no. 12, pt. 2, p. 1871 (1938)
3. (and Maxson, J. H.) Significance of concretions in Vishnu schist [absts.]: Pan-Am. Geol., v. 64, p. 65 (1935); Geol. Soc. Am. Proc. 1935, p. 342-343 (1936)
4. On the occurrence of sillimanite and staurolite in Grand Canyon: Grand Canyon Nat. Hist. Assoc. Bull. 5, p. 17-22 (1936)
5. Types of pegmatites in the Archean at Grand Canyon: Am. Mineral., v. 22, p. 436-445 (1937); [abst.]: Geol. Soc. Am. Proc. 1936, p. 332 (1937)
6. (and Maxson, J. H.) Archean formations of the Grand Canyon [abst.]: Geol. Soc. Am. Bull., v. 49, p. 1871 (1938)
7. (and Maxson, J. H.) Geology of the Archean of southwestern United States: 17th Internatl. Geol. Cong. Rep., v. 2, p. 275 (1939)

8. (and Schenk, E. T.) Unusual porphyritic dike near Boulder Dam, Arizona [abst.]: Geol. Soc. Am. Bull., v. 50, p. 1948-1949 (1939)
9. (and Maxson, J. H.) Intra-canyon lava flow of the lower granite gorge, Grand Canyon [abst.]: Geol. Soc. Am. Bull., v. 51, no. 12, p. 1956 (1940)
10. (and Schenk, E. T.) Camptonite dikes near Boulder Dam, Arizona: Am. Mineral., v. 35, nos. 9-10, p. 671-692, illus. (1950)

CAMPBELL, M. R.
1. The Deer Creek coal field, Arizona: USGS Bull. 225, p. 240-258 (1904)
2. Conglomerate dikes in southern Arizona: Am. Geol., v. 33, p. 135-138 (1904)
3. Fractured boulders in conglomerate: Am. Jour. Sci., 4th ser., v. 22, p. 231-234 (1906)
4. (and Gregory, H. E.) The Black Mesa coal field, Arizona: USGS Bull. 431, p. 229-238 (1911)

CAMPBELL, W. W.
Notes on the problem of lunar craters (including notes on Meteor Crater, Arizona): Astron. Soc. Pacific Pub., v. 32, no. 186, p. 126-138 (1920)

CANNEY, F. C.
Soil sampling experiments in the Mission mine area, Pima County, Arizona [abst.]: Min. Engr., v. 15, no. 1, p. 61 (1963)

CANNON, H. L.
1. The effect of uranium-vanadium deposits on the vegetation of the Colorado Plateau: Am. Jour. Sci., v. 250, p. 735-770 (1952)
2. (and Kleinhampl, F. J.) Botanical methods of prospecting for uranium: USGS Prof. Paper 300, p. 681-686 (1956)
3. Description of indicator plants and methods of prospecting for uranium deposits on the Colorado Plateau: USGS Bull. 1030-M, 18 p. (1957)
4. The development of botanical methods of prospecting for uranium on the Colorado Plateau: USGS Bull. 1085-A, 49 p. (1960)

CARDER, D. S. (*see also* Mead, T. C.)
1. (and Small, J. B.) Level divergences, seismic activity, and reservoir loading in the Lake Mead area, Nevada and Arizona: Am. Geophys. Union Trans., v. 26, no. 2, p. 203 (1945)
2. Influence of reservoir loading on local earthquake activity [abst.]: Geol. Soc. Am. Bull., v. 58, no. 12, pt. 2, p. 1264 (1947)
3. (and Bailey, L. F.) Earthquake energy distribution and reservoir loading, Lake Mead area, Nevada and Arizona 1939-1950 [abst.]: Earthquake Notes, v. 22, no. 2, p. 20-21 (1951)
4. Reservoir loading and local earthquakes in the Lake Mead area [abst.]: Geol. Soc. Am. Bull., v. 67, no. 12, p. 1763 (1956)

CAREY, J. F.
Standing of Miami Copper as shown by annual report: Ariz. Min. Jour., v. 9, no. 1, p. 26 (1925)

CAREY, W. W. (*see* Dubois, R. L., 6)

CARITHERS, L. W. (*see* Clinton, N. J., 2)
(and Clinton, N. J.) Uranium in shoreline sandstones of terrestrial and marine origin, Colorado Plateau: *in* Geology of uranium and thorium, United Nations International Conference on Peaceful Uses of Atomic Energy Proc., v. 6, p. 383-386, illus. (1956); [revised]: USGS Prof. Paper 300, p. 445-449, illus. (1956)

CARMEN, J. H. (*see* Kuellmer, F. J., 1)

CARNEGIE INSTITUTION OF WASHINGTON
Disclosures of ancient life in the Grand Canyon: New series Bull. v. 2, no. 9, p. 63-70 (1930)

CARPENTER, E. J.
(and Bransford, W. S.) Soil survey of the Benson area, Arizona: U. S. Dept. Agr., Field Op. Bur. Soils, 1921, adv. sheets, p. 247-280, maps (1924)

CARPENTER, F. M.
A fossil insect from the lower Permian of the Grand Canyon: U. S. Natl. Mus. Proc., v. 71, art. 23, 4 p. (1927)

CARPENTER, M. M.
1. When mining is not a gamble: Prog. Ariz., v. 2, no. 3, p. 8-11, 33-35 (1926)
2. The beginning of mining in Pima County, Arizona: Min. Jour., v. 11, no. 2, p. 5-7 (1927)
3. Conserve the mineral lands: Min. Jour., v. 14, no. 19, p. 5-7, 46-49 (1931)
4. Mine operations in the Patagonia district: Min. Jour., v. 24, no. 3, p. 3-5 (1940)

CARPENTER, Robert H.
1. The geology and ore deposits of the Vekol Mountains, Pinal County, Arizona: Stanford Univ., PhD Thesis, 110 p., illus. (1947)
2. Mining geology: Min. Cong. Jour., v. 48, no. 2 (1962)

CARR, M. S. (*see also* Dutton, C. E.)
(and Dutton, C. E.) Iron ore resources of the United States including Alaska and Puerto Rico, 1955: USGS Bull. 1082-C, (Ariz., p. 97) (1959)

CARR, W. H.
Forest of standing stones (Chiricahua National Monument): Nat. Hist., v. 56, no. 4, p. 168-173, illus., map (1947)

CARTER, N. L.
(and Kennedy, G. C.) Origin of diamonds in the Canyon Diablo and Novo Urei Meteorites: Jour. Geophys. Research, v. 69, no. 12, p. 2403-2422 (1964)

CARTER, O. C. S.
The petrified forests and Painted Desert of Arizona: Franklin Institute Journal, v. 157, p. 293-311 (1904)

CARTER, T. L.
1. Gold placers in Arizona: Engr. Min. Jour., v. 91, p. 561-562 (1911)
2. Gold placers of Arizona: Min. Sci. Press, v. 105, p. 166-168 (1912)

CASE, J. E.
(and Joesting, H. R.) Northeast-trending Precambrian structures in the central Colorado Plateau [abst.]: Geol. Soc. Am. Sp. Paper 68, p. 85 (1962)

CASSIDY, H. O. (*see* Cooperrider, C. K., 2)

CASTER, R. E.
Simuloid trails from the Upper Triassic (Chinle) of the Petrified Forest National Monument, Arizona: Am. Jour. Sci., v. 242, no. 2, p. 74-84 (1944)

CATANZARO, E. J.
1. A study of discordant zircons from the Little Belt (Montana), Beartooth (Montana), and Santa Catalina (Arizona) Mountains: Columbia Univ., PhD Thesis (1962)
2. (and Kulp, J. L.) Discordant zircons from the Little Belt (Montana), Beartooth (Montana), and Santa Catalina (Arizona) Mountains: Geochemica et Cosmochimica Acta, v. 28, no. 1, p. 87-124 (1964)

CATLIN, C. N.
Character of the ground-water resources of Arizona: Univ. Ariz., Coll. Agr. Exp. Sta. Bull. 114, p. 173-293 (1926)

CEDERSTROM, D. J.
1. Geology of the central Dragoon Mountains, Arizona: Univ. Ariz., PhD Thesis, 93 p., maps (1946)
2. The structural geology of the Dragoon Mountains, Arizona: Am. Jour. Sci., v. 244, no. 9, p. 601-621, map (1946)

CHAFFEE, M. A.
Dispersion patterns as a possible guide to ore deposits in the Cerro Colorado district, Pima County, Arizona: Univ. Ariz., MS Thesis, 69 pages (1964)

CHAFFEE, R. G. (*see* Colbert, E. H., 1)

CHAMBERLIN, R. V.
A new fossil chilopod from the late Cenozoic: San Diego Soc. Nat. Hist. Trans., v. 11, no. 7, p. 117-120, illus. (1949)

CHANNING, J. P.
The porphyry copper mines: Engr. Min. Jour., v. 91, p. 953-954 (1911)

CHAO, E. C. T. (*see also* Mead, C. W.)
1. The discovery of coesite from Meteor Crater, Arizona: Foote Prints, v. 23, no. 1 (1960)
2. (and Fahey, J. J. Littler, J., and Milton, D. J.) Stishovite, SiO_2, a hyperpressure new mineral from Meteor Crater, Arizona: Jour. Geophys. Research, v. 67, no. 1, p. 419-421 (1962)
3. (and Fahey, J. J. Littler, J., and Milton, D. J.) Stishovite, SiO_2, a very high pressure new mineral from Meteor Crater, Arizona: *in* Astrological Studies—Annual progress report, Aug. 25, 1961 to Aug. 24, 1962, pt. B, Crater Investigations; USGS Open-file Rep., p. 10-17 (1963)

CHAPMAN, T. G.
1. Vignettes of the future; Arizona: Engr. Min. Jour., v. 142, no. 8, p. 134 (1941)
2. (Editor) The mineral industries of Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 169, 20 p. (1962)

CHAPMAN, T. L.
San Manuel copper deposit, Pinal County, Arizona: USBM, RI 4108, 93 p., map (1947)

CHARTERS, A. C.
High-speed impact: Sci. Am., v. 203, no. 4, p. 128-131, 135-140 (1960)

CHENOWETH, W. L. (*see also* Akers, J. P., 11)
1. The geology and the uranium deposits of the northwest Carrizo area, Apache County, Arizona: Four Corners Geol. Soc., Guidebook Field Conf. 1, p. 177-185, illus., map (1955)
2. (and Cooley, M. E.) Pleistocene cinder dunes near Cameron, Arizona: Plateau, v. 33, no. 1, p. 14-16 (1960)
3. (and Page, P. B.) The Riverview mine, Coconino County, Arizona: Plateau, v. 33, no. 4, p. 112-114 (1961)
4. Geology of the Cameron quadrangle, Arizona: USGS Map GQ-162 (1962)

CHERNOSKY, E. J.
(and Maple, E., and Coon, R. M.) Rapid geomagnetic fluctuations at Tucson, Arizona: Am. Geophys. Union Trans., v. 35, p. 711-721, illus. (1954)

CHESTER, J. W.
Geology and mineralization of Hunt's Mesa, Monument Valley, Arizona: USAEC, RMO-801, 9 p., maps (1951)

CHEW, R. T., 3rd
1. The geology of the Mineta Ridge area, Pima and Cochise Counties, Arizona: Univ. Ariz., MS Thesis, 53 p., maps (1952)
2. Mid-Teritary rock unit from southern Arizona [abst.]: Geol. Soc. Am. Bull., v. 63, p. 1324 (1952)
3. Study of radioactivity in modern stream gravels as a method of prospecting: USGS Bull. 1030-E., p. 149-169 (1956)
4. Uranium and vanadium deposits of the Colorado Plateau that produced more than 1000 tons through June 30, 1955: USGS Map MF-54, scale 1:750,000 (1956)

5. The Mineta Formation, a middle Tertiary unit in southeastern Arizona: Ariz. Geol. Soc. Dig., v. 5, p. 35-44 (1962)

CHIDESTER, A. H.
(and Shride, A. F.) Asbestos in the United States: USGS Map MR-17 (1962)

CHILDS, O. E.
Geomorphology of the valley of the Little Colorado River, Arizona: Geol. Soc. Am. Bull., v. 59, no. 4, p. 353-388 (1948)

CHILSON, S. C. W.
Mine locations of the Chilson brothers: Ariz. Min. Jour., v. 9, no. 24, p. 5-6 (1926)

CHRIST, C. L.
(and Clark, J. R.) The crystal structure of murdochite: Am. Mineral., v. 40, no. 9-10, p. 907-916, illus. (1955); [abst.] Am. Mineral., v. 39, no. 3-4, p. 321 (1954)

CHRONIC, Halka (*see also* Pattison, H. M.)
Molluscan fauna from the Permian Kaibab formation, Walnut Canyon, Arizona: Geol. Soc. Am. Bull., v. 63, p. 95-116, illus. (1952)

CHURCH, J. A.
1. The geology and veins of Tombstone, Arizona: Engr. Min. Jour., v. 33, p. 218-219, 313 (1882)
2. The Tombstone, Arizona, mining district: AIME Trans., v. 33, p. 3-37, map (1903)

CLARK, C. M.
1. The discovery of the Silver King mine: Ariz. Min. Jour., v. 8, no. 9, p. 11, 26 (1924)
2. The story of the Mariquita gold mine: Ariz. Min. Jour., v. 8, no. 13, p. 9-10, 46-48 (1924)
3. The Doctor Thorne gold mine: Ariz. Min. Jour., v. 8, no. 18, p. 11, 47-48 (1925)
4. History of the Lost Dutchman gold mine: Ariz. Min. Jour., v. 8, no. 21, p. 11-12 (1925)
5. Workings of pre-historic mines: Ariz. Min. Jour., v. 9, no. 2, p. 26 (1925)

CLARK, D. L. (*see* Ethington, E. L., 2)

CLARK, J. L.
Structure and petrology pertaining to a beryl deposit, Baboquivari Mountains, Arizona: Univ. Ariz., MS Thesis, 49 p. (1956)

CLARK, J. R. (*see* Christ, C. L.)

CLARKE, F. W.
Water analysis (from the 1,000-foot level, Contention mine, Tombstone, Ariz.): USGS Water-Supply Paper 364, p. 39 (1914)

CLARKE, O. M., Jr.
1. Structural control of ore deposition at Ray, Arizona: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 91-95, illus., map (1952)
2. Geochemical prospecting for copper at Ray, Arizona: Econ. Geol., v. 48, no. 1, p. 39-45, illus. (1953)

CLAY, D. W.
Late Cenozoic stratigraphy in the Dry Mountain area, Graham County, Arizona: Univ. Ariz., MS Thesis, 68 p. (1960)

CLELAND, R. G.
A history of Phelps-Dodge, 1834-1950: Random House (Knopf), New York, 307 p. (1952)

CLIFFORD, J. O.
Ray Consolidated properties; description and comment: Mines and Methods, v. 4, p. 83-89 (1912)

CLINTON, N. J. (*see also* Carithers, L. W.; Kelley, V. C., 6)
1. Uranium reconnaissance of the Black Mountain-Yale Point area, Black Mesa, Navajo Indian Reservation, Arizona: USAEC, RME-91, 24 p., maps (1956)
2. (and Carithers, L. W.) Uranium deposits in sandstones of marginal marine origin: USGS Prof. Paper 300, p. 445-450 (1956)

CLIPPINGER, D. M (see Schmitt, H. A., 6)

COATES, D. R.
1. Memorandum of geology of ground water in Organ Pipe Cactus National Monument: USGS Ground-Water Branch Mimeo. Rep., 10 p., map (1951)
2. Gila Bend Basin (ground water), Maricopa County: USGS Open-file Rep., Tucson, Ariz., p. 159-164 (1952)
3. Willcox Basin (ground water), Cochise and Graham Counties: USGS Open-file Rep., Tucson, Ariz., p. 177-186 (1952)
4. Douglas Basin (ground water), Cochise County: USGS Open-file Rep., Tucson, Ariz., p. 187-194 (1952)
5. Memorandum on ground-water investigations in the Sells area, Papago Indian Reservation, Pima County, Arizona: USGS Mimeo. Rep., 6 p. (1954)
6. (and Halpenny, L. C.) Ground-water field trip, Tucson to Nogales, Arizona: USGS Ground-Water Branch Mimeo. Rep., 20 p. (1954)
7. (and Cushman, R. L.) Geology and ground-water resources of the Douglas Basin, Arizona, with a section on chemical quality of the ground water, by Hatchett, J. L.: USGS Water-Supply Paper 1354, 56 p., illus., map (1955)
8. Memorandum on the geology and ground-water resources of Dripping Spring Basin, Gila and Pinal Counties, Arizona: USGS Ground-Water Branch Open-file Rep., 11 p. (1955)

COATS, R. R.
1. Uranium and certain other trace elements in felsic volcanic rocks of Cenozoic age in western United States: USGS Prof. Paper 300, p. 75-78 (1956)
2. (and Barnett, P. R., and Conklin, N. M.) Distribution of beryllium in unaltered silicic volcanic rock of the western conterminous United States: Econ. Geol., v. 57, no. 6, p. 963-968 (1962)
3. (and Goss, W. D., and Rader, L. F.) Distribution of fluorine in unaltered silicic volcanic rocks of the western conterminous United States: Econ. Geol., v. 58, no. 6, p. 941-951 (1963)

COBBAN, W. A. (*see also* Gill, J. R.)
(and Reeside, J. B., Jr.) Correlation of the Cretaceous formations of the western interior of the United States: Geol. Soc. Am. Bull., v. 63, p. 1011-1044 (1952)

COCHRAN, H. M.
The petrography of the Twin Hills, Pima County, Arizona: Univ. Ariz., MS Thesis, 19 p., maps (1914)

COCKRELL, T. D. A.
The snails of New Mexico and Arizona: Nautilus, v. 19, p. 68-71 (1905)

COGHILL, W. H. (*see* De Vaney, F. D.)

COHEN, E. W.
Meteoreisen-Studien, XI: K.-k. naturh. Hofmus. Ann., Bd. 15, p. 351-391 (1900)

COLBASSANI, P. J. (*see* Anderson, F. G.)

COLBERT, E. H. (*see also* Camp, C. L., 8)
1. (and Chaffee, R. G.) A study of *Tetrameryx* and associated fossils from Papago Spring Cave, Sonoita, Arizona: Am. Mus. Novitates 1034, 21 p. (1939)
2. Studies of the phytosaurs *Machaeroprosopus* and *Rutiodon:* Am. Mus. Nat. Hist. Bull., v. 88, Art. 2, p. 53-96, illus. (1947)

3. The beginning of the age of dinosaurs in northern Arizona: Plateau, v. 22, p. 37-43, illus. (1950)
4. (and Mook, C. C.) The ancestral crocodilian *Protosuchus:* Am. Mus. Nat. Hist. Bull., v. 97, Art. 3, p. 143-182, illus. (1951)
5. A pseudosuchian reptile from Arizona: Am. Mus. Nat. Hist. Bull., v. 99, p. 561-592, illus. (1952)
6. Paleontology at the Museum of Northern Arizona: Plateau, v. 26, no. 3, p. 89-94 (1954)
7. Rates of erosion in the Chinle formation: Plateau, v. 28, no. 4, p. 73-76, tables (1956)

COLBY, D. S.
(and Oppegard, B. E.) Natural gas statistics, 1936-50: USBM, IC 7644, 35 p. (1952)

COLBY, R. E.
Stratigraphy and structure of the Recreation red beds, Tucson Mountain Park, Arizona: Univ. Ariz., MS Thesis, 64 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 48 (1958)

COLEMAN, R. G.
1. Mineralogical evidence on the temperature of formations of Colorado Plateau uranium deposits: Econ. Geol., v. 52, p. 1-4 (1957)
2. (and Delevaux, M.) Occurrence of selenium in sulfides from sedimentary rocks of the western United States: Econ. Geol., v. 52, no. 5, p. 499-527 (1957)

COLL, A.
1. The California district, Arizona: Min. World, v. 33, p. 503 (1910)
2. The Dos Cabezas district of Arizona: Min. World, v. 33, p. 816 (1910)

COLLINGS, M. R. (*see* Myrick, R. M.)

COLQUHON, J.
The history of the Clifton-Morenci mining district: J. Murray, London, 104 p. (1924)

COLTON, H. S.
1. Sunset Crater and the lava beds: Plateau, v. 2, no. 4, p. 1-3 (1929)
2. Fossil fresh-water shells from Winona, Coconino County, Arizona: Nautilus, v. 42, no. 3, p. 93-94 (1929)
3. (and Park, C. F., Jr.) Anosma or "Squeeze-ups": Science, new ser., v. 72, p. 579 (1930)
4. (and Park, C. F., Jr.) Anosma of Flagstaff volcanic fields [abst.]: Pan-Am. Geol., v. 53, p. 312-313 (1930)
5. Grand Falls: Mus. N. Ariz., Mus. Notes, v. 2, no. 12, p. 1-3 (1930)
6. Geological notes; Robinson Crater (a rhyolite crater): Plateau, v. 3, no. 11, p. 4 (1931)
7. Tuba City and the Charlie Day spring: Plateau, v. 3, no. 11, p. 1-4 (1931)
8. Walnut Canyon National Monument: Mus. N. Ariz., Mus. Notes, v. 4, no. 11, p. 1-6 (1932)
9. Quetschformen des Basalts: Natur und Volk, Band 64, Heft 5, p. 182-188 (1934)
10. Peripheral lava flows of San Francisco Mountains [abst.]: Pan. Am. Geol., v. 60, p. 302-303 (1934)
11. Hopi coal mines: Mus. N. Ariz., Mus. Notes, v. 8, no. 12, p. 59-61 (1936)
12. Basaltic cinder cones and lava flows of the San Francisco Mountain volcanic field: Mus. N. Ariz. Bull. 10, 50 p. (1937)
13. The eruption of Sunset Crater as an eye-witness might have observed it: Mus. N. Ariz., Mus. Notes, v. 10, no. 4, p. 9-12 (1937)
14. Some notes on the original condition of the Little Colorado River: Mus. N. Ariz., Mus. Notes, v. 10, no. 6, p. 17-20 (1937)

15. The exploration of limestone solution cracks: Plateau, v. 10, no. 10, p. 29-32 (1938)
16. Sunset Crater: Plateau, v. 18, no. 1, p. 7-14 (1945)
17. Black sand: Univ. N. Mex. Press, Albuquerque, 132 p. (1961)
18. Collapsed cinder cones in the San Francisco Mountains: *in* Contributions to the geology of northern Arizona, Mus. N. Ariz. Bull. 40, p. 1-4 (1964)

COLTON, R. E.
Black Mesa of northeastern Arizona is being explored for petroleum deposits; area is considered favorable from the viewpoint of subsurface structural arrangement: Calif. Oil World, v. 39, no. 4, p. 11-15, illus., map (1946)

COLVOCORESSES, G. M.
Meteor Crater: Rocks and Minerals, v. 11, p. 113-117 (1936)

COMSTOCK, T. B.
1. Mineral resources of the Territory: Rep. of the Governor of Arizona to Secretary of Interior, 1894, p. 32-36, Washington (1894)
2. Notes on Arizona mines: Engr. Min. Jour., v. 57, p. 103 (1894)
3. Notes on Arizona geology: Engr. Min. Jour., v. 60, p. 369 (1895)
4. The Chloride district, Arizona: Engr. Min. Jour., v. 70, p. 97-98 (1900)
5. The geology and vein phenomena of Arizona: AIME Trans., v. 30, p. 1038-1101 (1901)

CONANT, M. L. (*see* Avery, R. B.)

CONDRA, G. E.
1. (and Elias, M. K.) *Bicorbula,* a new Permian Bryozoan, consortium of Permian age [abst.]: Geol. Soc. Am. Bull., v. 54, no. 12, p. 1929 (1943)
2. (and Elias, M. K.) *Bicorbula,* a new Permian Bryozoan, probably a Bryozoan-algal consortium: Jour. Paleo., v. 19, no. 2, p. 116-125 (1945)

CONKLIN, D. R. (*see* Soister, P. E.)

CONKLIN, N. M. (*see* Coats, R. R., 2; Hewett, D. F., 8)

CONLEY, J. E. (*see* Davis, C. W.)

CONRAD, R.D.
Pre-Devonian unconformity, Gila County, Arizona: Univ. Ariz., MS Thesis, 56 p. (1964)

COOK, A.
(and Robinson, R. F.) Geology of Kennecott Copper Corporation's Safford copper deposit: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 143-148, maps (1962)

COOK, D. R. (*see* Jerome, S. E., 2)

COOK, F. S.
The geology of the Seven-Dash Ranch area, Cochise County, Arizona: Univ. Ariz., MS Thesis, 26 p., maps (1938)

COOLEY, M. E. (*see also* Akers, J. P., 1; Chenoweth, W. L., 2; Davis, G. E.; Irwin, J. H., 1, 2; Peirce, H. W., 4)
1. Geology of the Chinle formation in the upper Little Colorado River draining area, Arizona and New Mexico: Univ. Ariz., MS Thesis, 317 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 42 (1958)
2. The Mesa Redondo member of the Chinle formation, Apache and Navajo Counties, Arizona: Plateau, v. 31, no. 1, p. 7-15, illus. (1958)
3. Physiography of the Black Mesa Basin area, Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Con., p. 146-149, illus. (1958)
4. Physiography of the Glen-San Juan Canyon area; Part I: Plateau, v. 31, no. 2, p. 21-33 (1958); Part II (San Juan Canyon): Plateau, v. 31, no. 3, p. 49-56 (1959); Part III (Glen and Cataract Canyons): Plateau, v. 31, no. 4, p. 73-79 (1959)

5. Triassic stratigraphy in the Stateline region of west-central New Mexico and east-central Arizona: N. Mex. Geol. Soc., Guidebook 10th Field Conf., p. 66-73 (1959)
6. Analysis of gravel in Glen-San Juan Canyon region, Utah and Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 19-30 (1960)
7. Physiographic map of the San Francisco Plateau-lower Little Colorado area, Arizona: Univ. Ariz., Geochronological Laboratories, Tucson (1960)
8. (and Akers, J. P.) Ancient erosional cycles of the Little Colorado River. Arizona and New Mexico: USGS Prof. Paper 424-C, p. 244-248 (1961)
9. (and Hardt, W. F.) The relation of geology to hydrology in the Segi Mesas area, Utah and Arizona: Ariz. Geol. Soc. Dig., v. 4, p. 59-68 (1961)
10. Description and origin of caliche in the Glen-San Juan Canyon region, Utah and Arizona: Ariz. Geol. Soc. Dig., v. 4, p. 35-43 (1961)
11. Late Cenozoic geohydrology in the central and southern parts of Navajo-Apache Counties, Arizona: Ariz. Geol. Soc. Dig., v. 4, p. 69-77 (1961)
12. Late Pleistocene and Recent erosion and alluviation in parts of the Colorado River system, Arizona and Utah: USGS Prof. Paper 450-B, Art. 18, p. 48-50 (1962)
13. Geomorphology and the age of volcanic rocks in northeastern Arizona: Ariz. Geol. Soc. Dig., v. 5, p. 97-116 (1962)
14. (and Davidson, E. S.) The Mogollon Highlands—their influence on Mesozoic and Cenozoic erosion and sedimentation: Ariz. Geol. Soc. Dig., v. 6, p. 7-36 (1963)
15. (and Akers, J. P., and Stevens, P. R.) Geohydrologic data in the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah: *in* Pt. 3, Selected lithologic logs, drillers' logs, and stratigraphic sections, Ariz. State Land Dept. Water Res. Rep. 12-C, 157 p. (1964)
16. Travertine deposits in the Glen Canyon Region, Utah and Arizona: *in* Contributions to the geology of northern Arizona, Mus. N. Ariz. Bull. 40, p. 56-58 (1964)

COON, R. M. (*see* Chernosky, E. J.)

COOPER, C. M.

The Arizona-Globe copper property: Ariz. Min. Jour., v. 9, no. 16, p. 11 (1926)

COOPER, G. A.

New Cretaceous Brachiopoda from Arizona: Smithsonian Misc. Collections, v. 131, no. 4, 18 p., illus. (1955)

COOPER, J. C.

1. Cambrian, Devonian, and Mississippian rocks of the Four Corners area: Four Corners Geol. Soc., Guidebook 1, p. 59-65 (1955)
2. Cambrian, Devonian and Mississippian rocks of the Four Corners area: Four Corners Geol. Soc., Guidebook 3rd Field Conf., p. 69-78, illus. (1960)

COOPER, John R. (*see also* Gilluly, J., 8)

1. Arizona zinc and lead deposits; Johnson Camp area, Cochise County, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 156, p. 30-39, illus., map (1950)
2. (and Huff, L. C.) Geological investigations and geochemical prospecting experiment at Johnson, Arizona: Econ. Geol., v. 46, p. 731-756, maps (1951)
3. (and Silver, L. T.) Older Precambrian rocks of the Dragoon quadrangle, Cochise County, Arizona [abst.]: Geol. Soc. Am. Bull., v. 65, no. 12, p. 1242 (1954)
4. Metamorphism and volume losses in carbonate rocks near Johnson Camp, Cochise County, Arizona: Geol. Soc. Am. Bull., v. 68, no. 5, p. 577-610, illus., map (1957)
5. Reconnaissance geologic map of southeastern Cochise County, Arizona: USGS Map MF-213 (1960)
6. Some geologic features of the Dragoon quadrangle, Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 139-145 (1959)

7. Reconnaissance map of the Willcox, Fisher Hills, Cochise, and Dos Cabezas quadrangles, Cochise and Graham Counties, Arizona: USGS Map MF-231 (1960)
8. Some geologic features of the Pima mining district, Pima County, Arizona: USGS Bull. 1112-C, p. 63-103 (1960)
9. Turkey-track porphyry—a possible guide for correlation of Miocene rocks in southeastern Arizona: Ariz. Geol. Soc. Dig., v. 4, p. 17-35 (1961)
10. Bismuth in the United States: USGS Map MR-22 (1962)

COOPER, M.
1. Preliminary bibliography on uranium and thorium radioactive carbonaceous deposits: USAEC, RMO-835, 40 p. (1951)
2. Selected bibliography on uranium exploration and the geology of uranium deposits: USAEC, RME-4007, 34 p. (1953)
3. Bibliography and index of literature on uranium and thorium and radioactive occurrences in the United States, Part I, Arizona, Nevada, and New Mexico: Geol. Soc. Am. Bull., v. 64, p. 197-234 (1953)

COOPERRIDER, C. K.
1. (and Sykes, Glenton G.) The relationship of stream flow to precipitation on the Salt River watershed above Roosevelt Dam: Univ. Ariz., Coll. Agr. Exp. Sta. Tech. Bull. 76, 69 p. (1938)
2. (and Cassidy, H. O., and Niederhoff, C. H.) Forecasting streamflow of the Salt River, Arizona: Am. Geophys. Union Trans., v. 26, pt. 2, p. 275-282 (1945)

CORLE, Edwin
Listen, Bright Angel: Duell, Sloan and Pearce, New York, 312 p., illus. (1946)

CORYELL, K. C. (*see* Webb, B. P.)

COSNER, O. J. (*see also* Heindl, L. A., 18, 23, 26)
Ground Water in the Wupatki and Sunset Crater National Monuments, Coconino County, Arizona: USGS Water-Supply Paper 1475-J, p. 357-374 (1962)

COSULICH, Bernice
Future is strong for copper: Ariz. Daily Star, Tucson (18 Nov., 1945); Pay Dirt, no. 90, p. 2-3 (1945)

COULSON, O. B.
Geology of the Sweetwater Drive area and correlation of Santa Cruz Valley gravels: Univ. Ariz., MS Thesis, 71 p., maps (1950)

COUPAL, J. S.
1. Famous Tip Top mine reopened and in production: Min. Jour., v. 20, no. 5, p. 3-5 (1936)
2. Markets for Arizona manganese: Pay Dirt, no. 30, p. 14 (1940)

COURTRIGHT, J. H. (*see also* Richard, K. E., 1, 2, 3)
Progress report on investigations of some Cretaceous-Tertiary formations in southeastern Arizona: Ariz. Geol. Soc. Dig., v. 1, p. 7-9, illus. (1958)

COX, A. M.
History of Bisbee, 1877-1937: Univ. Ariz., MA Thesis, 198 p. (1938)

COX, E. T.
The geology of southern Arizona: Am. Naturalist, v. 14, p. 541-542 (1880)

CRABTREE, E. H.
Potential of the Western metal industry: *in* Frontiers for Research, Univ. Colo. Press, Boulder, p. 251-267 (1960)

CRAIG, L. C.
1. (and others) Preliminary report on the stratigraphy of the Morrison and related formations of the Colorado Plateau region: USGS Trace Elements Memo. Rep. 180, 64 p. (1952)

2. (and others) Stratigraphy of the Morrison and related formations, Colorado Plateau region, a preliminary report: USGS Bull. 1009-E, 44 p. (1955)
3. (and others) Dakota group of Colorado Plateau (Discussion): AAPG Bull., v. 45, no. 9, p. 1582-1591 (1961)

CRAMPTON, T. H. M.
Copper schist deposits of Arizona: Engr. Min. Jour., v. 107, p. 689 (1919)

CRAWFORD, W. P.
1. Notes on rickardite, a new occurrence: Am. Mineral., v. 15, p. 272-273 (1930)
2. (and Johnson, F.) Turquoise deposits of Courtland, Arizona: Econ. Geol., v. 32, p. 511-523 (1937)

CREASEY, S. C. (*see also* Peterson, N. P., 4; Anderson, C. A., 10)
1. (and Quick, G. L.) Copper deposits of a part of the Helvetia mining district, Pima County, Arizona: USGS Open-file Rep., 35 p., maps (1943)
2. (and Anderson, C. A.) Pre-Cambrian stratigraphy and structure of the Mingus Mountain quadrangle, Arizona [abst.]: Geol. Soc. Am. Bull., v. 59, no. 12, pt. 2, p. 1369 (1948)
3. Arizona zinc and lead deposits; Geology of the St. Anthony (Mammoth) area, Pinal County, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 156, p. 63-84, illus., map (1950)
4. Arizona zinc and lead deposits: Iron King mine, Yavapai County, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 156, p. 112-122, illus., map (1950)
5. Geology of the Iron King mine, Yavapai County, Arizona: Econ. Geol., v. 47, p. 24-56, maps (1952)
6. Post-Cambrian faulting in the Black Hills, Yavapai County, Arizona [abst.]: Geol. Soc. Am. Bull., v. 63, p. 1324 (1952)
7. (and Quick, G. L.) Copper deposits of part of Helvetia mining district, Pima County, Arizona: USGS Bull. 1027-F, p. 301-323, illus., map (1955)
8. Some phase relations in the hydrothermally altered rocks of porphyry copper deposits: Econ. Geol., v. 54, no. 3, p. 351-373 (1959)
9. (and Jackson, E. D., and Gulbrandsen, R. A.) Reconnaissance geologic map of parts of the San Pedro and Aravaipa Valleys, south-central Arizona: USGS Map MF-238 (1961)
10. (and Kistler, R. W.) Age of some copper-bearing porphyries and other igneous rocks in southeastern Arizona: USGS Prof. Paper 450-D, Art. 120, p. 1-5 (1962)

CRITTENDEN, M. D.
(and Cutlitta, F., Rose, H. J., Jr., and Fleischer, M.) Studies on manganese oxide minerals VI, Thallium, on some manganese oxides: Am. Mineral., v. 47, no. 11-12, p. 1461-1467 (1962)

CRITTENDEN, M. S.
(and Pavlides, L.) Manganese in the United States: USGS Map MR-23 (1962)

CROSBY, W. O.
The limestone-granite contact deposits of Washington Camp, Arizona: Tech. Quart., v. 18, p. 171-190 (1905); AIME Bi-Mo. Bull. 6, p. 1217-1238 (1905); AIME Trans., v. 36, p. 626-646 (1906)

CROSS, Charles Whitman
1. The laccolitic mountain groups of Colorado, Utah, and Arizona: USGS 14th Ann. Rep., pt. 2, p. 157-241 (1894)
2. The Triassic portion of the Shinarump group, Powell: Jour. Geol., v. 16, p. 97-123 (1908)

CROSTON, J. J.
1. Effect of revaluation on the gold-mining industry: AIME Trans., v. 126, p. 301-326 (1937)
2. Recent trends in copper production, ore reserves, and costs: AIME Trans., v. 126, p. 327-345 (1937)

CUETO RUI-DIAZ, E.
El Cañon del Colorado: Graficas Reunidas, S. A., Madrid, 32 p., illus., map (1943)

CULIN, F. L., Jr.
1. Magnesite: Univ. Ariz., Ariz. Bur. Mines Bull. 14, 10 p. (1916)
2. Mica: Univ. Ariz., Ariz. Bur. Mines Bull. 16, 12 p. (1916)
3. Gypsum: Univ. Ariz., Ariz. Bur. Mines Bull. 19, 8 p. (1916)
4. Cement: Univ. Ariz., Ariz. Bur. Mines Bull. 25, 15 p. (1916)
5. Celestite and strontianite: Univ. Ariz., Ariz. Bur. Mines Bull. 35, 4 p. (1916)
6. Building stones: Univ. Ariz., Ariz. Bur. Mines Bull. 40, 11 p. (1916)
7. Lime rocks: Univ. Ariz., Ariz. Bur. Mines Bull. 46, 8 p. (1917)
8. Gems and precious stones of Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 48, 7 p. (1917)

CULLER, R. C. (*see* Langbein, W. B., 1)

CUMMINGS, G. B. (*see* Smith, W. O.)

CUMMINGS, J. B.
1. Exploration of the Packard fluorspar property, Gila County, Arizona: USBM, RI 3880, 7 p., map (1946)
2. Exploration of New Planet iron deposit, Yuma County, Arizona: USBM, RI 3982, 37 p., maps (1946)
3. (and Romslo, T. M.) Investigation of the Twin Buttes copper mines, Pima County, Arizona: USBM, RI 4732, 12 p. (1950)

CURRIER, L. W.
Geological appraisal of dimension-stone deposits: USGS Bull. 1109, 78 p. (1960)

CURTIS, C. H.
The Esperanza concentrator: Min. Engr., v. 13, no. 11, p. 1234-1239 (1961)

CUSHING, E. M. (*see* Babcock, H. M., 1, 10)

CUSHMAN, R. L. (*see also* Coates, D. R., 7; Halpenny, L. C., 3, 15, 16; Jones, R. S.; Turner, S. F., 13, 20, 25)
1. (and Jones, R. S., and Hem, J. D.) Geology and ground-water resources of the San Simon Basin, Cochise and Graham Counties, Arizona: USGS Mimeo. Rep., 27 p. map (1947)
2. Lower Santa Cruz area (ground water), Pima and Pinal Counties, Arizona: USGS Open-file Rep., p. 115-135 (1952)
3. (and Halpenny, L. C.) Effect of western drought on the water resources of Safford Valley, Arizona: Am. Geophys. Union Trans., v. 36, no. 1, p. 87-94 (1955)

CUTLITTA, F. (*see* Crittenden, M. D.; Senftle, F. E.)

DAGETT, E. B. (*see* Fahey, J. J., 1)

DAKE, C. L.
The pre-Moenkopi (pre-Permian?) unconformity of the Colorado Plateau: Jour. Geol., v. 28, p. 61-74 (1920); [abst.]: Science, new ser., v. 51, p. 492 (1920)

DALE, T. N.
Slate deposits of the United States: USGS Bull. 586, 220 p. (1914)

DALE, Vernon B.
1. Tungsten deposits of Yuma, Maricopa, Pinal, and Graham Counties, Arizona: USBM, RI 5516, 68 p., illus. (1959)
2. (and Stewart, L. A., and McKinney, W. A.) Tungsten deposits of Cochise, Pima, and Santa Cruz Counties, Arizona: USBM, RI 5650, 132 p., illus., maps (1960)
3. Tungsten deposits of Gila, Yavapai, and Mohave Counties, Arizona: USBM, IC 8078, 104 p. (1961)
4. Mining, milling, and smelting methods, San Manuel Copper Corporation, Pinal County, Arizona: USBM, IC 8104, 145 p. (1962)

DALL, W. H.
Report on the mollusks collected by the International Boundary Commission of the United States and Mexico: U. S. Natl. Mus. Proc., v. 19, no. 1111, p. 333-379 (1897)

DALY, J. W. (*see* Jakosky, J. J., 1)

DAMON, Paul E. (*see also* Giletti, B. J.; Shutler, D., Jr.)

1. Geochemical dating of igneous and metamorphic rocks in Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 16-20 (1959)
2. (and Green, W. D., Halva, C. J., Sabels, B. E., and Taylor, O. J.) Correlation and chronology of ore deposits and volcanic rocks: USAEC Ann. Prog. Rep. 1, Contract AT (11-1)-689, Univ. Ariz. (1959)
3. (and Green, W. D., Halva, C. J., and Sabels, B. E.) Correlation and chronology of ore deposits and volcanic rocks: USAEC Ann. Prog. Rep. 2, Contract AT (11-1)-689, Univ. Ariz. (1960)
4. (and Hedge, C. E., and Livingston, D. E.) Geochemical dating of igneous and metamorphic rocks in southwestern United States: NSF Prog. Rep., Grant NSF-G6067, (May 1, 1960)
5. (and Giletti, B. J.) The age of the basement rocks of the Colorado Plateau and adjacent areas: N. Y. Acad. Sci. Annals, v. 91, art. 2, p. 443-452 (1961)
6. (and others) Correlation and chronology of ore deposits and volcanic rocks: USAEC Ann. Prog. Rep. 3, Contract AT (11-1)-689, Univ. Ariz. (1961)
7. (and Long, Auston) Arizona radiocarbon dates III: Radiocarbon, v. 4, p. 239-249 (1962)
8. How old is the older Precambrian of Arizona and Sonora: Jour. Geophys. Research, v. 67, no. 4, p. 1634 (1962)
9. (and Green, W. D.) Investigations of the helium age dating method by stable isotope-dilution technique: Int. Atomic Energy Agency in coop. with the Joint Committee on Radioactivity (ICSU) Proc., Athens (1962)
10. (and Livingston, D. E., and Erickson, R. C.) New K-Ar dates for the Precambrian of Pinal, Gila, Yavapai, and Coconino Counties, Arizona: N. Mex. Geol. Soc., Guidebook 13th field Conf., p. 56-58 (1962)
11. (and Miller, H. W., Jr.) A lava covered Tertiary forest in southern Arizona: Ariz. Acad. Sci. Jour., v. 2, no. 3, p. 117-119 (1963)
12. (and others) Correlation and chronology of ore deposits and volcanic rocks: USAEC Ann. Prog. Rep. 5, Contract AT (11-1)-689, Univ. Ariz. (1963)
13. (and others) Correlation and chronology of ore deposits and volcanic rocks: USAEC Ann. Prog. Rep. no. COO-689-42, Contract AT (11-1)-689, Univ. Ariz. (1964)

DANE, C. H. (*see* Baker, A. A., 3, 4, 7)

D'ARCY, R. L.
Mining practice and methods at the United Verde Extension Mining Company, Jerome, Arizona: USBM, IC 6250, 12 p. (1930)

DARE, W. L.

1. (and Lindblom, R. A., and Soule, J. H.) Uranium mining on the Colorado Plateau: USBM, IC 7726, 60 p., illus. (1955)
2. Underground mining methods and costs at three Salt Wash uranium mines of Climax Uranium Company: USBM, IC 7908, 36 p., illus. (1959)
3. Uranium mining in the Lukachukai Mountains, Apache County, Arizona, Kerr-McGee Oil Industries, Inc.: USBM, IC 8011, 30 p., illus. (1961)

DARTON, N. H.

1. Preliminary list of deep borings in the United States: USGS Water-Supply Paper 57, 60 p. (1902); 2nd ed.: Water-Supply Paper 149, 175 p. (1905)
2. Reconnaissance in Arizona and western New Mexico along the Santa Fe Railroad [abst.]: Geol. Soc. Am. Bull., v. 20, p. 700 (1910)

3. A reconnaissance of parts of northwestern New Mexico and northern Arizona: USGS Bull. 435, 88 p., map (1910)
4. The Southwest, its splendid natural resources, agricultural wealth, and scenic beauty: Natl. Geog. Mag. v. 21, p. 631-665 (1910)
5. Silica and lime deposition: Geol. Charakterbilder (H. Stille), no. 12, 6 pls., explanatory text, Berlin (1912)
6. Some features in the Grand Canyon of the Colorado River: Geol. Soc. Am. Bull., v. 23, p. 721 (1912); Science, new ser., v. 35, p. 310 (1912)
7. Guidebook of the western United States, Part C, The Santa Fe Route, with side trip to the Grand Canyon of the Colorado: USGS Bull. 613, p. 105-143, maps (1915)
8. Explosion craters: Sci. Monthly, v. 3, p. 417-430 (1916)
9. Story of the Grand Canyon; a popular illustrated account of its rocks and origin: Fred Harvey, Kansas City, Mo., 81 p., illus. (1917)
10. The Grand Canyon as an object lesson in geology: Wyo. Hist. Geol. Soc. Proc. and Coll. v. 17, p. 1-20 (1920)
11. Geothermal data of the United States: USGS Bull. 701, p. 13-17 (1920); [abst.]: Wash. Acad. Sci. Jour., v. 10, p. 519 (1920)
12. Grand Canyon of the Colorado River: Geol. Charakterbilder (K. Andree) no. 30, 16 p., Berlin (1924)
13. (and Lausen, C., Wilson, Eldred D., and others) Geologic map of the State of Arizona, scale 1:500,000: Univ. Ariz., Ariz. Bur. Mines in co-operation with the USGS (1924)
14. Structural features of New Mexico and Arizona [absts.]: Geol. Soc. Am. Bull., v. 36, p. 163 (1925); Pan-Am. Geol., v. 43, p. 156 (1925)
15. Topographic and geologic maps of Arizona and New Mexico [abst.]: Pan-Am. Geol., v. 43, p. 364 (1925)
16. A résumé of Arizona geology: Univ. Ariz., Ariz. Bur. Mines Bull. 119, 298 p., maps (1925)
17. The Permian of Arizona and New Mexico: AAPG Bull., v. 10, p. 819-852 (1926)
18. Tectonics of Arizona and New Mexico [absts.]: Geol. Soc. Am. Bull., v. 39, p. 182 (1928); Pan-Am. Geol., v. 49, p. 141 (1928)
19. Algonkian strata of Arizona and western Texas [absts.]: Geol. Soc. Am. Bull., v. 43, p. 123 (1932); Pan-Am. Geol., v. 57, p. 57 (1932)
20. Some Algonkian strata in Arizona and adjoining regions: Wash. Acad. Sci. Jour., v. 22, no. 11, p. 319 (1932)
21. Guidebook of the western United States, Part F, The Southern Pacific Lines, New Orleans to Los Angeles: USGS Bull. 845, 304 p., maps (1933)
22. Tectonics of the Southwest [abst.]: Oil and Gas Jour., v. 36, no. 44, p. 46-47 (1938)
23. Crater Mound, Arizona [abst.]: Geol. Soc. Am. Bull., v. 56, no. 12, p. 1154 (1945)

DAUGHERTY, L .H.

1. *Schilderia admanica,* a new fossil wood from the petrified forests of Arizona: Botanical Gazette, v. 96, p. 363-366, Chicago (1934); [abst.]: Pan-Am. Geol., v. 62, p. 74 (1934)
2. New fossil plants from the Petrified Forest [abst.]: Geol. Soc. Am. Proc. 1934, p. 389 (1935)
3. Triassic flora of the Petrified Forest National Monument [abst.]: Geol. Soc. Am. Proc. 1936, p. 395 (1937)
4. The upper Triassic flora of Arizona (discussion of its geological occurrence by H. R. Stagner): Carnegie Inst. Wash. Pub. 526, 108 p., maps (1941)
5. *Itopsidema,* a new genus of the Osmundaceae from the Triassic of Arizona: Am. Jour. Botany, v. 47, no. 9, p. 771-777 (1960)

DAVENPORT, R. E.
Geophysical investigation of the Sedimentary Hills area, Pima County, Arizona: Univ. Ariz., MS Thesis, 51 p. (1963)

DAVID, L. R.
A Permian shark from the Grand Canyon: Jour. Paleo., v. 18, no. 1, p. 90-93 (1944)

DAVIDSON, D. F.
Selenium in some oxidized sandstone-type uranium deposits: USGS Bull. 1162-C, 33 p. (1963)

DAVIDSON, E. S. (*see also* Cooley, M. E., 14)
1. Geology of the eastern part of the Safford Basin, Graham County, Arizona (a preliminary report): Ariz. Geol. Soc. Dig., v. 3, p. 123-126 (1960)
2. Facies distribution and hydrology of intermontane basin fill, Safford Basin, Arizona: USGS Prof. Paper 424-C, p. 151-153 (1961)
3. Origin of sediments in the intermontane Safford basin, Graham County, Arizona: Geol. Soc. Am. Sp. Paper 68, p. 18 (1962)

DAVIDSON, R. N.
Jerome district: Ariz. Min. Jour., v. 2, no. 7, p. 23-24 (1918)

DAVIS, A. P.
1. Irrigation near Phoenix, Arizona: USGS Water-Supply Paper 2, 98 p., maps (1897)
2. Water storage on Salt River, Arizona: USGS Water-Supply Paper 73, 54 p. (1902)

DAVIS, C. W. (*see also* Johnson, A. C.)
(and Vacher, H. C.; revised by Conley, J. E.) Bentonite; its properties, mining preparation, and utilization: USBM Tech. Paper 609, 83 p. (1940)

DAVIS, D. L.
(and Hetland, D. L.) Uranium in clastic rocks of the Basin and Range province: USGS Prof. Paper 300, p. 351-360 (1956)

DAVIS, G. E.
(and Hardt, W. F., Thompson, L. K., and Cooley, M. E.) Geohydrologic data in the Navajo and Hopi Indian Reservations—Arizona, New Mexico, and Utah: Pt. 1, Records of ground-water supplies, Ariz. State Land Dept., Water Resources Rep. 12-A, 157 p. (1963)

DAVIS, G. L. (*see* Aldrich, L. T., 1, 2; Tilton, G. R.)

DAVIS, H. E.
The Patagonia district of Arizona: Ariz. Min. Jour., v. 9, no. 23, p. 15-16 (1926)

DAVIS, R. E.
1. Geology of the Mary G mine area, Pima County, Arizona: Univ. Ariz., MS Thesis, 51 p. (1955)
2. Magnesium resources of the United States—a geologic summary and annotated bibliography to 1953: USGS Bull. 1019-E, 142 p. (1957)

DAVIS, W. E.
Electrical resistivity investigations of carnotite deposits in the Colorado Plateau: USGS Trace Elements Memo. Rep. 232, 25 p. (1951)

DAVIS, W. M.
1. Notes on the Colorado Canyon district: Am. Jour. Sci., 4th ser., v. 10, p. 251-259 (1900)
2. An excursion to the Grand Canyon of the Colorado: Harvard Coll., Mus. Comp. Zool. Bull., v. 38, p. 107-201 (1901); [absts.]: Geol. Soc. Am. Bull., v. 12, p. 483 (1901); Geol. Mag., ser. 4, v. 8, p. 324 (1901); Science, new ser., v. 13, p. 138 (1901)
3. Les enseignements du Grand Canyon du Colorado: La Geographie, Paris, Bull., v. 4, p. 339-351 (1901)

4. The walls of the Colorado Canyon [absts.]: Science, new ser., v. 15, p. 87 (1902); Geol. Soc. Am. Bull., v. 13, p. 528 (1903)
5. An excursion to the plateau province of Utah and Arizona: Harvard Coll., Mus. Comp. Zool. Bull., v. 42, p. 1-50 (1903)
6. The mountain ranges of the Great Basin: Harvard Coll., Mus. Comp. Zool. Bull., v. 42, p. 129-177 (1903)
7. The Colorado Canyon [abst.]: Science, new ser., v. 21, p. 1860 (1905)
8. The Colorado Canyon and its lessons: Liverpool Geol. Soc. Proc., v. 10, pt. 2, p. 98-102 (1906)
9. Der grosse Canyon des Colorado-Flusses: Gesellschaft für Erdkunde zu Berlin, Seitsch. 3, p. 164-172 (1909)
10. The Colorado Canyon; some of its lessons: Geographical Journal, London, v. 33, p. 535-540 (1909); Am. Geog. Soc., Bull. 41, p. 345-354 (1909); [abst.]: Brit. Assoc. Adv. Sci. Rep. 78, p. 948-949 (1909)
11. The Grand Canyon of the Colorado: Jour. Geog., v. 11, p. 310-314 (1913)
12. Channels, valleys, and intermont plains: Science, new ser., v. 66, p. 272-274 (1927)
13. Rock floors in arid and humid climates: Jour. Geol., v. 38, p. 1-27, 136-158 (1930)
14. (and Brooks, B.) The Galiuro Mountains, Arizona: Am. Jour. Sci., 5th ser., v. 19, p. 89-115 (1930)
15. Periodicity in desert physiography [abst.]: Pan-Am. Geol., v. 53, p. 320 (1930)
16. Physiographic contrasts, east and west: Sci. Monthly, v. 30, p. 395-415, 501-519 (1930)
17. The Peacock Range, Arizona: Geol. Soc. Am. Bull., v. 41, p. 293-313 (1930); [absts.]: Pan-Am. Geol. v. 53, p. 313; v. 54, p. 152 (1930); Geol. Soc. Am. Bull., v. 42, p. 308 (1931)
18. The Santa Catalina Mountains, Arizona: Am. Jour. Sci., 5th ser., v. 22, p. 289-317 (1931); [absts.]: Pan-Am. Geol., v. 55, p. 372-373 (1931); Geol. Soc. Am. Bull., v. 43, p. 235 (1932)
19. Remarks on arid pediments [abst.]: Pan-Am. Geol., v. 56, p. 236 (1931)
20. Basin range types: Science, new ser., v. 76, p. 241-245 (1932)
21. Sheetfloods and streamfloods: Geol. Soc. Am. Bull., v. 49, p. 1337-1416 (1938)

DAVISON, J. M.
A contribution to the problem of Coon Butte: Science, new ser., v. 32, p. 724-726 (1910)

DAY, W. C.
Stone: USGS 18th Ann. Rep., pt. 5, p. 950-1015 (1896); 19th Ann. Rep., pt. 6, p. 280-283, 286 (1898); 20th Ann. Rep., pt. 6, p. 346 (1899)

DEAN, B. G.
(and Brobst, D. A.) Annotated bibliography and index map of barite deposits in United States: USGS Bull. 1019-C, p. 145-152 (1955)

DEAN, J. W.
Helium potential of the Navajo-Chambers area, Apache County, Arizona: Interstate Oil Compact Commission Bull., v. 2, no. 2, p. 33 (1960)

DEAN, K. C.
(and Snedden, H. D., and Agey, W. W.) Concentration of oxide manganese ores from vicinity of Winkelman, Pinal County, Arizona: USBM, RI 4848, 21 p. (1952)

DECKER, B. L.
Wind markings in the Coconino sandstone: Plateau, v. 16, no. 3, p. 52-56 (1944)

DECOOK, K. J. (*see also* Heindl, L. A., 4)
San Simon basin (ground water), Cochise County: USGS Open-file Rep., p. 59-68 (1952)

DEFTY, W. E.
1. Vulture mine, Arizona: Engr. Min. Jour., v. 93, p. 1044-1045 (1912)
2. Arizona—its development and great progress: Min. Engr. World, v. 41, p. 1049-1050 (1914)

DEHLINGER, M. E.
Report on Ajo quadrangle, Arizona: Compass, v. 26, p. 182-188 (1949)

DEKALB, Courtenay
1. Onyx marbles: AIME Trans., v. 25, p. 562 (1895)
2. Ajo copper mines (Pima County, Arizona): Min. Sci. Press, v. 116, p. 115-119, 153-156 (1918)
3. Sacramento Hill disseminated copper deposit (Bisbee, Arizona): Min. Sci. Press, v. 116, p. 549-554, 578-583 (1918)

DELAVAULT, R. E. (*see* Warren, H. V., 2)

DELEVAUX, M. (*see* Coleman, R. G., 2)

DELLENBAUGH, F. S.
1. The romance of the Colorado River: New York (1902); [abst.]: USGS Water-Supply Paper 395, p. 16-22 (1916)
2. Meteor Butte: Science, new ser., v. 73, p. 38-39 (1931)

DELONG, C. W. (*see* Farnham, L. L., 3)

DEMPSEY, W. J.
1. Aeromagnetic map of Bagdad area, Yavapai County, Arizona: USGS Open-file Rep. (1952)
2. Aeromagnetic map of parts of Camelback, Phoenix, and Mesa quadrangles, Maricopa County, Arizona: USGS Open-file Rep. (1952)
3. Aeromagnetic map of part of Cortaro quadrangle, Pima County, Arizona: USGS Open-file Rep. (1952)
4. Aeromagnetic map of parts of Fisher Hills and Willcox quadrangles, Cochise County, Arizona: USGS Open-file Rep. (1952)
5. Aeromagnetic map of Globe quadrangle, Gila County, Arizona: USGS Open-file Rep. (1952)
6. Aeromagnetic map of Jerome-Prescott area, Yavapai County, Arizona: USGS Open-file Rep. (1952)
7. Aeromagnetic map of the Mammoth quadrangle, Pinal County, Arizona: USGS Open-file Rep. (1952)
8. (and Hill, M. E.) Aeromagnetic map of central Yavapai County, Arizona, including the Jerome mining district: USGS Map GP-402 (1963)
9. (and Fackler, W. D.) Aeromagnetic map of the Bagdad area, Yavapai County, Arizona: USGS Map GP-411 (1963)
10. (and Fackler, W. D.) Aeromagnetic map of the Dragoon quadrangle, Cochise County, Arizona: USGS Map GP-412 (1963)
11. (and Facker, W. D.) Aeromagnetic map of the Cochise quadrangle, Cochise County, Arizona: USGS Map GP-413 (1963)
12. (and Hill, M. E.) Aeromagnetic map of the Willcox and Luzena quadrangles, Cochise County, Arizona: USGS Map GP-418 (1963)
13. (and Hill, M. E.) Aeromagnetic map of the Mammoth quadrangle, Pinal and Pima Counties, Arizona: USGS Map GP-419 (1963)
14. (and Hill, M. E.) Aeromagnetic map of parts of the Phoenix, Mesa, Camelback and New River SE quadrangles, Maricopa County, Arizona: USGS Map GP-420 (1963)

DENNIS, P. E.
(and Johnson, P. W., and White, N. D.) Arizona (summary): *in* The role of

ground water in the national water situation; USGS Water-Supply Paper 1800, p. 138-163 (1963)

DENTON, T. C.
1. (and Haury, P. S.) Exploration of the Reward (Vekol) zinc deposit, Pinal County, Arizona: USBM, RI 3975, 42 p., map (1946)
2. Old Reliable copper mine, Pinal County, Arizona: USBM, RI 4006, 9 p., map (1947)
3. Aravaipa lead-zinc deposit, Graham County, Arizona: USBM, RI 4007, 14 p., maps (1947)
4. (and Kumke, C. A.) Investigation of Snowball fluorite deposits, Maricopa County, Arizona: USBM, RI 4540, 15 p. (1949)

DERBY, O. A.
Constituents of the Cañon Diablo meteorite: Am. Jour. Sci., 3rd ser., v. 49, p. 101-110 (1895)

DESAUSSURE, R.
Remains of the California condor in Arizona caves: Plateau, v. 29, no. 2, p. 44-45 (1956)

DETTERMAN, J. S.
1. Photogeologic map of the Kanab SE quadrangle, Kane County, Utah, and Mohave County and Coconino County, Arizona: USGS Map I-137 (1957)
2. Photogeologic map of the Emmett Wash NE quadrangle, Coconino County, Arizona: USGS Map I-190 (1956)
3. Photogeologic map of the Lees Ferry SW quadrangle, Coconino County, Arizona: USGS Map I-189 (1956)
4. Photogeologic map of the Johnson SW quadrangle, Kane County, Utah, and Coconino County, Arizona: USGS Map I-164 (1956)
5. (and Hackman, R. J.) Photogeologic map of the Johnson SE quadrangle, Kane County, Utah, and Coconino County, Arizona: USGS, Map I-248 (1957)

DE VANEY, F. D.
(and Coghill, W. H.) Occurrence and ore-dressing possibilities of ores of manganese in the United States: USBM, IC 6768, p. 23-98 (1934)

DEVERE, J.
The Tombstone bonanza, 1878-1886: Arizoniana, v. 1, no. 3, p. 16-20 (1960)

DEVEREAUX, W. B.
The Deer Creek coal fields, Arizona: Engr. Min. Jour., v. 32, p. 404-405 (1881)

DEWILDE, E. J.
1. Geology applied to mining at Bisbee, Arizona: Min. World, v. 42, p. 463-464 (1915)
2. Brief notes on copper deposits of Bisbee, Arizona: Min. World, v. 42, p. 583-585 (1915)

DEWOLF, W. P.
1. Revival of placer mining operations in Yavapai County, Arizona: Min. Engr. World, v. 44, p. 199-200 (1916)
2. Jerome, Arizona, the center of a great copper mining industry: Min. Engr. World, v. 44, p. 775-777 (1916)
3. Reopening old mines in Arizona: Min. Engr. World, v. 45, p. 329-331 (1916)
4. Yavapai County, Arizona, mines and mills: Min. Engr. World, v. 45, p. 503-504 (1916)
5. Katherine district activity opens promising properties: Ariz. Min. Jour., v. 5, no. 12, p. 22 (1921)

DICE, L. R.
Notes on *Hypolagus browni and Lepus benjamini,* fossil hares from the Pleistocene of Arizona: Mich. Acad. Sci. Papers, v. 16, p. 379-382 (1932)

DICKEY, D. D. (*see* Wright, J. C.)

DICKIE, E. R.

Bagdad copper adopts open-pit mining: Min. Met., v. 28, no. 481, p. 9 (1947)

DICKINSON, John

Remarks on the "Petrified Forest" of Arizona [abst.]: Am. Assoc. Adv. Sci. Proc. v. 35, p. 230 (1887)

DICKINSON, R. G.

1. The Cambrian and Ordovician Systems of southeastern Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 21-24 (1959)
2. Correlations of the El Paso formation in western Texas, southwestern New Mexico, and southeastern Arizona based on insoluble residues: Univ. Ariz., MS Thesis, 41 p. (1960)

DICKSON, R. H.

1. The cost of "bringing in" the Verde Central mine: Min. Jour., v. 13, no. 10, p. 9, 20 (1929)
2. Mining methods and costs of mining copper ore at the Verde Central Mines, Inc., Jerome, Arizona: USBM, IC 6464, 14 p. (1931)

DIERY, H. D.

Petrography and petrogenetic history of a quartz monzonite intrusive, Swisshelm Mountains, Cochise County, Arizona: Univ. Ariz., MS Thesis, 100 p. (1964)

DILLER, J. S.

1. (and Whitfield, J. E.) Dumortierite from Harlem, New York, and Clip, Arizona: USGS Bull. 64, p. 31-33, (1888-1890)
2. (and Whitfield, J. E.) Mineralogical notes: Am. Jour. Sci., 3rd ser., v. 37, p. 216-220 (1889)
3. Notes on asbestos deposits of the United States (extract from USGS Mineral Res., 1907): Min. World, v. 29, p. 207-209 (1908)
4. Asbestos; its occurrence, production, and uses: Min. World, v. 31, p. 461-463 (1909)
5. The types, modes of occurrence, and important deposits of asbestos in the United States: USGS Bull. 470, p. 505-524, maps (1911); Can. Min. Inst. Quart. Bull. 13, p. 45-58 (1911); Can. Min. Inst. Jour., v. 14, p. 92-106 (1912)
6. Asbestos: USGS Bull. 666, (Ariz., p. 52) (1919)

DIMENT, W. H.

(and Stewart, S. W., and Roller, J. C.) Crustal structure from the Nevada Test Site to Kingman, Arizona, from seismic and gravity operations: Jour. Geophys. Research, v. 66, no. 1, p. 201-214 (1961)

DINGS, M. G.

Arizona zinc and lead deposits; Wallapai mining district, Mohave County, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 156, p. 138-142, map (1950); USGS Bull. 978-E, p. 123-163, maps (1951)

DINSMORE, C. A.

1. The Patagonia district, Arizona: Min. World, v. 31, p. 224 (1909)
2. The Johnson and Dragoon districts, Arizona: Min. World, v. 31, p. 833-834 (1909)
3. Courtland, Arizona, and its mining possibilities: Min. World, v. 32, p. 747-749 (1910)
4. The Ray Consolidated Copper Company: Min. Sci. Press, v. 103, p. 282-285 (1911)
5. Clifton-Morenci district, Arizona: Min. World, v. 34, p. 498 (1911)
6. Touring the mining section of the Southwest: Min. Engr. World, v. 35, p. 151-152, 203-204 (1911)
7. The Vulture mine, Arizona; its past and present: Min. Engr. World, v. 35, p. 645-646 (1911)

8. Operations at Mammoth mine, Goldfield, Arizona: Min. Engr. World, v. 35, p. 691-692 (1911)
9. Ray Central copper property: Min. Engr. World, v. 35, p. 920-921 (1911)
10. Some of the mines in the Wickenburg district, Arizona: Min. Engr. World, v. 35, p. 966 (1911)
11. Operations of Copper Queen Gold Mining Company, Arizona: Min. Engr. World, v. 35, p. 1173-1174 (1911)
12. History and development of the Gold Road mine: Min. Engr. World, v. 35, p. 1275-1276 (1911)
13. The Congress Junction mining district, Arizona: Min. Engr. World, v. 36, p. 1006-1007 (1912)

DOBROVOLNY, E. (*see* Huddle, J. W., 1, 3, 4)

DODGE, N. N.
The most interesting spot on earth (Meteor Crater, Arizona): Pacific Disc., v. 8, no. 4, p. 24-26, illus. (1955)

DODD, P. H.
Examples of uranium deposits in the Upper Jurassic Morrison formation on the Colorado Plateau: USGS Prof. Paper 300, p. 243-262 (1956)

DOELL, R. R.
Paleomagnetic study of rocks from the Grand Canyon of the Colorado River: Nature, v. 176, no. 4494, p. 1167 (1955)

DOERINGSFELD, W. W.
(and Amuedo, C. L., and Ivey, J. B.) Generalized tectonic map of the Black Mesa Basin: N. Mex. Geol. Soc., Guidebook of the Black Mesa Basin, northeastern Arizona, p. 145 (1958)

DOLEZAL, E.
Vor 50,000 Jahren, Superbombe aus dem Weltall-der Meter-Krater von Arizona: Universum Natur und Technik, Jahrg. 13, Nr. 15, p. 459-463, illus., Vienna (1958)

DOMAN, R. S.
The lure of Arizona gold was inspiration for Oatman: Ariz. Min. Jour., v. 6, no. 14, p. 3-4 (1922)

DONALD, E. M.
Earthquake, Grand Canyon: Grand Canyon Nature Notes, v. 9, no. 11, p. 372-377, map (1935)

DONALD, P. G.
Geology of the Fresnal Peak area, Baboquivari Mountains, Arizona: Univ. Ariz., MS Thesis, 45 p. (1959)

DOUGLAS, E. M.
Boundaries, areas, geographic centers, and altitudes of the United States and the several states, with a brief record of important changes in their territory: USGS Bull. 689, 234 p., maps (1923); 2nd ed.: Bull. 817, 265 p., maps (1930)

DOUGLAS, James
1. Clifton copper mines of Arizona: Engr. Min. Jour. (Feb. 21 ,1880)
2. Copper resources of the United States: AIME Trans., v. 19, p. 688-690 (1891)
3. The copper industry of Arizona: Mineral Industry, v. 6, p. 227-232 (1898)
4. The Copper Queen mine, Arizona: Min. Sci. Press, v. 79, p. 432-433 (1899); AIME Trans., v. 29, p. 511-546 (1900)
5. Record of borings in the Sulphur Spring Valley, Arizona: Am. Philo. Soc. Proc., v. 40, p. 161-163 (1901)
6. The Copper Queen mines and works, Arizona, U. S. A.: Inst. Min. Met. London Trans., v. 22, p. 532-590 (1913)

7. Historical sketch of Copper Queen mine: Min. Engr. World, v. 38, p. 525-527 (1913)

DOUGLAS, James S.
Facts about Verde and copper: Min. Met., v. 16, p. 258-259 (1935)

DOUGLAS, Walter
1. Copper in Arizona: Engr. Min. Jour., v. 109, p. 115-116 (1920)
2. The life of James Douglas (Dedication of the Douglas Memorial Building for Mining and Metallurgy): Univ. Ariz., Gen. Bull. 5, p. 69-79 (1940)

DOUGLASS, R. C.
The foraminiferal genus *Orbitolina* in North America: USGS Prof. Paper 333, 52 p. (1960)

DOWNEY, J. S. (*see also* Lance, J. F., 12)
Leporidae of the Tusker local fauna from southeastern Arizona: Jour. Paleo., v. 36, no. 5, p. 1112-1115 (1962)

DRAKE, R. J.
1. Mollusk shells found in alluvium at Buell Park, Apache County, Arizona: Plateau, v. 22, p. 26-31 (1949)
2. Non-marine mollusks from recent sediments near Vernon, Apache County, Arizona: S. Calif. Acad. Sci. Bull. 61, p. 25-28 (1962)

DRAPER, G. E. (*see* Smith, H. V., 3)

DREYER, R. M. (*see* Garrels, R. M., 1)

DRYGALSKI, Erich von
Talubertiefung im Grand Canyon des Colorado: *in* Transcontinental Excursion, 1912; Am. Geog. Soc. Memorial Volume, p. 343-348 (1915)

DUBIN, D. J.
Fusulinid fauna from the type area of the Earp formation, Permo-Pennsylvanian, Cochise County, Arizona: Univ. Ariz., MS Thesis, 102 p. (1964)

DUBOIS, Robert L. (*see also* Anthony, J. W., 4; Kiersch, G. A., 8; Laidley, R. A.)
1. (and Kiersch, G. A.) Garnet: *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 2, p. 90-95, maps, Univ. Ariz. Press, Tucson (1955)
2. (and Anthony, J. W.) Anomalous magnetism project, Department of Geology, University of Arizona: Ariz. Geol. Soc. Dig., v. 1, p. 17-18 (1958)
3. Some geologic features of the St. Michaels area, Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 191-193, map (1958)
4. Geology of the Santa Catalina Mountains: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 107-116 (1959); Ariz. Geol. Soc. Dig., v. 1, p. 15 (1958)
5. Petrography and structure of a part of the gneissic complex of the Santa Catalina Mountains, Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 117-127, illus. (1959)
6. (and Carey, W. W.) Magnetic investigation of a ring dike, Buell Park, Arizona: Geophysics, v. 29, no. 4, p. 553-564 (1964)

DU COSTA, J. A. (*see* Skibitzke, H. E., 3)

DUEL, M. (*see* Breger, I. A., 1)

DUFF, G. J.
(and Kumke, C. A.) Mining and milling methods at San Xavier mine, Eagle-Picher Mining and Smelting Company, Pima County, Arizona: USBM, IC 7581, 13 p., cross-sections (1950)

DUKE, A.
Arizona gem fields, 2d ed.: Southwest Printers, Yuma, Arizona, 132 p., illus. (1957); 4th ed.: 130 p., illus. (1960)

DUMBLE, E. T.
1. Notes on the geology of southeastern Arizona: AIME Trans., v. 31, p. 696-715 (1902)

2. A Carboniferous coal in Arizona: Am. Geol., v. 30, p. 270 (1902)

DU MOULIN, W. L.
Water development at New Cornelia Copper Company: Ariz. Min. Jour., v. 8, no. 24, p. 5-8 (1925)

DUNHAM, M. S.
The geology of the Blue Jay mine area, Helvetia, Arizona: Univ. Ariz., MS Thesis, 45 p. (1937)

DUNNING, C. H. (*see also* Peplow, E. H., Jr.)
1. Arizona mining at crossroads: Pay Dirt, no. 87, p. 6-7 (1945)
2. Future is bright in nonmetallics: Pay Dirt, no. 91, p. 1-2 (1946)
3. Our future metallic resources: Pay Dirt, no. 91, p. 4-5 (1946)
4. (and Peplow, E. H., Jr.) Rocks to riches: Southwest Publishing Co., Phoenix, Arizona, 406 p. (1959)

DURY, G. H.
Principles of underfit streams: USGS Prof. Paper 452-A, 67 p. (1964)

DURYEE, Edward
1. Tests of cement materials from Gila River, Arizona: USGS Water-Supply Paper 33, p. 82-90 (1900)
2. Cement investigations in Arizona: USGS Bull. 213, p. 372-380 (1903)

DUTTON, B. P.
Zuni in brief review: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 162-170 (1962)

DUTTON, Carl E. (*see also* Carr, M. S.)
(and Carr, M. S.) Iron ore deposits of the western United States: USGS Strategic Mineral Investigations Preliminary map 3-212 (1947)

DUTTON, Clarence E.
1. Excavation of the Grand Canyon of the Colorado River [abst.]: Am. Assoc. Adv. Sci. Proc., v. 30, p. 128-130 (1882)
2. Physical geology of the Grand Canyon district: USGS 2nd Ann. Rep., p. 47-166 (1882)
3. Tertiary history of the Grand Canyon district: USGS Mon. 2, 264 p., folio atlas (1882)

DWORNIK, E. J. (*see* Adler, I.)

DYAS, F. R.
Review of mining operations in 1915: Min. Engr. World, v. 44, p. 284-291 (1916)

EARDLEY, A. J.
1. Late Cenozoic trenches of the Rocky Mountains [abst.]: Geol. Soc. Am. Bull., v. 58, no. 12, pt. 2, p. 1176 (1947)
2. Structural geology of North America: Harper and Bros., New York, 624 p. (1951)

EARLING, R. B. (*see* Probert, F. H., 2)

EASTLICK, J. T.
New developments at the Christmas mine, Arizona: Ariz. Geol. Soc. Dig., v. 1, p. 1-6, map (1958)

EASTON, W. H. (*see* Gutschick, R. C., 1)
(and Gutschick, R. C.) Corals from the Redwall limestone (Mississippian) of Arizona: S. Calif. Acad. Sci. Bull., v. 52, p. 1-27, illus. (1953)

EATON, A. L.
Fluorescent minerals of the Colorado desert: Mineralogist, v. 8, no. 4, p. 156 (1940)

EBBLEY, Norman
Colorado Plateau uranium: Min. World, v. 12, no. 2, p. 10 (1950)

EBNER, M. J.
A selected bibliography on quicksilver: USGS Bull. 1019-A, 57 p. (1954)

ECKEL, E. B. (*see also* Harrell, M. A.)
1. Boxwork siderite; an analagous occurrence of silica and chrysocolla (discussion): Econ. Geol., v. 25, p. 290-292 (1930)
2. Geology and ore deposits of the Mineral Hill area, Pima County, Arizona: Univ. Ariz., MS Thesis, 51 p., maps (1930)
3. Geology of dam sites on Williams River and Kirkland Creek, Arizona: USGS Ground-Water Branch Open-file Rep., 14 p., maps (1940)

ECKEL, E. C.
1. Cement materials and industry of the United States: USGS Bull. 243, (Ariz., p. 86-88) (1905)
2. Portland cement materials and industry in the United States: USGS Bull. 522, (Ariz., p. 90-91) (1913)

ECKELMANN, W. R.
(and Kulp, J. C.) Uranium-lead method of age determination, Part II, North America: Geol. Soc. Am. Bull., v. 68, p. 1117-1140 (1957)

ECKSTEIN, W. H.
Photogeologic map, Agathla Peak-2, Navajo Indian Reservation, Navajo County, Arizona: USGS Trace Elements Memo. Rep. 411 (1952)

EDWARDS, Ira
A visit to the petrified forests of Arizona: Milwaukee Public Museum Yearbook 1923, v. 3, p. 164-170 (1925)

EIGO, M. (*see* Knoerr, 4)

EISEMAN, F. B., Jr.
The Hopi salt trail: Plateau, v. 32, no. 2, p. 25-32 (1959)

EKREN, E. B. (*see* Frischknecht, F. C., 1)

ELIAS, M. K. (*see* Condra, G. E., 1, 2)

ELKINS, D. A.
Estimated cost of exploiting enriched, hard manganese ore from the Maggie Canyon deposit, Artillery Mountains region, Mohave County, Arizona: USBM, RI 6438, 78 p. (1964)

ELLIOTT, W. W., AND COMPANY
History of Arizona territory: 323 p., San Francisco (1884)

ELLIS, A. J. (*see* Meinzer, O. E., 2)

ELLSWORTH, P. C. (*see also* King, J. W., 1)
(and Hatfield, K. G.) Geology and ore deposits of Mesa VI, Lukachukai district, Arizona: USAEC, RMO-802, 12 p., maps (1951)

ELSING, M. J.
1. The Bisbee mining district: Engr. Min. Jour.-Press, v. 115, p. 177-184 (1923)
2. (and Heineman, R. E. S.) Arizona metal production: Univ. Ariz., Ariz. Bur. Mines Bull. 140, 112 p. (1936)
3. The cost of producing copper: Min. Jour., v. 20, no. 23, p. 3-4 (1937)
4. Precious metal content of Arizona copper ores: Min. Jour., v. 21, no. 2, p. 6-7 (1937)
5. A fair market price for copper: Min. Jour., v. 21, no. 7, p. 9, 64 (1937)

ELSTON, W. E.
Structural development and Paleozoic stratigraphy of Black Mesa Basin, northeastern Arizona, and surrounding areas: AAPG Bull. 44, no. 1, p. 21-36, illus. (1960)

ELY, F. B.
On ore deposits (particularly copper deposits of Arizona): Min. Sci. Press, v. 113, p. 689-691 (1916)

ELY, S.
The Lost Dutchman Mine: William Morrow, New York, 178 p. (1953)

EMERY, W. B.
The igneous geology of Carrizo Mountain, Arizona: Am. Jour. Sci., 4th ser., v. 42, p. 349-363, map (1916)

EMMONS, S. F.
1. Geological guidebook of the Rocky Mountain excursion: 5th Int. Geol. Cong., compte rendu p. 253-487, maps (1893)
2. Secondary enrichment of ore deposits: AIME Trans., v. 30, p. 177-217 (1901); Posepny Volume, p. 433-472 (1902)
3. Origin of copper in Permian and Triassic beds [abst.]: Science, new ser., v. 20, p. 760-761 (1904)
4. Copper in the red beds of the Colorado Plateau region: USGS Bull. 260, p. 221-232 (1905)

EMMONS, W. H.
1. The enrichment of sulphide ores: USGS Bull. 529, 260 p. (1913)
2. The enrichment of ore deposits: USGS Bull. 625, 530 p. (1917)
3. The principles of economic geology: McGraw-Hill Book Co., N.Y., 606 p. (1918); 2nd ed.: 520 p. (1940)
4. Gold deposits of the world: McGraw-Hill Book Co., 562 p. (Ariz., p. 191-203), maps (1937)

EMORY, W. H.
1. Notes of a military reconnaissance from Ft. Leavenworth, Missouri, to San Diego, California: U.S. 30th Cong., 1st sess., Sen. Ex. Doc. 7, H. Ex. Doc. 41, p. 5-126 (1848)
2. Report on the United States and Mexican boundary survey: U.S. 34th Cong., 1st sess., Sen. Ex. Doc. 108, H. Ex. Doc. 135, no. 258, 174 p., maps (1857)
3. General description of the country adjacent to the boundary between the United States and Mexico: Am. Assoc. Adv. Sci. Proc. 10, pt. 2, p. 134-148 (1857)

ENDLICH, F. M. (*see also* Hayden, F. V.)
The Pearce mining district, Arizona: Engr. Min. Jour., v. 63, p. 571 (1897)

ENGINEERING AND MINING JOURNAL
1. Mining for shooting stars (Meteor Crater, Arizona): v. 120, p. 1001-1002 (1925)
2. Our most promising copper area; Miami and Castle Dome, Magma Copper Company, and Ray Mines Division: v. 150, no. 7, p. 95-96 (1949)
3. Phelps Dodge projects assure copper for tomorrow: v. 150, no. 7. p. 98-99 (1949)
4. Asarco's Mission: v. 163, no. 1, p. 70-79 (1962)

ENLOWS, H. E.
1. Geology and ore deposits of the Little Dragoon Mountains: Univ. Ariz., PhD Thesis, 41 p., map (1939)
2. Structure of Little Dragoon Mountains, Arizona: Pan-Am. Geol., v. 25, no. 4, p. 241-252, maps (1941); no. 5, p. 328-336 (1941)
3. The igneous geology of Chiricahua National Monument, Arizona: Tulsa Geol. Soc. Dig., v. 19, p. 105-107, illus. (1951)
4. Welded tuffs of Chiricahua National Monument, Arizona: Geol. Soc. Am. Bull., v. 66, no. 10, p. 1215-1246, map (1955)

ENSIGN, B. H. (*see* Michaelson, S. D.)

ENSIGN, O. A.
Silver mining in the Tip Top district: Ariz. Min. Jour., v. 7, no. 17, p. 5-6 (1924)

EPIS, R. C. (*see also* Konishi, K; Langenheim, R. L. ,Jr., 2)
1. (and Gilbert, C. M.) Sandy facies of Upper Devonian strata in southeastern Arizona [abst.]: Geol. Soc. Am. Bull., v. 67, no. 12, p. 1767 (1956)

2. (and Gilbert, C. M., and Langenheim, R. L., Jr.) Upper Devonian Swisshelm formation of southeastern Arizona: AAPG Bull., v. 41, no. 10, p. 2243-2256, illus. (1957)
3. Early Paleozoic strata in southeastern Arizona: AAPG Bull., v. 41, no. 10, p. 2223-2242, illus. (1957); addendum: v. 42, no. 11, p. 2750-2756, illus., map (1958)
4. Structural relations in the Pedregosa and Swisshelm Mountains, Cochise County, Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1718 (1959)

ERICKSON, M. P. (*see* Bateman, P. C.)

ERICKSON, R. C. (*see also* Damon, P. E., 10)
Petrology and structure of an exposure of the Pinal schist, Santa Catalina Mountains, Arizona: Univ. Ariz., MS Thesis, 71 p. (1962)

ETHINGTON, R. L.
1. Devonian conodonts in Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 72-77 (1962)
2. (and Clark, D. L.) Conodonts from the El Paso formation (Ordovician) of Texas and Arizona: Jour. Paleo., v. 38, no. 4, p. 685-704 (1964)

ETTINGER, L. J.
Geology of the Pat Hills, Cochise County, Arizona: Univ. Arizona., MS Thesis, 47 p. (1962)

ETTLINGER, I. A. (*see also* Short, M. N., 2)
1. Ore deposits support hypothesis of a central Arizona batholith: AIME Tech. Pub. 63, 23 p., map (1928); [abst.]: Min. Met., v. 9, p. 77 (1928)
2. (and Short, M. N.) Magma mine, Superior district: *in* Copper Resources of the World, 16th Int. Geol. Cong., p. 207-213 map (1935)

EVANS, H. T., Jr.
(and Garrels, R. M.) Thermodynamic equivalent of vanadium in aqueous systems as applied to the interpretation of the Colorado Plateau ore deposits: Geochemica et Cosmochimica Acta, v. 15, no. 1-2, p. 131-149 (1958)

EVANS, L. G. (*see* Freeman, G. A.)

EVENSEN, C. G. (*see also* McKee, E. D., 46; Mitcham, T. W., 1)
1. A comparison of the Shinarump conglomerate on the Hoskannini Mesa with that in other selected areas in Arizona and Utah: Univ. Ariz., MS Thesis, 88 p. (1953)
2. (and Gray, I. B.) Evaluation of uranium ore guides, Monument Valley, Arizona and Utah: Econ. Geol., v. 53, no. 6, p. 639-662, illus. (1958)
3. The Shinarump member of the Chinle formation: N. Mex. Geol. Soc., Guidebook of the Black Mesa Basin, northeastern Arizona, p. 95-97 (1958)

EVENSEN, James
Geology of the Copper Hill area, Winkelman, Arizona: Univ. Ariz., MS Thesis, 45 p. (1961)

EVERHART, D. L. (*see also* McKelvey, V. E., 3)
1. Reconnaissance examinations of copper-uranium deposits west of the Colorado River: USAEC, RMO-659, 19 p., maps (1950)
2. Geology of uranium deposits — a condensed version: USAEC, RMO-732, 28 p. (1951)
3. Uranium-bearing vein deposits in the United States: USGS Prof. Paper 300, p. 97-104 (1956)

EVERETT, F. D.
Reconnaissance of tellurium resources in Arizona, Colorado, New Mexico, and Utah: USBM, RI 6350, 38 p. (1964)

EVERIT, R. S.
Hot spring water from Clifton, Arizona: Econ. Geol., v. 20, p. 291-292 (1925)

FACKLER, W. D. (*see* Dempsey, W. J., 9, 10, 11)

FAHEY, J. J. (*see also* Chao, E. C. T., 2, 3)
1. (and Dagett, E. B., and Gordon, S. G.) Wherryite, a new mineral from the Mammoth mine, Arizona: Am. Mineral., v. 35, no. 1-2, p. 93-98, illus. (1950)
2. Murdochite, a new copper-lead-oxide mineral: Am. Mineral., v. 40, no. 9-10, p. 905-906 (1955); [absts.]: Geol. Soc. Am. Bull., v. 64, p. 1420 (1953); Am. Mineral., v. 39, no. 3-4, p. 327 (1954)
3. Recovery of coesite and stishovite from Coconino sandstone of Meteor Crater, Arizona: Am. Mineral., v. 49, no. 11-12, p. 1643-1647 (1964)

FAICK, J. N.
1. Geology of the Ord mine, Mazatzal Mountains quicksilver district, Arizona: USGS Bull. 1042-R, p. 685-698, illus., maps (1958)
2. (and Hildebrand, F. A.) An occurrence of molybdenian stolzite in Arizona: Am. Mineral., v. 43, no. 1-2, p. 156-159, tables (1958)

FAIR, Charles L.
1. Geohydrology of the Safford inner valley: Ariz. Geol. Soc. Dig., v. 4, p. 125-131 (1961)
2. (and Jinks, J. E.) Santa Catalina foothills fault in the Pontotoc area: Ariz. Geol. Soc. Dig., v. 4, p. 131-133 (1961)
3. Probable Cretaceous-Tertiary section in Fresnal Canyon, Baboquivari Mountains: Ariz. Geol. Soc. Dig., v. 4, p. 93-95 (1961)

FAIRBANKS, E. E.
Mineragraphic notes on manganese minerals: Am. Mineral., v. 8, p. 209-210 (1923)

FAIRBANKS, H. M.
(and Berkey, C. P.) Mining in Arizona Territory: *in* Life and letters of R. A. F. Penrose, Jr., p. 193-210, Geological Society of America (1952)

FAIRBANKS, H. W.
The physiography of southern Arizona and New Mexico [absts.]: Engr. Min. Jour., v. 75, p. 154 (1903); Jour. Geol., v. 11, p. 97-99 (1903)

FAIRCHILD, H. L.
1. Origin of Meteor Crater (Coon Butte), Arizona: Geol. Soc. Am. Bull., v. 18, p. 493-504 (1907)
2. A meteoric crater of Arizona: 10th Int. Geol. Cong., p. 147-151, map (1907)
3. Meteor Crater exploration: Science, new ser., v. 69, p. 485-487 (1929)
4. Nature and fate of Meteor Crater bolide: Science, new ser., v. 72, p. 463-467 (1930)

FANSETT, George R.
Prospectors (Arizona and its heritage): Univ. Ariz. Bull., v. 7, no. 3, p. 163-169 (1936)

FARISH, T. E.
1. The great diamond swindle: Ariz. Min. Jour., v. 3, no. 1, p. 23-26 (1919)
2. History of Arizona: 8 vols., Phoenix, Arizona (1914-1918)

FARMER, M. F.
Tracks and trackways of northern Arizona — a record of the past: Plateau, v. 28, no. 3, p. 54-66, illus. (1956)

FARNHAM, L. L.
1. (and Havens, R.) Pikes Peak iron deposits, Maricopa County, Arizona: USBM, RI 5319, 31 p., illus. (1957)
2. Manganese deposits of western Arizona: USBM, IC 7843, 87 p., illus. (1958)
3. (and Stewart, L. A., and Delong, C. W.) Manganese deposits of eastern Arizona: USBM, IC 7990, 178 p., illus. (1961)

FARRINGTON, O. C.
1. On crystallized azurite from Arizona: Am. Jour. Sci., 3rd ser., v. 41, p. 300-307 (1891)

2. Analysis of "iron shale" from Coon Mountain, Arizona: Am. Jour. Sci., 4th ser., v. 22, p. 303-309 (1906)

FEARING, J. F., Jr.
1. (and Benedict, P. C.) Geology of the Verde Central mine (Jerome district): Engr. Min. Jour.-Press, v. 119, p. 609-611 (1925)
2. Some notes on the geology of the Jerome district, Arizona: Econ. Geol. v. 21, p. 757-773 (1926)

FEEMSTER, Lee T.
Four Corners area: *in* Oil, gas, and helium in Arizona, Arizona Development Board, *for* Arizona Oil and Gas Conservation Commission, p. 67 (1961)

FEISS, J. W.
The geology and ore deposits of Hiltano Camp, Arizona: Univ. Ariz., MS Thesis, 40 p., maps (1929)

FENNEMAN, N. M.
1. (and others) Physical divisions of the United States (map, scale 1:7,000,000): USGS (1930)
2. Physiography of western United States: McGraw-Hill Book Co., N.Y., 534 p., map (1931)
3. Physiographic history of Great Basin: Pan-Am. Geol., v. 57, p. 131-142 (1932)

FENTON, Carroll L.
Wildlife through Arizona ages: Ariz. Highways, v. 36, no. 3, p. 32-35 (1960)

FENZI, Warren E.
Trends in open-pit mining: Min. Cong. Jour., v. 48, no. 2, p. 39-42 (1962)

FERGUSSON, W. B.
The Cretaceous System of southeastern Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 43-48 (1959)

FERRIS, H. A.
(and Busch, J. E.) Bridal Veil mines in Cataract Canyon: Ariz. Min. Jour., v. 8, no. 7, p. 9-10, 23-24 (1924)

FERRY, Philip
1. Where lava dammed the Colorado: Nat. Hist., v. 60, no. 4, p. 168-176, illus. (1951)
2. The Little Colorado runs dry: Pacific Disc., v. 10, no. 3, p. 18-23, illus. (1957)

FETH, J. H. (*see also* Halpenny, L. C., 15; Heindl, L. A., 10)
1. The geology of the northern Canelo Hills, Santa Cruz County, Arizona: Univ. Ariz., PhD Thesis, 150 p., map (1947)
2. Permian stratigraphy and structure, northern Canelo Hills, Arizona: AAPG Bull., v. 32, p. 82-108 (1948)
3. (and Anthony, J. W.) Spheroidal structures in Arizona volcanics: Am. Jour. Sci., v. 247, no. 11, p. 791-801, illus. (1949)
4. Structural reconnaissance of the Red Rock quadrangle, Arizona: USGS Ground-Water Branch Mimeo Rep., 34 p., illus. (1951); [abst.]: Geol. Soc. Am. Bull., v. 60, p. 1887 (1949)
5. Occurrence of ground water near Flagstaff, Coconino County, Arizona [abst.]: Geol. Soc. Am. Bull., v. 63, p. 1327 (1952)
6. Duncan basin (ground water), Greenlee County: USGS Open-file Rep., p. 36-44 (1952)
7. Safford basin (ground water), Graham County: USGS Open-file Rep., p. 45-58 (1952)
8. (and Heindl, L. A., Johnson, P. W., and Wolcott, H. N.) Other areas irrigated with ground water: USGS Open-file Rep., p. 195-201 (1952)
9. The relation of geologic activity to the origin of parks and prairies near Flagstaff, Arizona: Plateau, v. 24, no. 3, p. 104-110 (1952)

10. A geologic and geophysical reconnaissance of the Doney Park-Black Bill Park area, Arizona, with reference to ground water; with a section on geophysics by Yost, C. B., Jr.: USGS Circ. 233, 11 p., illus., geol. map (1953)
11. Preliminary report of investigations of springs in the Mogollon Rim region, Arizona, with sections on base flow of streams by White, N. D., and quality of water by Hem, J. D.: USGS Mimeo. Rep., 77 p. illus. (1954)
12. Geologic and ground-water reconnaissance of the Patagonia area, Arizona: USGS Ground-Water Branch Mimeo. Rep., 12 p. (1954)
13. Lake deposits in western United States [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1719 (1959)
14. Springs along the Mogollon Rim in Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 129-135 (1962)
15. (and Hem, J. D.) Reconnaissance of Headwater Springs in the Gila River Drainage Basin, Arizona: USGS Water-Supply Paper 1619-H, 54 p. (1963)

FETZNER, R. W.
Pennsylvanian paleotectonics of Colorado Plateau: AAPG Bull.: v. 44, no. 8, p. 1371-1413, illus. (1960)

FEUCHÉRE, Leon (*see* Bonillas, Y. S.)

FILLO, P. V.
Manganese mining and milling methods and costs, Mohave Mining and Milling Company, Maricopa County, Arizona: USBM, IC 8144, 29 p. (1963)

FINCH, J. W.
1. Sedimentary metalliferous deposits of the Red Beds: AIME Trans, v. 76, p. 379-392 (1928)
2. Sedimentary copper deposits of the Western States: *in* Ore deposits of the Western States; AIME Lindgren Volume, p. 481-487 (1933)

FINCH, W. I. (*see also* Butler, A. P., Jr., 2; Miesch, A. T., 1)
1. Preliminary geologic map showing the distribution of uranium deposits and the principal ore-bearing formations of the Colorado Plateau: USGS Map MF-16 (1955)
2. (and Parrish, I. S., and Walker, G. W.) Epigenetic uranium deposits in the United States: USGS Map I-299 (1959)
3. Geology of uranium deposits in Triassic rocks of the Colorado Plateau region: USGS Bull. 1074-D, 40 p. (1959)

FINLAY, J. R.
1. The southwest copper field (New Mexico-Arizona-Sonora): Engr. Min. Jour., v. 106, p. 199-205 (1918)
2. The Jerome district of Arizona: Engr. Min. Jour., v. 106, p. 557-562, 605-610 (1918)

FINNELL, T. L.
1. Structural control of uranium ore at Monument No. 2 mine, Apache County, Arizona: Econ. Geol., v. 52, no. 1, p. 25-35, illus. (1957); [discussion by Mitcham, T. W.]: Econ. Geol., v. 52, no. 5, p. 586-589, illus. (1957)
2. Recurrent movement on the Canyon Creek fault, Navajo County, Arizona: USGS Prof. Paper 450-D, Art, 143, p. 80-82 (1962)

FISCHER, R. P.
1. Peculiar hydrothermal copper-bearing veins of the northeastern Colorado Plateau: Econ. Geol., v. 31, p. 571-599 (1936)
2. Sedimentary deposits of copper, vanadium, uranium, and silver in southwestern United States: Econ. Geol., v. 32, p. 906-951 (1937)
3. Uranium-bearing sandstone deposits of the Colorado Plateau: Econ. Geol., v. 45, p. 1-11 (1950)
4. Uranium-vanadium-copper deposits on the Colorado Plateau: USGS Prof. Paper 300, p. 143-154 (1956)

5. (and Stewart, J. H.) Copper-vanadium-uranium deposits in sandstone, their distribution and geochemical cycles: Econ. Geol., v. 56, no. 3, p. 509-520 (1961)
6. Vanadium in the United States: USGS Map MR-16 (1962)

FISHER, Clyde
Where a comet struck the earth: Nat. Hist., v. 34, p. 754-762 (1934)

FISHER, W. L.
1. Upper Paleozoic and lower Mesozoic stratigraphy of Parashant and Andrus Canyons, Mohave County, northwestern Arizona: Univ. Kansas, PhD Thesis, 407 p. (1962)
2. (and Sorauf, J. E.) Correlation chart of the Permian formations of North America; discussion of the Grand Canyon section: Geol. Soc. Am. Bull., v. 73, p. 649-652 (1962)
3. Lithologic and faunal zonation of massive limestones, Kaibab formation, northwestern Arizona: Plateau, v. 36, no. 4, p. 110-114 (1964)

FIX, C. E.
Selected annotated bibliography of the geology and occurrence of uranium-bearing marine black shales in the United States: USGS Bull. 1059-F, 61 p. (1958)

FLAGG, A. L.
1. Rockhounds and Arizona minerals: Whispering Wind Press, Phoenix, Arizona, 82 p., illus. (1944)
2. Mineral display at State Fair: Pay Dirt, no. 100, p. 3-4 (1946)
3. Arizona minerals: Ariz. Highways, v. 23, no. 3, p. 28-31, illus. (1947)
4. Fluorescent minerals: Ariz. Highways, v. 25, no. 1, p. 30-33 (1949)
5. Beauty from the earth — on mineral collecting in Arizona: Ariz. Highways, v. 32, no. 11, p. 8-14, illus. (1956)
6. Petite minerals: Ariz. Highways, v. 33, no. 11, p. 6-11 (1957)
7. Mineralogical journeys in Arizona: F. H. Bittner, Scottsdale, Arizona, 93 p., illus. (1958)
8. Color magic in fluorescent minerals: Ariz. Highways, v. 36, no. 1, p. 24-31 (1960)

FLEISCHER, M. (*see* Crittenden, M. D.; Hewett, D. F., 7, 8)

FLETCHER, J. E.
Sedimentation investigations in Walnut Gulch Watershed, Arizona: Agricultural Research Service-Soil Conservation Workshop, Oxford, Miss (1959)

FLETCHER, L.
The meteoric iron of Tucson (Arizona): Mineral. Mag., v. 9, p. 16-36 (1890)

FLINT, R. F.
(and others) Glacial map of North America, 2 sheets, Pt. 1; Bibliography and explanatory notes, Pt. 2; Geol. Soc. Am. Sp. Paper 60, 37 p., illus. map (1945)

FLINTER, B. H.
The alteration of Malayan ilmenite grains and the question of "arizonite": Econ. Geol., v. 54, p. 720-729 (1959)

FONTANA, B. L.
The Mowry mine, 1858-1958: Kiva, v. 23, no. 3 (1958)

FOOTE, A. E.
1. A new locality for meteoric iron with a preliminary notice of the discovery of diamonds in the iron: Am. Jour. Sci., 3rd ser., v. 42, p. 413-417; (1891); Am. Assoc. Adv. Sci. Proc., v. 40, p. 279-283 (1892); [abst.]: Am. Geol., v. 8, p. 192 (1891)
2. Geological features of the meteoric iron locality in Arizona: Acad. Nat. Sci. Phila. Proc. 1891, p. 407 (1891)

FOOTE, W. M.
Preliminary note on the shower of meteoric stones near Holbrook, Navajo County, Ariz., July 19, 1912: Am. Jour. Sci., 4th ser., v. 34, p. 437-456 (1912)

FORAKER, C. B.
Ventilation and air conditioning of the Magma mine: AIME Trans., v. 141, p. 253-267 (1940)

FORD, W. E.
1. On the chemical composition of dumortierite: Am. Jour. Sci., 4th ser., v. 14, p. 426-430 (1902); Zeitschr. Kryst., v. 37, p. 417-421 (1903)
2. (and Bradley, W. M.) On the identity of footeite with connellite together with the description of two new occurrences of the mineral: Am. Jour. Sci., 4th ser., v. 39, p. 670-676 (1915)

FORRESTER, J. D.
1. (Contributor to sections on Mining and Minerals, and Fuels): *in* Arizona — its people and resources; Univ. Ariz. Press, Tucson, Arizona (1960)
2. (and Moore, R. T.) Maps with special reference to the geologic and mineral maps of Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 170, 11 p., illus. (1962)
3. What is Black Mesa's potential?: World Oil., v. 57, no. 1, p. 116-120 (1963)

FOSHAG, W. L.
Famous mineral localities; Yuma County, Arizona: Am. Mineral., v. 4, p. 149-150 (1919)

FOSTER, M. D. (*see* Ross, C. S., 2)

FOSTER, R. W.
(and others) Gallup to Globe via Zuni, St. Johns, Show Low and Salt River Canyon [Road log]: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 10-26 (1962)

FOUR CORNERS GEOLOGICAL SOCIETY
Geology of the Paradox Basin fold and fault belt (northeastern Arizona); Guidebook 3rd Field Conf., 173 p., maps; includes papers by numerous authors which are cited individually (1960)

FOWLER, G. M.
1. Montana mine, Ruby: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 119-124, maps (1938)
2. Arizona zinc and lead deposits; Montana mine: Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 43-49, map (1951)

FOX, C. K.
The Colorado delta; a discussion of the Spanish explorations and maps; the Colorado River silt load, and its seismic effect on the Southwest: Private Publication, Los Angeles, 75 p., maps (1936)

FRANK, F. J.
Progress report on subsurface geologic investigation in the Yuma area: USGS Open-file Rep., 7 p. (1963)

FRANKE, R. P.
Geology of the Cochise mining district, Arizona: Min. Reporter, v. 51, p. 503 (1905)

FRAZIER, R. H.
The Fort Apache limestone of east-central Arizona: Univ. Ariz., MS Thesis, 58 p. (1961)

FRECH, F.
1. Section in Congress Canyon opposite Point Sublime, Arizona: *in* Geologic guidebook of the Rocky Mountain Excursion; 5th Int. Geol. Cong., compte rendu, p. 476-481 (1893)
2. Das Profil des Grossen Colorado-Canon: Neues Jahrbuch für Mineralogie, Geologie, und Paläontologie, Stuttgart, Band 2, p. 153-156 (1895)

FREEMAN, George A.
(and Rampacek, C., and Evans, L. G.) Copper segregation process shows promise at Lake Shore mine: Min. Engr., v. 13, no. 10, p. 1152-1155 (1961)

FREEMAN, V. L. (*see* Mullens, T. E.)

FRENZEL, A. B.
A turquoise deposit in Mohave County: Engr. Min. Jour., v. 66, p. 697 (1898)

FRIEDRICH, J. J.
On copper minerals from the Bisbee district, Arizona: N.Y. Acad. Sci. Trans., v. 8, p. 45-46 (1888)

FRISCHKNECHT, F. C. (*see also* Black, R. A., 2)
1. (and Ekren, E. B.) Electromagnetic studies in the Twin Buttes quadrangle, Arizona: USGS Prof. Paper 424-D, p. 259-261 (1961)
2. (and Petrafeso, F. A.) Aeromagnetic map of part of the Toh-Atin Mesa quadrangle, Apache County, Arizona: USGS Map GP-403 (1963)
3. (and Petrafeso, F. A.) Aeromagnetic map of part of the Los Gigantes Buttes quadrangle, Apache County, Arizona: USGS Map GP-404 (1963)
4. (and Petrafeso, F. A.) Aeromagnetic map of the Yellowstone Canyon quadrangle, Apache County, Arizona: USGS Map GP-405 (1963)
5. (and Petrafeso, F. A.) Aeromagnetic map of the Canyon del Muerto quadrangle, Apache County, Arizona: USGS Map GP-406 (1963)
6. (and Petrafeso, F. A.) Aeromagnetic map of the Nazlini quadrangle, Apache County, Arizona: USGS Map GP-407 (1963)

FRONDEL, Charles
1. Paramelaconite, a tetragonal oxide of copper: Am. Mineral., v. 26, no. 11, p. 657-672 (1941)
2. (and Heinrich, E. W.) New data on hetaerolite, hydrohetaerolite, coronadite, and hollandite: Am. Mineral., v. 27, no. 1, p. 48-56 (1942)

FULLER, W. H. (*see* Smith, H. V., 3)

FULTON, C. H.
The ores of copper, lead, gold, and silver: USBM Tech. Paper 143, 45 p. (1916)

FURNESS, J. W.
History of the development of the copper industry of the world: *in* Copper Resources of the World; 16th Int. Geol. Cong., p. 1-20 (1935)

FURNISH, W. M., Jr. (*see* Miller, A. K., 1, 2)

GABELMAN, J. W.
1. Uranium deposits in limestone: USGS Prof. Paper 300, p. 405-412 (1956)
2. (and Boyer, W. H.) Relation of uranium deposits to feeder structures, associated alteration and mineral zones: United Nations 2nd International Conference on Peaceful Uses of Atomic Energy Proceedings, v. 2, p. 338-350, illus., maps (1958)

GABRIELSON, C. W.
Arizona's inexhaustible ores: Pay Dirt, no. 86, p. 5-6 (1945)

GALBRAITH, F. W. (*see also* Short, M. N., 4)
1. Geology of the Silver King area, Superior, Arizona: Univ. Ariz., PhD Thesis, 153 p., maps (1935)
2. Gypsum: Univ. Ariz., Ariz. Bur. Mines Circ. 5, 6 p. (1940)
3. (and Kuhn, T. H.) A new occurrence of dioptase in Arizona: Am. Mineral., v. 25, no. 10, p. 709-710 (1940)
4. Empire Mountains overthrust: Pam-Am. Geol., v. 73, p. 377-378 (1940)
5. Empire Mountains, southeastern Arizona [abst.]: Geol. Soc. Am. Bull., v. 51, no. 12, p. 1927 (1940)
6. Minerals of Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 149, 82 p. (1941); 2nd ed., revised: Bull. 153, 97 p. (1947)

7. Thrust faulting in the Empire Mountains, southeastern Arizona [abst.]: Geol. Soc. Am. Bull., v. 60, p. 1889-1890 (1949)
8. (and Anthony, J. W.) Fifty common Arizona minerals: Univ. Ariz., Ariz. Bur. Mines. Circ. 14, 17 p. (1949)
9. (and Loring, W. B.) Arizona zinc and lead deposits; Swisshelm districts: Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 30-36, illus. (1951)
10. (and Brennan, D. J.) Minerals of Arizona: Univ. Ariz., Phys. Sci. Bull. 4, 116 p. (1959)
11. The Empire Mountains, Pima County, Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 127-133 (1959)

GALE, H. S.
Nitrate deposits: USGS Bull. 523, 36 p. (1912)

GALLAGHER, B. J.
Desert materials, types and uses: *in* 13th Highway Geological Symposium, Phoenix, Arizona, p. 18-21 (1962)

GANNETT, H.
Profiles of rivers in the United States: USGS Water-Supply Paper 44, p. 100 (1901)

GARDINER, Frederick, Jr.
An Arizona natural bridge: Science, v. 6, p. 67 (1885)

GARDINER, L. (*see* Rosenzweig, A.)

GARDNER, E. D. (*see also* Lausen, C., 4)
1. Mining methods and costs at Herron and Laster lease, Superior, Arizona: USBM, IC 6799, 9 p. (1934)
2. Gold mining and milling in the Black Mountains, western Mohave County, Arizona: USBM, IC 6901, 45 p., maps (1936)
3. (and Johnson, C. H., and Butler, B. S.) Copper mining in North America; USBM, Bull. 405, 300 p., maps (1938)
4. (and Mosier, M.) Open-cut metal mining: USBM Bull. 433, 176 p. (1941)

GARDNER, F. J.
1. Arizona shows signs of year-end flurry; oil exploration and wildcatting: Oil and Gas Jour., v. 60, no. 50, p. 125 (1962)
2. Texaco scores heavily in Arizona: Oil and Gas Jour., v. 61, no. 18, p. 203 (1963)
3. Arizona wildcats hum: Oil and Gas Jour., v. 61, no. 40, p. 187 (1963)

GARDNER, L. S.
1. The Hurricane fault in southwestern Utah and northwestern Arizona: Am. Jour. Sci., v. 239, no. 4, p. 241-260, maps (1941); [abst.]: Wash. Acad. Sci. Jour., v. 30, no. 11, p. 492 (1940)
2. The Hurricane fault: Utah Geol. Soc., Guidebook VII, p. 15-21, illus., map (1952)

GARNER, E. L. (*see* Rosholt, J. N., Jr.)

GARRELS, R. M. (*see also* Evans, H. T., Jr.; Hostetler, P. B.; McKelvey, V. E., 3)
1. (and Dreyer, R. M.) Mechanism of limestone replacement at low temperatures and pressures: Geol. Soc. Am. Bull., v. 63, no. 4, p. 325-379, illus. (1952)
2. (and Larsen, E. S., 3rd) Geochemistry and mineralogy of the Colorado Plateau uranium ores: USGS Prof. Paper 320, 236 p. (1959)

GARRETT, S. K.
Tennessee-Schuylkill mine: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 117-119, maps (1938)

GARRISON, F. L.
Notes on minerals: Acad. Nat. Sci. Phila. Proc., v. 59, p. 445-446 (1907)

GASS, H. J.
A review of Paleozoic fish of Arizona: Univ. Ariz., MS Thesis, 97 p. (1963)

GASTIL, R. G. (Gordon)
1. An occurrence of authigenic xenotime: Jour. Sed. Pet., v. 24, no. 4, p. 280-281, illus. (1954)
2. Late Precambrian volcanism in southeastern Arizona: Am. Jour. Sci., v. 252, no. 7, p. 436-440, illus. (1954)
3. Older Precambrian stratigraphy of upper Tonto Basin, central Arizona [abst.]: Geol. Soc. Am. Bull., v. 65, no. 12, p. 1255-1256 (1954)
4. Older Precambrian rocks of the Diamond Butte quadrangle, Gila County, Arizona: Geol. Soc. Am. Bull., v. 59, no. 12, p. 1495-1513, illus., maps (1958)
5. A working hypothesis for Arizona's Older Precambrian history: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 52-55 (1962)

GATEWOOD, J. S.
1. (and others) Use of water by bottom-land vegetation in lower Safford Valley, Arizona: USGS Water-Supply Paper 1103, 210 p., illus. (1950)
2. (and Wilson, A., Thomas, H. E., and Kister, L. R.) General effects of drought on water resources of the Southwest: USGS Prof. Paper 372-B, p. 1-55 (1964)

GAULT, D. E., (*see* Moore, H. J.; Shoemaker, E. M., 8, 10)

GAZDIK, G. C.
(and Tagg, K. M.) Annotated bibliography of high-calcium limestone deposits in the United States, including Alaska, to April 1956: USGS Bull. 1019-I, 36 p. (1957)

GAZIN, C. L.
The late Cenozoic vertebrate faunas from the San Pedro Valley, Arizona: U.S. Natl. Mus. Proc., v. 92, no. 3155, p. 457-518, map (1942)

GEBHARDT, R. C.
Geology and mineral resources of the Quijotoa Mountains: Univ. Ariz., MS Thesis, 63 p., maps (1931)

GEITHMANN, Harriet
A forest of the past: Nat. Hist., v. 34, p. 653-661 (1934)

GENTH, F. A.
Analysis of the meteoric iron from Tucson, province of Sonora, Mexico: Acad. Nat. Sci. Phila. Proc., v. 7, p. 317-318 (1855); Am. Jour. Sci., 2nd ser., v. 20, p. 118-120 (1855)

GENTIEU, N. P.
The biography of a crater: Foote Prints, v. 30, no. 2, p. 3-14, illus. (1958)

GEORGE, D'Arcy
Mineralogy of uranium and thorium bearing minerals: USAEC, RMO-563 (1949)

GERHARDT, A. W. (*see* Jaquays, D. W.)

GERRARD, T. A.
1. Environment studies of the Fort Apache member, Supai formation (Permian), east-central Arizona: Univ. Ariz., PhD Thesis, 187 p. (1964)
2. Stratigraphy of the Fort Apache member, Supai formation (Permian), east-central Arizona: *in* Contributions to the geology of northern Arizona, Mus. N. Ariz. Bull. 40, p. 33-48 (1964)

GESSEL, C. D.
(and Rutledge, D. H.) Large-scale mapping of Lake Powell: Am. Soc. Civil Engr. Proc., v. 88, Paper 3318, Jour. Surveying and Mapping Div., no. SU 1, p. 17-27, illus., (Nov., 1962)

GETSINGER, Floyd
Agate in Arizona: Lapidary Jour., v. 15, no. 3, p. 316-318 (1961)

GIDLEY, J. W. (*see also* Bryan, K., 14)
1. Preliminary report on fossil vertebrates of the San Pedro Valley, Arizona: USGS Prof. Paper 131, p. 119-131 (1922)
2. Fossil proboscidea and edentata of the San Pedro Valley, Arizona: USGS Prof. Paper 140, p. 83-96 (1926)

GILBERT, C. M. (*see* Epis, R. C., 1, 2; Peterson, N. P., 6, 10, 13)

GILBERT, G. K. (*see also* Marcou, J., 4)
1. (Report): *in* Preliminary report concerning explorations and surveys in Nevada and Arizona, 1871 (Wheeler), U.S. 42nd Cong., 2nd sess., Sen. Ex. Doc. 65, p. 90-94 (1872)
2. On certain recent geological and geographical researches in Arizona and Nevada: Philo. Soc. Wash. Bull. 1, p. 54-56 (1874)
3. On the age of the Tonto sandstone [abst.]: Philo. Soc. Wash. Bull. 1, p. 109 (1874)
4. Report on the geology of portions of Nevada, Utah, California, and Arizona: U. S. Geog. and Geol. Surveys W. 100th Mer., v. 3, p. 21-187, maps (1875)
5. Report on the geology of portions of New Mexico and Arizona: U.S. Geog. and Geol. Surveys W. 100th Mer., v. 3, p. 501-567 (1875)
6. The Colorado Plateau province as a field for geological study: Am. Jour. Sci., 3rd ser., v. 12, p. 16-24, 85-103 (1876); [abst.]: Am. Assoc. Adv. Sci. Proc., v. 23, pt. 2, p. 32-35 (1875)
7. Itinerary, Albuquerque, New Mexico, to Flagstaff, Arizona, and to the Grand Canyon: *in* Geological guidebook of the Rocky Mountain excursion, 5th Int. Geol. Cong., Compte rendu, p. 468-474 (1893)
8. A rock fissure (northern Arizona): Science, new ser., v. 2, p. 117-119 (1895)
9. The origin of hypotheses, illustrated by the discussion of a topographic problem: Science, new ser., v. 3, p. 1-13 (1896); Wash. Geol. Soc. (1896)

GILBERT, James
The Arizona copper mine: Canadian Journal, new ser., v. 2, p. 321-324, Toronto, Canada (1857)

GILDERSLEEVE, B.
Magnesite and brucite in the United States: USGS Map MR-27 (1962)

GILETTI, B. J. (*see also* Damon, P. E., 5)
(and Damon, P. E.) Rubidium-strontium ages of some basement rocks from Arizona and northwestern Mexico: Geol. Soc. Am. Bull., v. 72, no. 4, p. 639-643 (1961)

GILL, J. R.
(and Cobban, W. A.) Stratigraphy of lower and middle parts of the Pierre shale, northern Great Plains: USGS Prof. Paper 424-D, p. 185-191, maps (1961)

GILLERMAN, E.
Geology of the central Peloncillo Mountains, Hidalgo County, New Mexico, and Cochise County, Arizona: N. Mex. Bur. Mines Miner. Res. Bull. 57, 152 p., illus., map (1958)

GILLINGHAM, T. E.
The geology of the California mine area, Pima County, Arizona: Univ. Ariz., MS Thesis, 65 p., map (1936)

GILLSON, J. L.
Fluorspar deposits in the Western States: AIME Trans., v. 173, p. 19-46 (1947)

GILLULY, James
1. Ajo district: *in* Copper Resources of the World; 16th Int. Geol. Cong., p. 228-233, map (1935)
2. Pediments of the Ajo region, Arizona [abst.]: Wash. Acad. Sci. Jour., v. 26, p. 388-389 (1936)

3. Physiography of the Ajo region, Arizona: Geol. Soc. Am. Bull., v. 48, p. 323-347, map (1937); [abst.]: Geol. Soc. Am. Proc. 1937, p. 122-123 (1938)
4. Geology and ore deposits of the Ajo quadrangle, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 141, 83 p., maps (1937)
5. Ajo district: Univ. Ariz., Ariz. Bur. Mines. Bull. 145, p. 86-90, map (1938)
6. The mineralization of the Ajo copper district, Arizona: Econ. Geol., v. 37, no. 4, p. 257-309 (1942); [absts.]: Geol. Soc. Am. Bull., v. 52, no. 12, pt. 2, p. 1904 (1941); Am. Mineral., v. 27, no. 3, p. 222-223 (1942)
7. General geology of central Cochise County, Arizona (with sections on age and correlation by A. R. Palmer, J. S. Williams, and J. B. Reeside, Jr.): USGS Prof. Paper 281, 169 p., illus., maps (1956)
8. (and Cooper, J. R., and Williams, J. S.) Late Paleozoic stratigraphy of central Cochise County, Arizona: USGS Prof. Paper 266, 49 p., illus. (1954)
9. Thrust faulting in the Dragoon Mountains, Arizona [abst.]: Geol. Soc. Am. Bull., v. 52, no. 12, p. 1949 (1941)
10. Emplacement of the Uncle Sam porphyry, Tombstone, Arizona: Am. Jour. Sci., v. 243, no. 15, p. 643-666, maps (1945)
11. The Ajo mining district, Arizona: USGS Prof. Paper 209, 112 p. maps (1946)
12. Distribution of mountain building in geologic times: Geol. Soc. Am. Bull., v. 60, p. 561-590, illus. (1949)
13. Geology of the New Cornelia mine, Ajo, Arizona: Ariz. Geol. Soc.-Geol. Soc. Am.; Guidebook Southern Ariz., p. 58-61, map (1952)
14. The tectonic evolution of the western United States: Quart. Jour. Geol. Soc. London, p. 113-174 (June, 1963)

GILMORE, C. W.
1. A new fossil turtle, *Kinosternon airzonense,* from Arizona: U. S. Natl. Mus. Proc., v. 62, art. 5, 8 p. (1922)
2. Fossil footprints from the Grand Canyon: Smithsonian Misc. Collections, v. 77, no. 9, 41 p. (1926); [absts.]: Geol. Soc. Am. Bull., v. 37, p. 240-241 (1926); Wash. Acad. Sci. Jour., v. 7, p. 272 (1927)
3. Footprints of unknown vertebrate animals in the Carboniferous and Permian of the Grand Canyon [abst.]: Science, new ser., v. 65, p. 479-480 (1927)
4. Fossil footprints from the Grand Canyon; second contribution: Smithsonian Misc. Collections, v. 80, no. 3, 78 p. (1927)
5. Fossil footprints from the Grand Canyon; third contribution: Smithsonian Misc. Collections, v. 80, no. 8, 16 p. (1927)
6. Fossil footprints in the Grand Canyon of the Colorado, Arizona: Smithsonian Inst. Pub. 2957, p. 7-10 (1928)
7. (and Sturdevant, G. E.) Discovery of fossil tracks on the north rim of the Grand Canyon: Science, new ser., v. 67, p. 216 (1928)
8. Fossil hunting in Utah and Arizona: Smithsonian Inst. Pub. 3480, p. 1-4, illus. (1938)

GIRTY, G. H.
Note on the Carboniferous fossils (of the Bisbee quadrangle, Arizona): USGS Prof. Paper 21, p. 46-54 (1904)

GOLDTHWAIT, J. W. (*see* Huntington, E., 1, 2)

GONYER, F. A. (*see* Hurlbut, C. S., Jr., 1; Shannon, E. V.)

GOODALE, C. W.
1. The occurrence and treatment of the argentiferous manganese ores of Tombstone district, Arizona: AIME Trans., v. 17, p. 767-774, map (1889); v. 18, p. 910-912 (1890)
2. Reminiscences of early days in Tombstone: Ariz. Min. Jour., v. 10, no. 23, p. 3-4, 60-62 (1927)

GOODWIN, J. C.
Reformed copper ores (Bisbee, Arizona): Min. Sci. Press, v. 85, p. 60, 75, 85 (1902)

GORDON, E. R.
The geology of the Twin Buttes mining district: Univ. Ariz., MS Thesis, 12 p., map (1922)

GORDON, S. G. (*see also* Fahey, J. J., 1)
Recently described "bisbeeite" from Grand Canyon is cyanotrichite: Am. Mineral., v. 8, p. 92-93 (1923)

GORDON, W. T.
Preliminary report on specimens of silicified wood (chiefly of *Araucarioxylon*) collected by John Muir, Esq., at Adamana, near Holbrook, Arizona, U. S. A.: Royal Botanical Garden, Edinburgh, Notes no. 20, p. 257-258 (1909)

GOSS, W. D. (*see* Coats, R. R., 3)

GOSS, Wesley P.
1. Exploration and development of the San Manuel ore body: Min. Cong. Jour., v. 34, no. 12, p. 22-26, illus. (1948)
2. Our most promising copper area; San Manuel Copper Corporation: Engr. Min. Jour., v. 150, no. 7, p. 92-95 (1949)

GOTT, G. B. (*see* Pierce, A. P.)

GOULD, H. R.
1. Erosion in the reservoir: Chapt. R *in* Pt. 4 *of* Comprehensive survey of sedimentation in Lake Mead, 1948-1949; USGS Prof. Paper 295, p. 209-213 (1960)
2. Amount of sediment: Chapt. P *in* Pt. 4 *of* Comprehensive survey of sedimentation in Lake Mead, 1948-1949; USGS Prof. Paper 295, p. 195-200 (1960)
3. Turbidity currents: Chapt. Q *in* Pt. 4 *of* Comprehensive survey of sedimentation in Lake Mead, 1948-1949; USGS Prof. Paper 295, p. 201-207 (1960)

GOWING, F. A.
Notes on geology of Mineral Creek district, Pinal County, Arizona: Min. Reporter, v. 49, p. 501-504 (1904)

GRAICHEN, W.
Das Kupfer-Gold-Lager von Globe, Arizona: Zeitschrift. für praktische Geologie, Jg. 13, Heft 1, p. 39-40, Berlin, Germany (1905)

GRAMETBAUR, A. B.
Selected bibliography of andalusite, kyanite, sillimanite, dumortierite, topaz, and pyrophylite in the United States: USGS Bull. 1019-N, 38 p. (1959)

GRANGER, B. H. (*see also* Barnes, W. C., 2)
Arizona place names: Univ. of Ariz. Press, Tucson, 519 p., maps (1960)

GRANGER, H. C. (*see also* Neurburg, G. J.; Wyant, D. G.)
1. (and Raup, R. B.) Uranium deposits of the Dripping Spring quartzite, Gila County, Arizona: USGS Bull. 1046-P, 72 p., illus. (1959)
2. Reconnaissance study of uranium deposits in Arizona: USGS Bull. 1147-A, 54 p. (1962)
3. (and Raup, R. B.) Stratigraphy of the Dripping Spring quartzite, southeastern Arizona: USGS Bull. 1168, 119 p. (1964)

GRANT, L. S.
Short stories of some of the famous mines of the world: Ariz. Min. Jour., v. 6, no. 12, p. 7-11, 25-26 (1922)

GRATER, R. K.
Last stand of the ground sloth: Ariz. Highways, v. 34, no. 7, p. 30-33, illus. (1958)

GRATON, L. C. (*see also* Bonillas, Y. S.)
(and Murdock, J.) The sulphide ores of copper; some results of microscopic study: AIME Bull. 77, p. 741-811 (1913); Trans., v. 45, p. 26-93, 529-530 (1914)

GRAY, I. B. (*see also* Evensen, C. G., 2)
Nature and origin of the Moenkopi-Shinarump hiatus in Monument Valley, Arizona and Utah: Univ. Ariz., PhD Thesis, 94 p. (1961)

GRAY, Jane (*see also* Martin, P. S., 3)
1. Late Tertiary microflora from the Basin and Range Province, Arizona: Science, v. 132, no. 3420, p. 147-148 (1960)
2. Micropaleobotanical research on the late Tertiary sediments of Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 145-149 (1960)
3. Tertiary pollen flora from the Basin and Range Province, Arizona [abst.] Geol. Soc. Am. Bull., v. 71, no. 12, p. 2061-2062 (1960)
4. Early Pleistocene paleoclimatic record from Sonoran Desert, Arizona: Science, v. 133, no. 3445, p. 38-39 (1961)

GRAY, R. S.
1. Cenozoic geology of Hindu Canyon, Mohave County, Arizona: Univ. Ariz., MS Thesis, 62 p. (1959)
2. Late Cenezoic geology of Hindu Canyon: Ariz. Acad. Sci. Jour., v. 3, no. 1, p. 39-42 (1964)

GRAYBEAL, F. T.
The geology and gypsum deposits of the southern Whetstone Mountains, Cochise County, Arizona: Univ. Ariz., MS Thesis, 80 p., (1962)

GREEN, T. E., Jr.
Disturbed beds near St. Johns, Apache County, Arizona: Univ. Tex., MS Thesis (1960); [abst.]: Ariz. Geol. Soc. Dig., v. 3, p. 181 (1960)

GREEN, W. D. (*see also* Damon, P. E., 2, 3, 9)
The distribution of radioactivity in natural magnetite: Univ. Ariz., MS Thesis, 128 p. (1962)

GREENSTEIN, G.
The structure of the Amole arkose north of King Canyon, Tucson Mountains, Arizona: Univ. Ariz., MS Thesis, 42 p. (1961)

GREENWAY, J. C.
Success after failures (story of New Cornelia): Ariz. Min. Jour., v. 3, no. 8, p. 17 (1920)

GREGG, C. C.
(and Moore, E. L.) Reconnaissance of the Chinle formation in the Cameron-St. Johns area, Coconino, Navajo, and Apache Counties, Arizona: USAEC, RME-51, 15 p., illus. (1955)

GREGORY, H. E. (*see also* Campbell, M. R., 4)
1. Some features of the geology of the Navajo reservation [abst.]: Science, new ser., v. 32, p. 62 (1910)
2. The Shinarump conglomerate: Am. Jour. Sci., 4th ser., v. 35, p. 424-438 (1913); [abst. with discussion by A. W. Grabau and N. H. Darton]: Geol. Soc. Am. Bull., v. 24, p. 679-680 (1913)
3. Preliminary geological map of the Navajo-Moki Reservation [abst.]: Geol. Soc. Am. Bull., v. 24, p. 680 (1913)
4. A reconnaissance of a portion of the Little Colorado Valley, Arizona: Am. Jour. Sci., 4th ser., v. 38, p. 491-501 (1914)
5. The igneous origin of the glacial deposits on the Navajo Reservation, Arizona and Utah: Am. Jour. Sci., 4th ser., v. 40, p. 97-115, map (1915)
6. The oasis of Tuba, Arizona: Assoc. Am. Geog. Annals, v. 5, p. 107-119 (1915)
7. The Navajo country: Am. Geog. Soc. Bull., v. 47, p. 561-577 (1915)
8. The Navajo country; a geographic and hydrographic reconnaissance of parts of Arizona, New Mexico, and Utah: USGS Water-Supply Paper 380, 219 p., maps (1916); [abst.]: Wash. Acad. Sci. Jour., v. 7, p. 132 (1917)
9. Garnet deposits on the Navajo Reservation, Arizona and Utah: Econ. Geol., v. 11, p. 223-230 (1916)

10. Geology of the Navajo country; a reconnaissance of parts of Arizona, New Mexico, and Utah: USGS Prof. Paper 93, 161 p., maps (1917)
11. (and Noble, L. F.) Notes on a geological traverse from Mohave, California, to the mouth of San Juan River, Utah: Am. Jour. Sci., 5th ser., v. 5, p. 229-238 (1923)
12. (and Moore, R. C.) The Kaiparowits region, a geographic and geological reconnaissance of parts of Utah and Arizona: USGS Prof. Paper 164, 161 p., maps (1931)
13. Colorado Plateau region: 16th Int. Geol. Cong., Guidebook 18, 38 p., maps (1932)
14. Colorado drainage basin: Am. Jour. Sci., v. 245, p. 694-705 (1947)
15. Geology and geography of the Zion Park region, Utah and Arizona: USGS Prof. Paper 220, 200 p. (1950)

GREGORY, N. B.
Zinc mines of the Hualapai district, Arizona: Min. World, v. 33, p. 1179-1180 (1910)

GREIG, J. W. (*see* Brady, L. F., 15)

GRIFFIN, B. E.
Ground water problems in the lower Gila desert area: *in* 13th Highway Geol. Symposium, Phoenix, Arizona, p. 22-25 (1962)

GRIFFITH, William
Kinds and ocurrence of anthracite coal: Min. Mag., v. 13, p. 214-221 (1906)

GRIFFITTS, W. R.
(and Larrabee, D. M., and Norton, J. J.) Beryllium in the United States: USGS Map MR-35 (1962)

GRISWOLD, G. B.
A study of subsidence at the San Manuel Mine, Tiger, Arizona: Univ. Ariz., MS Thesis, 86 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 42 (1958)

GRISWOLD, L. S.
Some features of the Arizona Plateau [abst.]: Science, new ser., v. 2, p. 706-707 (1895)

GROSS, E. B. (*see* Laverty, R. A.)

GROUT, F. F. (*see* Butler, B. S., 18)

GRUNDSTEDT, Henry G.
Geophysics, skip hoisting signify new mining trends set by Pima mine: Min. World, v. 20, no. 8, p. 34 (1958)

GRUNDY, W. D. (*see also* McKee, E. D., 46; Wood, H. B., 1)
1. Geology and uranium deposits of the Shinarump conglomerate of Nokai Mesa, Arizona and Utah: Univ. Ariz., MS Thesis, 88 p. (1953)
2. (and Oertell, E. W.) Uranium deposits in the White Canyon and Monument Valley mining districts, San Juan County, Utah, and Navajo and Apache Counties, Arizona: Intermountain Assoc. Pet. Geol., Guidebook 9th Field Conf., p. 197-207, illus. (1958)

GRUNER, John W. (*see also* Rosenzweig, A.)
1. Mineral association in the uranium deposits of the Colorado and adjacent regions with special emphasis on those in the Shinarump formation: USAEC, RMO-566, pt. 3 (1952)
2. Mineral association in the uranium deposits of the Colorado Plateau and adjacent regions: USAEC, RME-3092 (1954)
3. The origin of the uranium deposits of the Colorado Plateau and adjacent regions: Mines Mag., v. 44, no. 3, p. 53-66, illus. (1954)
4. The uranium mineralogy of the Colorado Plateau and adjacent regions: Utah Geol. Soc., Guidebook 9, p. 70-77, tables (1954)

5. Mineral associations in the continental-type uranium deposits of the Colorado Plateau and adjacent areas: Intermountain Assoc. Pet. Geol., Guidebook 7th Field Conf., p. 151-154, illus. (1956)

GUDE, A. J. (*see* Stugard, F., Jr.)

GUILD, F. N.

1. Microscopic relations of magnetite, hematite, pyrite, and chalcopyrite: Econ. Geol., v. 29, no. 2, p. 107-120 (1934)
2. Petrography of the Tucson Mountains, Pima County, Arizona: Am. Jour. Sci., 4th ser., v. 20, p. 313-318 (1905)
3. The composition of molybdite from Arizona: Am. Jour. Sci., 4th ser., v. 23, p. 455-456 (1907)
4. Coon Mountain crater: Science, new ser., v. 26, p. 24-25 (1907)
5. The mineralogy of Arizona: The Chemical Publishing Co., Easton, Pa., 103 p. (1910)
6. Mineralogische Notizen: Zeitschr. Kryst., v. 49, no. 4, p. 321-331 (1911)
7. A microscopic study of the silver ores and their associated minerals: Econ. Geol., v. 12, p. 297-353 (1917); Min. Sci. Press, v. 115, p. 857-864 (1917)
8. Flagstaffite, a new mineral from Arizona: Am. Mineral., v. 5, p. 169-172 (1920)
9. The identity of flagstaffite and terpin hydrate: Am. Mineral., v. 6, p. 133-135 (1921)
10. Flagstaffite, a new Arizona mineral and its identity with terpin hydrate [abst.]: Science, new ser., v. 55, p. 543 (1922)
11. Copper pitch ore: Am. Mineral., v. 14, p. 313-318 (1929)
12. The relation of pyrite to wolframite: Am. Mineral., v. 15, p. 451-452 (1930)
13. Piedmontite in Arizona: Am. Mineral., v. 20, p. 679-692 (1935)

GUITERAS, J. R.

Gold mining and milling in the Black Canyon area, Yavapai County, Arizona: USBM, IC 6905, 51 p. (1936)

GULBRANDSEN, R. A. (*see* Creasey, S. C., 9)

GUSTAFSON, L. B.

Paragenesis and hypogene zoning at the Magma mine, Superior, Arizona: Harvard Univ., PhD Thesis (1962)

GUTSCHICK, R. C. (*see also* Easton, W. H.)

1. (and Easton, W. H.) Corals from the Redwall limestone (Mississippian) of Arizona [abst.]: Geol. Soc. Am. Bull., v. 53, no. 12, p. 1830 (1942)
2. The Redwall limestone (Mississipian) of Yavapai County, Arizona: Plateau, v. 16, no. 1, p. 1-11, illus., map (1943)
3. Redwall limestone of north-central Arizona [abst.]: Geol. Soc. Am. Bull., v. 58, no. 12, pt. 2, p. 1186 (1947)
4. Redwall limestone along the southwest margin of the Colorado Plateau, Arizona [abst.]: Geol. Soc. Am. Bull., v. 60, no. 12, pt. 2, p. 1893 (1949)

GUYTON, W. F.

(and Rose, N. A., and Tipton, R. J.) Report on the ground water in Arizona: App. A *of* The underground water resources of Arizona; Arizona Underground Water Commission, Phoenix, Ariz., 1st revision, p. 33-58, illus. (1953)

HACK, J. T.

1. The late Quaternary history of several valleys of northern Arizona (preliminary announcement): Mus. N. Ariz., Mus. Notes, v. 11, p. 68-73 (1939)
2. Dunes of the western Navajo country: Geog. Rev., v. 31, no. 2, p. 240-263, maps (1941)
3. Sedimentation and volcanism in the Hopi Buttes, Arizona: Geol. Soc. Am. Bull., v. 53, no. 2, p. 335-372, maps (1942)

HACKMAN, R. J. (*see also* Detterman, J. S., 5)
1. Photogeologic map, Agathla Peak-4 quadrangle, Navajo Indian Reservation, Navajo County, Arizona: USGS Trace Elements Memo. Rep. 412 p. (1952)
2. Photogeologic map of the Navajo Mountain-13 quadrangle, Kane and San Juan Counties, Utah, and Coconino County, Arizona: USGS Map I-184 (1956)
3. Photogeologic map of the Navajo Mountain-15 quadrangle, San Juan County, Utah, and Navajo County, Arizona: USGS Map I-185 (1956)
4. Photogeologic map of the Navajo Mountain-14 quadrangle, San Juan County, Utah, and Coconino County, Arizona: USGS Map I-238 (1957)
5. Photogeologic map of the Buckskin Gulch SW quadrangle, Kane County, Utah, and Coconino County, Arizona: USGS Map I-244 (1957)

HADLEY, R. F.
Influence of riparian vegetation on channel shape, northeastern Arizona: USGS Prof. Paper 424-C, p. 30-31 (1961)

HAFER, Claude
1. Mining in southwest Yavapai County, Arizona: Min. World, v. 34, p. 639-641 (1911)
2. Vulture mine and others in the Hassayampa: Min. World, v. 34, p. 1233-1234 (1911)
3. Copper Creek district of Arizona (Yavapai County): Engr. Min. Jour., v. 98, p. 1145 (1914)

HAFF, J. C. (*see also* Mayo, E. B., 2; Kiersch, G. A., 8, 9, 12, 13, 14)
1. Measured stratigraphic sections (Bidahochi formation): *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 3, p. 75-76, Univ. Ariz. Press, Tucson (1955)
2. (and Kiersch, G. A.) Crushed stone and manufactured aggregate: *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 3, p. 27-58, maps, Univ. Ariz. Press, Tucson (1955)

HAGER, Dorsey
1. Oil possibilities of the Holbrook area in northeast Arizona: private publ., 31 p. (1921); Min. and Oil Bull., v. 8, p. 23-26, 33-34, 71-74, 81, 94, 135-140 (1922)
2. The Holbrook area, Arizona: Min. Oil Bull., v. 8, p. 523 (1922)
3. Stratigraphy, northeast Arizona, southeast Utah: Min. and Oil Bull., v. 10, p. 135, 137, 139, 167, 383, 385, 423, 439 (1924)
4. Meteor Crater: Engr. Min. Jour.-Press, v. 121, p. 374 (1926)
5. Gas & Oil possibilities in northeast Arizona: Ariz. State Land Dept., Phoenix, 19 p. (1948)
6. Crater Mound (Meteor Crater), Arizona: Pop. Astron., v. 57, no. 9, p. 457-458 (1949); Meteor. Soc. Contrib., v. 4, no. 3, p. 223-224 (1949)
7. The search for gas and oil in Utah and northern Arizona: Mines Mag., v. 41, no. 10, p. 51-56, illus. (1951)
8. Crater Mound Arizona—a geologic feature [abst.]: Geol. Soc. Am. Bull., v. 63, p. 1362-1363 (1952)
9. Crater Mound (Meteor Crater), Arizona, a geologic feature: AAPG Bull., v. 37, no. 4, p. 821-857, illus., map (1953); [discussion]: no. 11, p. 2577-2580 (1953); v. 40, no. 1, p. 161-162 (1956)

HAINS, C. F.
(and Van Sickle, D. M., and Peterson, H. V.) Sedimentation rates in small reservoirs in the Little Colorado River Basin: USGS Water-Supply Paper 1110-D, p. 129-155, map (1952)

HAINS, C. H. (*see* Langbein, W. B., 1)

HALL, James
Geology and paleontology of the boundary: *in* Report on the United States and

Mexican boundary survey (Emory); 34th Cong., 1st sess., Sen. Ex. Doc. 108, H. Ex. Doc. 135, v. 1, pt. 2, p. 101-140, map (1857)

HALL, S. M.
Making of a great mine (United Verde): Out West, p. 3-26, (July, 1906)

HALLOCK, Charles
Physiography of the great Colorado Canyon: Am. Antiquity, v. 32, no. 4, p. 213-216 (1910)

HALPENNY, Leonard C. (*see also* Babcock, H. M., 2; Brown, S. C., 1, 2, 4; Coates, D. R., 6; Cushman, R. L., 3; Repenning, C. A., 1; Turner, S. F., 2, 3, 17, 22; Whitcomb, H. A., 2; Wolcott, H. N., 5)

1. (and others) Ground-water resources of the Duncan Basin, Arizona: USGS Mimeo. Rep., 21 p., map (1946)
2. (and Hem, J. D., and Jones, I. I.) Definitions of geologic, hydrologic, and chemical terms used in reports on the ground-water resources and problems of Arizona: USGS Mimeo. Rep., 29 p. (1947)
3. (and Cushman, R. L.) Ground-water resources and problems of Cactus Flat-Artesian, San Simon Basin, Arizona, with section on quality of water by Hem, J. D.: USGS Mimeo. Rep., 14 p. (1947)
4. (and Brown, S. C.) Water-supply investigation at Chinle, Navajo Indian Reservation, Arizona: USGS Mimeo. Rep., 10 p. (1948)
5. (and Brown, S. C.) Water-supply investigation of Fort Defiance area, Navajo Indian Reservation, Apache County, Arizona, with a section on quality of water by Hem, J. D.: USGS Mimeo. Rep., 11 p. (1949)
6. Preliminary report on the ground-water resources of the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah: USGS Mimeo. Rep., 13 p. (1951); N. Mex. Geol. Soc., Guidebook 2nd Field Conf., p. 147-151 (1951)
7. (and Harshbarger, J. W.) Ground-water resources of the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah [abst.]: Geol. Soc. Am. Bull., v. 63, p. 1330 (1952)
8. (and Turner, S. F.) Ground-water problems of Queen Creek: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 9-16, illus. (1952)
9. (and others) Groundwater in the Gila River Basin and adjacent areas, Arizona—a summary: USGS Open-file Rep., 224 p., maps (1952)
10. Utilization of ground water in Arizona: USGS Open-file Rep., 2 p. (1952)
11. Development of agriculture as related to natural factors: USGS Open-file Rep., p. 3-5 (1952)
12. Development of irrigation in Arizona: USGS Open-file Rep., p. 5-7 (1952)
13. Collection of ground water data: USGS Open-file Rep., p. 27-33 (1952)
14. (and others) Problems relating to use of ground water: USGS Open-file Rep., p. 203-206 (1952)
15. (and Cushman, R. L., and Feth, J. H.) Answers to 24 questions (on Central Arizona) asked by the Hon. John R. Murdock, Member of Congress from Arizona, by letter to the Director, U.S. Geol. Survey: USGS Ground Water Branch Open-file Rep., 13 p. (1952)
16. (and Cushman, R. L.) Pumpage and ground-water levels in Arizona in 1951: USGS Water-Supply Paper 1196, p. 3-40 (1954)
17. (and others) Pumpage and ground-water levels in Arizona in 1952: USGS Water-Supply Paper 1226, p. 1-42 (1955)
18. (and others) Pumpage and ground-water levels in Arizona in 1953: USGS Water-Supply Paper 1270, p. 3-41 (1956)

HALVA, C. J. (*see also* Damon, P. E., 2, 3)
A geochemical investigation of "basalts" in southern Arizona: Univ. Ariz., MS Thesis, 117 p. (1961)

HAMIL, J. H.
The Globe-Miami district; "The country with the copper bottom": Ariz. Min. Jour., v. 5, no. 23, p. 9, 10, 63 (1922)

HAMILTON, J. C. (*see* Petersen, R. G., 1; Myers, A. T.)

HAMILTON, P.
The resources of Arizona: 1st ed., Prescott, Ariz. (1881); 2nd ed.: San Francisco, (1883); 3rd ed.: (1884)

HAMILTON, P. K.
(and Kerr, P. F.) Umohoite from Cameron, Arizona: Am. Mineral., v. 44, p. 1248-1260, illus. (1959)

HAMILTON, Warren
Geologic map of the Big Maria Mountains NE quadrangle, Riverside County, California, and Yuma County, Arizona: USGS Map GQ-350 (1964)

HAMMER, D. F.
1. Geology and ore deposits of the Jackrabbit area, Pinal County, Arizona: Univ. Ariz., MS Thesis, 156 p. (1961)
2. (and Webster, R. N., and Lamb, D. C.) Some geologic features of the Superior area, Pinal County, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 148-153 (1962)

HAMMONS, Lee
Mineral collecting in Mohave County: Ariz. Highways, v. 37, no. 5, p. 38 (1962)

HANCE, J. H.
Potash in western saline deposits: USGS Bull. 540, p. 469 (1914)

HANDVERGER, P. A.
Geology of the Three R mine, Palmetto mining district, Santa Cruz County, Arizona: Univ. Ariz., MS Thesis, 70 p. (1963)

HANKS, H. G.
On certain magnetic rocks of Arizona and California: San Francisco Microscopical Society, San Francisco, 4 p. (1890)

HANNIBAL, H.
A synopsis of the Recent and Tertiary fresh water mollusca of the Californian province, based upon an ontogenetic classification: Malacological Society of London Proceedings, London, v. 10, p. 112-211 (1912)

HANSEN, B. E. (*see* Wilson, D.)

HANSEN, M. G.
1. Nonmetallics in Yavapai County, Arizona: Min. Jour., v. 13, no. 14, p. 5-6 (1929)
2. Geology and ore deposits of the United Verde mine: Min. Cong. Jour., v. 16, p. 306-312 (1930)
3. Diamond drilling at the United Verde mine: USBM, IC 6708, 19 p. (1933)

HAPP, S. C.
Engineering geology reference list: Geol. Soc. Am. Bull., v. 66, p. 993-1030 (1955)

HARBECK, G. E. (*see also* Thomas, N. O.)
(and Kohler, M. A., Koberg, G. E., and others) Water-loss investigations; Lake Mead studies: USGS Prof. Paper 298, 100 p. (1958)

HARBOUR, J.
Sedimentology and stratigraphy of the basin-fill sediments in the Safford Valley: Ariz. Geol. Soc. Dig., v. 3, p. 131-132 (1960)

HARDER, E. C.
1. Manganese deposits of the United States: USGS Bull. 380, p. 274 (1909); Bull. 427, p. 151-152 (1910)

2. (and Hewett, D. F.) Recent studies of domestic managanese deposits: AIME Trans., v. 63, p. 3-50 (1920)

HARDING, Norman
(and Miller, Roswell, 3rd) A gravity survey of Meteor Crater, Arizona [abst.]: Geophysics, v. 18, no. 3, p. 742 (1953)

HARDT, W. F. (*see also* Cooley, M. E., 9; Davis, G. E.; Kister, L. R., 1)
1. (and Cahill, J. M., and Booher, M. B.) Annual report on ground water in Arizona—Spring 1957 to Spring 1958: Ariz. State Land Dept. Water Res. Rep. 5, 60 p., illus. (1958)
2. (and Stulik, R. S., and Booher, M. B.) Annual report on ground water in Arizona—Spring 1958 to Spring 1959: Ariz. State Land Dept. Water Res. Rep. 6, 61 p., illus. (1959)
3. (and Stulik, R. S., and Booher, M. B.) Annual Report on ground water in Arizona—Spring 1959 to Spring 1960: Ariz. State Land Dept. Water Res. Rep. 7, 73 p., illus. (1960)

HARDWICK, W. R.
1. (and Sierakoski, J.) Mining methods and practices at the Johnson Camp copper-zinc mine, Coronado Copper and Zinc Co., Cochise County, Arizona: USBM, IC 7788, 27 p., illus. (1957)
2. Block-caving mining methods and costs, Bagdad mine, Bagdad Copper Corp., Yavapai County, Arizona: USBM IC 7890, 28 p., illus. (1959)
3. Open-pit copper mining methods, Morenci Branch, Phelps Dodge Corp., Greenlee County, Arizona: USBM, IC 7911, 67 p., illus. (1959)
4. (and Jones, E. L., 3rd) Open-pit copper mining methods and costs at the Bagdad mine, Bagdad Copper Corp., Yavapai County, Arizona: USBM, IC 7929, 30 p., illus. (1959)
5. Open-pit copper mining methods at New Cornelia Branch, Phelps Dodge Corporation Pima County, Arizona: USBM, IC 7938, 83 p., illus. (1960)
6. (and Stover, M. M.) Open-pit copper mining methods and practices, Copper Cities Division, Miami Copper Co., Gila County, Arizona: USBM, IC 7985, 51 p., illus. (1960)
7. Open-pit copper mining and concentrating methods and costs, Silver Bell Unit, American Smelting and Refining Company, Pima County, Arizona: USBM, IC 8153, 72 p. (1963)
8. Mining methods and costs, Inspiration Consolidated Copper Company, Open-pit mine, Gila County, Arizona: USBM, IC 8154, 65 p. (1963)

HARKER, Alfred
Physical geology in the basin of the Colorado: Nat. Sci., v. 1, p. 205-210 (1892)

HARNESS, C. L.
Strontium minerals: USBM, IC 7200, 17 p. (1942)

HARPER, W. G. (*see* Poulson, E. N., 2)

HARRELL, M. A.
(and Eckel, E. B.) Ground-water resources of the Holbrook region, Arizona: USGS Water-Supply Paper 836, p. 19-105, maps (1939)

HARRER, C. M.
Reconnaissance of iron resources in Arizona: USBM, IC 8236, 204 p. (1964)

HARSHBARGER, J. W. (*see also* Akers, J. P., 2, 3, 10; Brown, R. H.; Halpenny, L. C., 7; Repenning, C. A., 4)
1. The upper Jurassic stratigraphy of Black Mesa, Arizona: Univ. Ariz., MS Thesis, 117 p., maps (1948); [abst.]: Geol. Soc. Am. Bull., v. 59, no. 12, pt. 2, p. 1372 (1948)
2. Petrology and stratigraphy of upper Jurassic rocks of central Navajo Reservation, Arizona: Univ. Ariz., PhD Thesis, 216 p., maps (1949)

3. (and Repenning, C. A., and Jackson, R. L.) Jurassic stratigraphy of the Navajo country: N. Mex. Geol. Soc., Guidebook of the San Juan Basin, p. 95-99, illus. (1951)
4. The Cow Springs sandstone formation of the Black Mesa basin (Arizona) and adjoining areas [abst.]: AAPG Bull., v. 36, p. 963-964 (1953)
5. (and Repenning, C. A., and Callahan, J. T.) The Navajo Country, Arizona-Utah-New Mexico: *in* Subsurface facilities of water management and patterns of supply—type area studies; U. S. Cong., House Committee on Interior and Insular Affairs, Chapter 7, p. 105-219 (1953)
6. (and Repenning, C. A.) Water resources of the Chuska Mountains area, Navajo Indian Reservation, Arizona and New Mexico, with a section on quality of water by Hatchett, J. L.: USGS Circ. 308, 16 p., illus., map (1954)
7. Groundwater in the Navajo Country: Science, v. 119, p. 421 (1954)
8. (and others) Annual report on ground water in Arizona—Spring 1956 to Spring 1957: Ariz. State Land Dept. Water Res. Rep. 2, 42 p., illus. (1957)
9. (and Repenning, C. A., and Irwin, J. H.) Stratigraphy of the uppermost Triassic and the Jurassic rocks of the Navajo Country (Colorado Plateau): USGS Prof. Paper 291, 74 p., illus., maps (1957); [Summary]: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 98-114, illus. (1958)
10. Use of ground water in Arizona: *in* Climate and man in the Southwest—a symposium; Univ. Ariz. Bull., v. 28, no. 4, p. 51-68, illus. (1958)
11. Geohydrology of Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1723-1724 (1959)
12. Geohydrology of arid lands (Arizona—a case study): USGS Ground-Water Branch Open-file Rep., 28 p. (1959)
13. (and Repenning, C. A., Callahan, J. T., and others) Well records and table of chemical analysis for report, The geology and ground-water resources of the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah: USGS Open-file Rep., 189 tables (1960)
14. (Contributor to section on water): *in* Arizona—its people and resources; Univ. Ariz. Press, Tucson, Ariz. (1960)
15. Geologic framework and hydrology of intermontane valleys of the Great Basin [abst.]: Geol. Soc. Am. Bull., v. 71, no. 12, pt. 2, p. 1881-1882 (1960)
16. Maps of Navajo Indian Reservation and vicinity, Arizona: USGS Open-file Rep. (1961)

HARSHMAN, E. N. (*see also* Short, M. N., 4)
Geology of the Belmont-Queen Creek district, Superior, Arizona: Univ. Ariz., PhD Thesis, 168 p., maps (1939)

HART, L. H.
Mesothermal copper veins and replacements: *in* Ore deposits of the Western States; AIME Lindgren volume, p. 603-616 (1933)

HART, O. M.
1. (and Hetland, D. L.) Preliminary report on uranium-bearing deposits in Mohave County, Arizona: USAEC, RME-4026, 48 p., illus. (1953)
2. Uranium investigations in Mohave County, Arizona: USAEC, RME-2029, 18 p. (1955)

HARTMAN, E. W.
Equipment of the Dreamy Draw mine: Min. Jour., v. 14, no. 3, p. 38-39 (1930)

HASKELL, H. S. (*see also* Kiersch, G. A., 14)
(and Sayner, D. B.) Gold: *in* Mineral Resources Navajo-Hopi Indian Reservation, Arizona-Utah, v. 1, p. 33-38, maps, illus., Univ. Ariz. Press, Tucson (1956)

HASTINGS, E. F.
Mining and milling methods at the Pilgrim mine, Chloride, Arizona: USBM, IC 6945, 18 p. (1937)

HASTINGS, J. B.
Meteor Crater: Min. Sci. Press, v. 98, p. 523-525 (1909)

HATCHETT, J. L. (*see* Kister, L. R., 2)

HATELY, J. G.
Copper mining on the Colorado River: Min. World, v. 26, p. 809, map (1907)

HATFIELD, K. G. (*see also* Ellsworth, P. C.)
(and Maise, C. R.) Geologic reconnaissance of the Defiance Uplift, Apache County, Arizona: USAEC, RME-71, 14 p., map (1954)

HATMAKER, Paul
1. Diatomite: USBM, IC 6391, 20 p. (1931)
2. Pumice and pumicite: USBM, IC 6560, 23 p. (1932)

HAURY, E. W.
1. A possible Cochise-Mogollon-Hohokam sequence: Am. Philo. Soc. Proc., v. 86, no. 2, p. 260-263, illus. (1943)
2. The stratigraphy of Ventana Cave, Arizona: Am. Antiquity, v. 8, no. 3, p. 218-223, illus. (1943)
3. The stratigraphy and archaeology of Ventana Cave: Univ. Ariz. Press, Univ. N. Mex. Press, 599 p. (1950)
4. The Naco Mammoth: Kiva, v. 18, no. 3-4 (1952)
5. Discovery of the Naco mammoth and associated projectle points: Pt. 1 *of* Artifacts with mammoth remains, Naco, Arizona; Am. Antiquity, v. 19, no. 1, p. 1-14, illus. (1953)
6. The Lehner mammoth site, southeastern Arizona: Am. Antiquity, v. 25, no. 1, p. 2-30 (1959)
7. Association of fossil fauna and artifacts of the Sulfur Spring stage, Cochise culture: Am. Antiquity, v. 25, no. 4, p. 609-610 (1960)

HAURY, P. S. (*see also* Denton, T. C., 1; Stewart, L. A., 4)
1. Exploration of the Mohawk zinc prospect, Pima County, Arizona: USBM, RI-3958, 6 p. (1946)
2. Zinc-lead mines in the Wallapai mining district, Mohave County, Arizona: USBM, RI 4101, 43 p., map (1947)

HAVENOR, K. C. (*see also* Kottlowski, F. E., 4)
1. Pennsylvanian framework of sedimentation in Arizona: Univ. Ariz., MS Thesis, 73 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 48 (1958)
2. (and Pye, W. D.) Pennsylvanian paleogeography of Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 78-81, illus. (1958)
3. The Pennsylvanian System of southeastern Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 34-37 (1959)

HAVENS, R. (*see* Farnham, L. L. 1; Potter, G. M.)

HAY, O. P.
Descriptions of species of Pleistocene vertebrata, types or specimens of most of which are preserved in the U. S. National Museum: U. S. Natl. Mus. Proc., v. 59, p. 599-642 (1921)

HAYDEN, F. V.
United States geological and geographical surveys of the territories; geological and geographical atlas of Colorado and portion of adjacent territory, corrected to date: Folio 22 (detailed geologic sheets, by F. M. Endlich, W. H. Holmes, A. C. Peale, A. R. Marvine, and C. A. White) Washington (1881)

HAYES, C. W.
Iron ores of the United States: USGS Bull. 394 (Ariz., p. 102-103), (1909)

HAYES, P. T.
(and Landis, E. R.) Geologic map of the southern part of the Mule Mountains, Cochise County, Arizona: USGS Map I-418 (1964)

HAZEN, G. E.
(and Turner, S. F.) Geology and ground-water resources of the upper Pinal Creek area, Arizona: USGS Mimeo. Rep., 55 p., map (1946)

HAZEN, S. W., Jr.
Statistical analysis of churn-drill and diamond-drill sample data from the San Manuel copper mine, Arizona: USBM, RI 6216, 124 p. (1963)

HAZLEWOOD, R. M. (*see* Black, R. A., 2)

HEAD, R. E.
1. Artillery Peak ore (microscopic studies, analyses): USBM, RI 3560, p. 6-7 (1941)
2. Valazza ore, Cottonwood (microscopic studies, analyses): USBM, RI 3560, p. 10 (1941)

HEADDEN, W. P.
Mineralogical notes: Colo. Sci. Soc. Proc., v. 7, p. 141-150 (1903)

HEATON, R. L.
Late Paleozoic and Mesozoic history of Colorado and adjacent areas: AAPG Bull., v. 34, no. 8, p. 1659-1698 (1950)

HECK, N. H.
1. Earthquake history of the United States exclusive of the Pacific region: U. S. Coast and Geodetic Survey Special Pub., 149, 61 p. (1928)
2. Earthquakes and the western Mountain region: Geol. Soc. Am. Bull., v. 49, p. 1-21 (1938)

HEDBURG, Edward
1. The Calizona placers, Arizona: Min. World, v. 31, p. 138 (1909)
2. The Greens Valley mining district, Arizona: Min. World, v. 31, p. 1245-1246 (1909)

HEDGE, Carl E. (*see also* Damon, P. E., 4)
Sodium-potassium ratios in muscovites as a geothermometer: Univ. Ariz., MS Thesis, 29 p. (1961)

HEDGES, J. H. (*see* Stewart, L. A., 2)

HEINDL, L. A. (*see also* Feth, J. H., 8)
1. Exploratory deep wells of the state of Arizona as of January 1, 1951: Ariz. State Land Dept. Mimeo. Rep., 17 p. (1951)
2. Occurrence of Helium in northeastern Arizona [abst.]: Geol. Soc. Am. Bull., v. 63, no. 12, pt. 2, p. 1331 (1952)
3. Gila conglomerate: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 112-116, illus., map (1952)
4. (and DeCook, K. J.) Principles of ground water occurrence: USGS Open-file Rep., p. 8-22 (1952)
5. Upper San Pedro basin (groundwater), Cochise County: USGS Open-file Rep., p. 69-86 (1952)
6. Lower San Pedro (groundwater): USGS Open-file Rep., p. 87-100 (1952)
7. Cenozoic alluvial deposits in the upper Gila River drainage basin, Arizona and New Mexico [abst.]: Geol. Soc. Am. Bull., v. 65, no. 12, p. 1262 (1954)
8. Memorandum on geology and groundwater resources in the vicinity of Oracle, Pinal County, Arizona: USGS Mimeo. Rep., 11 p., illus. (1955)
9. Ground-water conditions between Oracle and Oracle Junction, Pinal County, Arizona: USGS Ground-Water Branch Mimeo Rep., 5 p. (1955)
10. (and Feth, J. H.) Piping and earthcracks—a discussion: Am. Geophys. Union Trans., v. 36, no. 2, p. 342-345 (1955)
11. Stratigraphic relationships within Cenozoic alluvial deposits of the upper Gila River drainage [abst.]: USGS Ground-Water Branch Open-file Rep., 1 p. (1957)

12. Cenozoic alluvial deposits in the vicinity of Mammoth, Pinal County, Arizona [abst.] USGS Ground-Water Branch Open-file Rep., 2 p. (1957)
13. Cenozoic alluvial deposits of the upper Gila River area, New Mexico and Arizona: Univ. Ariz., PhD Thesis, 249 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 49 (1958)
14. Geology of the Point of Pines area, San Carlos Indian Reservation, Graham County, Arizona: Ariz. Geol. Soc. Dig., v. 1, p. 10-11 (1958)
15. Geology of the San Xavier Indian Reservation, Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 152-159 (1959)
16. Stratigraphic relationships of the Whitetail and Gila conglomerates near Ray, Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1724-1725 (1959)
17. Geology of the lower Bonita Creek area, a preliminary report: Ariz. Geol. Soc. Dig., v. 3, p. 35-39 (1960)
18. (and Cosner, O. J.) Hydrologic data and drillers' logs, Papago Indian Reservation, Arizona: USGS Open-file Rep., 23 p. (1960)
19. Cenozoic geology of the Papago Indian Reservation, Pima, Maricopa, and Pinal Counties, Arizona (A preliminary summary): Ariz. Geol. Soc. Dig., v. 3, p. 31-34 (1960)
20. (and Lance, J. F.) Topographic, physiographic, and structural subdivisions of Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 12-18 (1960)
21. (and Armstrong, C. A.) The geology and ground-water conditions in the Gila Bend Indian Reservation, Maricopa County, Arizona: USGS Ground-Water Branch Open-file Rep., 88 p., illus. (1960)
22. (and McCullough, R. A.) Geology and the availability of water in the lower Bonita Creek area, Graham County, Arizona: USGS Water-Supply Paper 1589, 56 p., illus. (1961)
23. (and Cosner, O. J.) Hydrologic data and drillers' logs, Papago Indian Reservation, Arizona, with a section on chemical quality of the water by Kister, L. R.: Ariz. State Land Dept. Water Res. Rep. 9, 116 p., illus. (1961)
24. Cenozoic geology in the Mammoth area, Pinal County, Arizona: USGS Ground-Water Branch Open-file Rep., 97 p., illus. (1961)
25. (and others) Summary of occurrence of ground water on the Papago Indian Reservation, Arizona: USGS Ground-Water Branch Open-file Rep., 24 p. (1961)
26. (and Cosner, O. J., Page, H. G., Armstrong, C. A., and Kister, L. R.) Summary of occurrence of ground water on the Papago Indian Reservation: USGS Hydro. Inv. Atlas HA-55 (1962)
27. Ground-water shadows and buried topography, San Xavier Indian Reservation, Pima County, Arizona: USGS Prof. Paper 450-C, Art. 109, p. 120-122 (1962)
28. Should the term "Gila Conglomerate" be abandoned?: Ariz. Geol. Soc. Dig., v. 5, p. 73-88 (1962)
29. Cenozoic geology of Arizona—a 1960 résumé: Ariz. Geol. Soc. Dig., v. 5, p. 9-24 (1962)
30. Cenozoic geology in the Mammoth area, Pinal County, Arizona: USGS Bull. 1141-E, 41 p. (1963)
31. (and Armstrong, C. A.) Geology and ground-water conditions in the Gila Bend Indian Reservation, Maricopa County, Arizona: USGS Water-Supply Paper 1647-A, 48 p. (1963)
32. (and McClymonds, N. E.) Younger Precambrian formations and the Bolsa (?) quartzite of Cambrian age, Papago Indian Reservation, Arizona: USGS Prof. Paper 501-C, p. 43-49 (1964)

HEINEMAN, R. E. S. (*see also* Elsing, M. J., 2)
1. The geology and ore deposits of the Johnson mining district, Arizona: Univ. Ariz., MS Thesis, 45 p., map (1927)

2. (and Brady, L. F.) The Winona meteorite (Arizona): Am. Jour. Sci., 5th ser., v. 18, p. 477-486 (1929)
3. A note on the ocurrence of monazite in western Arizona: Am. Mineral., v. 15, p. 536-537 (1930)
4. An Arizona gold nugget of unusual size: Am. Mineral., v. 16, p. 267-269 (1931)
5. On the so-called Elden meteorite: Am. Jour. Sci., v. 23, p. 417-420 (1932)
6. Sugarloaf Butte alunite: Engr. Min. Jour., v. 136, p. 138-139 (1935)
7. Summary of mining history in Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 26-32, production graphs (1938)
8. Alunite: Univ. Ariz., Ariz. Bur. Mines Circ. 2, 1 p. (1940)
9. Quartz: Univ. Ariz., Ariz. Bur. Mines, Circ. 7, 2 p. (1941)

HEINRICH, E. W. (*see also* Frondel, C., 2)
Some rare-earth mineral deposits in Mohave County, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 167, 22 p., illus. (1960)

HEINRICHS, W. E., Jr. (*see also* Thurmond, R. E., 1)
1. (and Thurmond, R. E.) A case history of the geophysical discovery of the Pima mine, Pima County, Arizona: Geophysics Case Hist., v. 2, p. 600-612, illus. (1956); [abst.]: Geophysics, v. 19, no. 3, p. 633 (1954)
2. (and Seward, F. A., Jr.) Geophysics in ground-water studies in the Southwest: Ariz. Geol. Soc. Dig., v. 6, p. 55-60 (1963)

HEM, J. D. (*see also* Babcock, H. M., 3, 5, 6; Cushman, R. L., 1; Feth, J. H., 11, 14, 16; Halpenny, L. C., 2; Jones, R. S.; McDonald, H. R., 3, 4; Morrison, R. B., 2; Repenning, C. A., 1; Whitcomb, H. A., 2)
1. Quality of water of the Gila River basin above Coolidge Dam, Arizona: USGS Water-Supply Paper 1104, 2230 p., illus. (1950)
2. Quality of ground water: USGS Open-file Rep., p. 22-26 (1952)
3. Quality of water in lower Santa Cruz area: USGS Open-file Rep., p. 135-136 (1952)
4. The "Salt Balance" concept and its application to the Salt River Valley area: USGS Open-file Rep., p. 147-150 (1952)

HEMBREE, C. H. (*see* Iorns, W. V.)

HEMPHILL, W. R. (*see also* Witkind, I. J., 18)
Photogeologic map of the Fredonia NW quadrangle, Mohave County, Arizona: USGS Map I-133 (1956)

HENDERSON, C. W.
The history and influence of mining in the western United States: *in* Ore deposits of the Western States; AIME Lindgren Volume, p. 730-784 (1933)

HENDERSON, E. P. (*see also* Ksanda, C. J.)
1. (and Perry, S. H.) The Pima County meteorite: U.S. Natl. Mus. Proc., v. 99, no. 3241, p. 353-355, illus. (1949)
2. (and Perry, S. H.) A reinvestigation of the Weaver Mountains, Arizona, meteorite: Pop. Astron., v. 59, no. 5, p. 263-266, illus. (1951); Meteor. Soc. Contrib., v. 5, no. 1, p. 50-53, illus. (1951)

HENDERSON, Junius
Some new Mesozoic mollusca from the Rocky Mountain region and Arizona: Jour. Paleo., v. 8, p. 259-263 (1934); [abst.]: Geol. Soc. Am. Proc. 1933, p. 371 (1934)

HENDERSON, P. C.
1. A history of the Prescott Bradshaw mining districts: Univ. Ariz., MA Thesis, 155 p. (1958)
2. The Peck mine, silver bonanza in the Bradshaw Mountains: Arizona and the West, v. 4, no. 3, p. 227-236 (1962)

HENDERSON, R. (*see* Hunter, A. M.)

HENDERSON, R. G. (*see* Vacquier, V.)

HENDRICKS, E. L.
1. (and Williams, K., and Bowie, J. E.) Progress report in use of water by riparian vegetation, Cottonwood Wash, Arizona: USGS Circ. 434, 11 p. (1960)
2. Compilation of records of surface waters of the United States, October 1950 to September 1960; Part 9, Colorado River Basin: USGS Water-Supply Paper 1733, 586 p. (1964)

HENDRICKS, T. A. (*see* Andrews, D. A., 2)

HENDRICKSON, G. E.
Notes on sources of ground-water recharge in the Lower Colorado River area as indicated by chemical character of the water [abst.]: Geol. Soc. Am. Sp. Paper 73, p. 170 (1963)

HENRICH, Carl
1. The copper ore deposits and the copper production near Clifton, Arizona: Engr. Min. Jour., v. 39, p. 68-69 (1885)
2. The copper ore deposits near Morenci, Arizona: Engr. Min. Jour., v. 43, p. p. 202-203, 219-220 (1887)

HERNLUND, R. W. (*see* Thurmond, R. E., 4)

HERNON, R. M. (*see also* Moore, B. N., 3)
1. Pegmatite rocks of the Catalina-Rincon Mountains, Arizona: Univ. Ariz., MS Thesis, 65 p., map (1932)
2. The Paradise formation and its fauna: Univ. Ariz., PhD Thesis, 107 p. (1934); Jour. Paleo., v. 9, p. 653-696 (1935)
3. Cerbat Mountains: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 110-117, maps (1938)

HERRICK, R. L.
1. Ray Consolidated mines, a low-grade copper property at Ray, Arizona: Mines and Minerals, v. 29, p. 544-547 (1909)
2. The Miami Copper mines, Arizona: Mines and Minerals, v. 30, p. 80-84 (1909)
3. Mining at Miami, Arizona: Mines and Minerals, v. 30, p. 751-756, map (1910)
4. Superior and Boston mine: Mines and Minerals, v. 31, p. 112-116 (1910)

HERRING, B. F. (*see* Kaiser, E. P., 4)

HESS, F. L.
1. Notes on a wolframite deposit in the Whetstone Mountains, Arizona: USGS Bull. 380, p. 164-165 (1909); Min. World, v. 31, p. 748 (1909)
2. Tungsten minerals and deposits: USGS Bull. 652, 85 p. (1917)
3. (and Larsen, E. S.) Contact-metamorphic tungsten deposits of the United States: USGS Bull. 725, p. 260 (1921)
4. Molybdenum deposits, a short review: USGS Bull. 761, 35 p. (1924)
5. Uranium and radium sedimentary deposits: *in* Ore deposits of the Western States; AIME Lindgren Volume, p. 455-480 (1933)
6. Useful minerals in pegmatites: *in* Ore deposits of the Western States; AIME Lindgren Volume, p. 528-536 (1933)

HETLAND, D. L. (*see* Davis, D. L.; Hart, O. M., 1)

HEVLY, R. H.
1. (and Martin, P. S.) Geochronology of pluvial Lake Cochise, southern Arizona: Ariz. Acad. Sci. Jour., v. 2, no. 1, p. 24-32 (1961)
2. Pollen analysis of Laguna Salada: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 115-118 (1962)

HEWETT, D. F. (*see also* Harder, E. C., 2)
1. Carnotite discovered near Aguila, Arizona: Engr. Min. Jour.-Press, v. 120, p. 19 (1925)

2. Central Arizona holds deposits of carnotite: Ariz. Min. Jour., v. 9, no. 7, p. 49-50 (1925)
3. (and Rove, O. N.) Occurrence and relations of alabandite: Econ. Geol. v. 25, p. 36-56 (1930)
4. Sedimentary manganese deposits: *in* Ore deposits of the Western States; AIME Lindgren Volume, p. 489 (1933)
5. Manganese in western hydrothermal ore deposits: *in* Ore deposits of the Western States; AIME Lindgren Volume, p. 671-682 (1933)
6. (and Callaghan, E., Moore, B. N., Nolan, T. B., Ruby, W. W., and Schaller, W. T.) Mineral resources of the region around Boulder Dam: USGS Bull. 871, 197 p., maps (1936)
7. (and Fleischer, M.) Deposits of the manganese oxides: Econ. Geol., v. 55, no. 1, p. 1-55 (1960)
8. (and Fleischer, M., and Conklin, N. M.) Deposits of the manganese oxides; supplement: Econ. Geol., v. 58, no. 1, p. 1-51 (1963)

HEWITT, W.
The evolution of the Grand Canyon of the Colorado: Liverpool Geol. Assoc. Jour., v. 9, p. 49-55 (1889)

HEYL, A. V. (*see also* McKnight, E. T., 3)
(and Bozion, C. N.) Oxidized zinc deposits of the United States; Part I, General Geology: USGS Bull. 1135-A, 52 p., map (1962)

HEYLMUN, E. B., Jr. (*see also* Stokes, W. L., 9)
Kanab — the oil signs are there: Oil and Gas Jour., v. 58, no. 24, p. 168-171 (1960)

HEYMAN, A. M.
Geology of the Peach-Elgin copper deposit, Helvetia district, Arizona: Univ. Ariz., MS Thesis, 66 p., map (1958); [abst.]; Ariz. Geol. Soc. Dig., v. 1, p. 49-50 (1958)

HIBBARD, C. W.
(and Wright, B. A.) A new Pleistocene bighorn sheep from Arizona: Jour. Mammalogy, v. 37, no. 1, p. 105-107, illus. (1956)

HICKEY, J. J.
The ideal flow field in a small watershed and its relation to the drainage network: Univ. Ariz., MS Thesis, 32 p. (1964)

HIGDON, C. E.
Geology and ore deposits of the Sunshine area. Pima County, Arizona: Univ. Ariz., MS Thesis, 25 p., maps (1933)

HIGGINS, Edwin
1. Copper deposits of the Globe-Kelvin districts: Engr. Min. Jour., v. 89, p. 769-772, 813-816, 870-874 (1910)
2. Copper deposits of northern Yuma County, Arizona: Min. World, v. 33, p. 855-857, 903, 904, 949-951 (1910)
3. Copper Creek basin, Arizona: Engr. Min. Jour., v. 91, p. 270-273 (1911)
4. The Vekol copper deposits (Pinal County): Engr. Min. Jour., v. 91, p. 473-474 (1911)

HILDEBRAND, F. A. (*see* Faick, J. N., 2)

HILL, Alexander
The Ray copper mines, Arizona: Engr. Min. Jour., v. 69, p. 587-588 (1900)

HILL, D.
Some Ordovician corals from New Mexico, Arizona, and Texas: N. Mex. Bur. Mines Miner. Res. Bull. 64, 25 p., illus. (1959)

HILL, G. F.
Turquoise; its history and significance in the Southwest: Univ. Ariz., MS Thesis, 210 p., map (1938)

HILL, J. M. (*see also* Schrader, F. C., 4)
1. Notes on the placer deposits of Greaterville, Arizona: USGS Bull. 430, p. 11-22, map (1910)
2. Note on the occurrence of tungsten minerals near Calabasas, Arizona: USGS Bull. 430, p. 164-166 (1910)
3. Tungsten minerals in Arizona: Min. World, v. 33, p. 148 (1910)
4. The mining districts of the western United States, with a geologic introduction by Waldemar Lindgren: USGS Bull. 507, p. 54-76, map (1912)
5. Copper deposits of the White Mesa district, Arizona: USGS Bull. 540, p. 159-163 (1914)
6. The Grand Gulch mining region, Mohave County, Arizona: USGS Bull. 580, p. 39-58, map (1914)

HILL, M. E. (*see* Dempsey, W. J., 8, 12, 13, 14)

HILL, M. J. (*see* Moody, J. D.)

HILLEBRAND, J. R.
1. Geology and ore deposits in the vicinity of Putnam Wash, Pinal County, Arizona: Univ. Ariz., MS Thesis, 94 p., map (1953)
2. A suggested source for the thiophile elements of the Tertiary ore deposits of the Southwest: Econ. Geol., v. 49, no. 8, p. 863-876 (1954)

HILLEBRAND, W. F. (*see also* Lindgren, W., 4)
1. Emmonsite, a ferric tellurite (Tombstone): Colo. Sci. Soc. Proc., v. 2, p. 20-23 (1886)
2. Analyses of three descloizites from new localities: Am. Jour. Sci. 3rd ser., v. 37, p. 434-439 (1889); Colo. Sci. Soc. Proc., v. 3, p. 193-199 (1890)

HILLS, R. C.
1. (Crystals of vanadinite from Silver district, Arizona): Colo. Sci. Soc. Proc., v. 3, p. 257 (1891)
2. Pseudomorphous crystals of malachite after azurite from Bisbee, Arizona: Colo. Sci. Soc. Proc., v. 3, p. 258 (1891)

HINCKLEY, D. N.
1. Reconnaissance of the Cameron area, Coconino County, Arizona: USAEC, RME-81 (revised) 21 p., illus., map (1955)
2. An investigation of the occurrence of uranium at Cameron, Arizona: Univ. Utah, MS Thesis (1957)

HINDS, N. E. A. (*see also* Stoyanow, A. A., 7)
1. Researches on Algonkian formations of Grand Canyon National Park: Carnegie Inst. Wash. Yearbook 32, p. 325-358 (1933); Yearbook 34, p. 326-329 (1935); Yearbook 35, p. 331-333 (1936)
2. Ep-Archean and ep-Algonkian intervals in western North America: Carnegie Inst. Wash. Pub. 463, p. 1-52 (1935); [abst.]: Geol. Soc. Am. Proc. 1934, p. 319-320 (1935)
3. Uncompahgran and Beltian deposits in western North America: Carnegie Inst. Wash. Pub. 463, pt. 2, p. 53-136 (1936)
4. Cambrian-Algonkian unconformity in western North America [abst.]; Geol. Soc. Am. Proc. 1935, p. 353-354 (1936)
5. Basal Cambrian contacts in western North America [abst.]: Geol. Soc. Am. Proc. 1936, p. 299 (1937)
6. Pre-Cambrian geology in western North America [abst.]: Geol. Soc. Am. Proc. 1936, p. 305-306 (1937)
7. Algonkian [abst.]: Geol. Soc. Am. Proc. 1936, p. 306 (1937)
8. Pleistocene gravels in the Grand Canyon of the Colorado River [abst.]: Geol. Soc. Am. Proc. 1936, p. 328-329 (1937)
9. Researches on Algonkian formations: Carnegie Inst. Wash. Yearbook 36, p. 348-349 (1937); Yearbook 37, p. 358 (1938)

10. Large landslides in the Colorado Plateau [abst.]: Geol. Soc. Am. Proc. 1937, p. 241-242 (1938)
11. Pre-Cambrian Arizonan revolution in western North America: Am. Jour. Sci., 5th ser., v. 35, p. 445-449 (1938); [abst.]: Geol. Soc. Am. Proc. 1937, p. 242-243 (1938)
12. Algonkian of the Grand Canyon, Arizona [abst.]: Geol. Soc. Am. Bull., v. 49, p. 1885-1886 (1938)
13. An Algonkian jelly fish from the Grand Canyon of the Colorado: Science, new ser., v. 88, no. 2278, p. 186-187 (1938)
14. Late pre-Cambric rocks of western North America: Pan-Am. Geol., v. 71, p. 44-46 (1939)
15. Pre-Cambrian formations in western North America: 6th Pacific Sci. Cong. Proc., p. 289-309 (1939)

HINRICHS, E. N. (*see* King, R. U., 2; Olson, J. C., 1)

HINSON, H. H. (*see* Anderson, C. C.)

HINTON, H. P.
Frontier speculations, a study of the Walker mining district: Pacific Historical Review, v. 29, no. 3, p. 245-255 (1960)

HINTON, R. J.
The handbook to Arizona: San Francisco and New York (1878)

HITCHCOCK, C. H.
1. (and Blake, W. P.) Geological map of the United States: *in* Statistics of mines and mining in the states and territories west of the Rocky Mountains (Raymond); U.S. Treas. Dept. 4th Rep. (1873)
2. The geological map of the United States: AIME Trans., v. 15, p. 465-488, map (1887)

HOAGLAND, Jackson
1. Comstock-Dexter's plan for production: Min. Jour., v. 21, no. 8, p. 3-4 (1937)
2. The growth of Phelps Dodge Corporation: Min. Jour., v. 21, no. 10, p. 3-7, 38-43 (1937)
3. Accomplishments of the copper excise tax: Min. Jour., v. 22, no. 19, p. 4-7, 35 (1939)
4. Development of Morenci open-pit mine: Min. Jour., v. 23, no. 24, p. 3-6, 39, 40 (1940)
5. The Phelps Dodge Morenci project: Min. Jour., v. 25, no. 15, p. 3-7, 33 (1941)

HOBBS, S. W.
Tungsten deposits in the Boriana district and the Aquarius Range, Mohave County, Arizona: USGS Bull. 940-I, p. 247-264, maps (1944)

HODGE, H. C.
Arizona mining in the 70's, Part I: Pay Dirt, no. 90, p. 5 (1945); Part 2: no. 92, p. 10-11 (1946); Part 3: no. 93, p. 10-11 (1946)

HODGES, C. A.
Comparative study of S. P. and Sunset craters and associated lava flows, San Francisco volcanic field, Arizona: Univ. Wisc., MS Thesis, 129 p. (1960); Plateau, v. 35, no. 1, p. 15-34 (1962)

HODGSON, J. P.
Operations of the Copper Queen mines, Bisbee, Arizona: Min. Engr. World, v. 44, p. 429-433 (1916)

HODGSON, R. A.
Regional study of jointing in Comb Ridge-Navajo Mountain area, Arizona and Utah: AAPG Bull., v. 45, no. 1, p. 1-38 (1961)

HOFFMAN, V. J.
Heavy mineral distribution in sands of the Tortolita Mountain pediment, southern Arizona: Univ. Ariz., MS Thesis, 72 p. (1963)

HOGUE, W. G.
1. Geology of the northern part of the Slate Mountains, Pinal County, Arizona: Univ. Ariz., MS Thesis, 43 p., maps (1940)
2. (and Wilson, E. D.) Arizona zinc and lead deposits; Bisbee or Warren district: Univ. Ariz., Ariz. Bur. Mines Bull. 156, p. 17-29, illus., map (1950)

HOLDEN, E. F.
1. Ceruleofibrite, a new mineral (Bisbee): Am. Mineral., v. 7, p. 80-83 (1922)
2. "Ceruleofibrite" is connellite: Am. Mineral., v. 9, p. 55-56 (1924)

HOLLAND, H. D.
(and others) The distribution of leachable uranium in surface samples in the vicinity of ore bodies: Pt. 2 *of* The use of leachable uranium in geochemical prospecting on the Colorado Plateau; Econ. Geol., v. 53, no. 2, p. 190-209, illus. (1958)

HOLLAND, L. F. S.
Meteor Mountain crater, Arizona: Engr. Min. Jour.-Press, v. 119, p. 253-254 (1925)

HOLLANDER, J. T.
Geology and aquifer characteristics of the inner-valley alluvium in the Safford Valley, Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 133-135 (1960)

HOLLICK, Arthur
The petrified forests of Arizona: New York Botanical Garden Journal, v. 31, no. 361, p. 14-18 (1930)

HOLLYDAY, E. F.
A geohydrologic analysis of mine dewatering and water development, Tombstone, Cochise County, Arizona: Univ. Ariz., MS Thesis, 90 p. (1963)

HOLM, D. A.
The oil possibilities of Arizona: Ariz. State Land Dept., 47 p., maps (1938)

HOLMES, G. H., Jr.
Investigation of Beryllium Deposits in the Northern Virgin Mountains of Clark County, Nevada and Mohave County, Arizona: USBM, RI 6572, 30 p. (1964)

HOLMES, J. G.
Soil survey of the Yuma area, Arizona: U.S. Dept. Agr., Field Oper., Bur. Soils, 1902, p. 777-791 (1903)

HOLMES, W. H. (*see* Hayden, F. V.)

HOLSER, W. T. (*see* Warner, L. A.)

HOLT, E. B.
1. Gold mines in the River Range of Arizona: Min. Jour., v. 24, no. 5, p. 3-6 (1940)
2. Gold mines of the Cherry Creek district: Min. Jour., v. 25, no. 2, p. 3-4 (1941)
3. New production from Castle Dome district: Min. Jour., v. 26, no. 7, p. 4-5 (1942)
4. Antler mine in Mohave County, Arizona: Min. Jour., v. 27, no. 19, p. 3-4 (1944)

HONEYMAN, P. D. I.
Our most promising copper area; Inspiration: Engr. Min. Jour., v. 150, no. 7, p. 95 (1949)

HOOK, D. L.
Late Cenozoic stratigraphy and structure of a part of the Walnut Grove basin, Yavapai County, Arizona: Univ. Ariz., MS Thesis, 49 p. (1956)

HOOKER, M.
Annotated bibliography of North American Geology, 1950: USGS Bull. 985, 291 p. (1952)

HOOVER, J. W.
Physiographic provinces in Arizona: Pan-Am. Geol., v. 65, p. 321-335, 379 (1936)

HOOVER, W. B. (*see also* Silver, C., 1)
Jurassic formations of parts of Utah, Colorado, Arizona, and New Mexico: N. Mex. Geol. Soc., Guidebook of the San Juan Basin, New Mexico and Colorado, p. 76-81, illus. (1950)

HORNADAY, W. T.
Camp fires on desert and lava: 366 p., maps, New York (1908)

HORTON, F. W.
Molybdenum; its ores and their concentration, with a discussion of markets, prices, and uses: USBM Bull. 111, 132 p. (1916)

HORTON, R. E.
Evaporation maps of the United States: Am. Geophys. Union Trans., v. 24, pt. 2, p. 743-753 (1943)

HORVATH, E. A.
Preliminary fusulinid zonation of the Naco formation in east-central Arizona: Univ. Utah, MS Thesis (1960)

HOSTETLER, P. B.
(and Garrels, R. M.) Transportation and precipitation of uranium and vanadium at low temperatures, with special reference to sandstone-type uranium deposits: Econ. Geol., v. 57, no. 2, p. 137-167 (1962)

HOUSER, F. N.
The geology of the Contention mine area, Twin Buttes, Arizona: Univ. Ariz., MS Thesis, 61 p. maps (1949)

HOVEY, E. O.
1. Note on a calcite group from Bisbee, Arizona: Am. Mus. Nat. Hist. Bull. 12, p. 189-190 (1900)
2. Newly discovered cavern in the Copper Queen mine (at Bisbee, Arizona): Am. Mus. Jour., v. 11, p. 304-307 (1911)

HOWARD, A. D.
1. Pediment gaps of the Sacaton Mountains, Arizona [abst.]: Geol. Soc. Am. Bull., v. 51, p. 1930-1931 (1940)
2. Pediment passes and pediment problems: Jour. Geomorph., v. 5, no. 1, p. 1-31 (1942); no. 2, p. 95-136 (1942)

HOWARD, C. S.
1. Quality of water of the Colorado River in 1926-1928: USGS Water-Supply Paper 636-A, p. 1-14 (1930)
2. Suspended matter in the Colorado River in 1925-1928: USGS Water-Supply Paper 636-B, p. 15-44 (1930)
3. Quality of water of the Colorado River in 1928-1930: USGS Water-Supply Paper 638-D, p. 145-162 (1932)
4. (and Love, S. K.) Quality of surface waters of the United States, 1943, with a summary of analyses of streams in Colorado River, Pecos River, and Rio Grande Basins, 1925-1943: USGS Water-Supply Paper 970, 180 p. (1945)
5. Suspended sediment in the Colorado River, 1925-1941: USGS Water-Supply Paper 998, 165 p. (1947)
6. Density curents in Lake Mead: *in* Pt. 3, Minnesota International Hydraulics Conv. Proc., Univ. Minn., p. 355-368, illus. (1953)

HOWELL, B. F.
1. New Permian terebellid worm from Arizona: Wagner Free Inst. Sci. Bull., v. 28, p. 25-27, illus. (1953)

2. Stipsellus annulatus, a skolithos-like cambrian fossil from Arizona: Wagner Free Inst. Sci. Bull., v. 32, no. 2, p. 17-20, illus. (1957)

HOWELL, E. E.
Report on the geology of portions of Utah, Nevada, Arizona, and New Mexico: U. S. Geog. and Geol. Survey W. 100th Mer. Rep., v. 3, p. 227-301 (1875)

HOWELL, P. W. (*see also* Kiersch, G. A., 8)
1. (and Keller, W. D.) Reports on structural clay: *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 2, p. 54-72, illus., Univ. Ariz. Press, Tucson (1955)
2. The Cenozoic geology of the Chetoh County, Arizona and New Mexico: Univ. Ariz., PhD Thesis, 148 p. (1959)

HOYT, C. L.
(and others) Ray district: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 80-86 (1938)

HUBBARD, S. J. (*see* Michaelson, S. D.)

HUDDLE, J. W. (*see also* Andrews, D. A., 2)
1. (and Dobrovolny, E.) Upper Devonian bioherms in central Arizona [abst.]: Elisha Mitchell Sci. Soc. Jour., v. 62, no. 2, p. 140-141 (1946)
2. Devonian and Mississippian paleogeography of northeastern Arizona: Tulsa Geol. Soc. Dig., v. 16, p. 76-78 (1948)
3. (and Dobrovolny, E.) Late Paleozoic stratigraphy and oil and gas possibilities of central and northeastern Arizona: USGS Oil and Gas Invest. Prelim. Chart 10 (1945); [revised]: (1952)
4. (and Dobrovolny, E.) Devonian and Mississippian rocks in central Arizona: USGS Prof. Paper 233-D, 112 p., map (1952); [abst.]: Geol. Soc. Am. Bull., v. 57, p. 1205-1206 (1946)

HUFF, Lyman C. (*see also* Cooper, J. R., 2; Lovering, T. S., 3)
1. A sensitive field test for detecting heavy metals in soil or sediment: Econ. Geol., v. 46, p. 524-540 (1951)
2. Abnormal copper, lead, and zinc content of soil near metalliferous veins: Econ. Geol., v. 47, p. 517-542 (1952)
3. A "fossil" geochemical anomaly near Jerome, Arizona [abst.]: AIME abstracts of technical papers, p. 11, (1953); Econ. Geol., v. 48, p. 327 (1953)
4. A Paleozoic geochemical anomaly near Jerome, Arizona: USGS Bull. 1000-C, p. 105-118, illus. (1955)
5. (and Marranzino, A. P.) Geochemical prospecting for copper deposits hidden beneath alluvium in the Pima district, Arizona: USGS Prof. Paper 424-B, Art. 133, p. 308-310 (1961)

HUGHES, P. W.
1. History of the Supai formation in the Black Mesa, Yavapai County, Arizona: Plateau, v. 22, p. 32-36, illus. (1949)
2. The stratigraphy of the Supai formation in the Chino Valley area, Yavapai County, Arizona: Univ. Ariz., MS Thesis, 95 p., maps (1950)
3. Stratigraphy of Supai formation, Chino Valley area, Yavapai County, Arizona: AAPG Bull., v. 36, no. 4, p. 635-647 (1952)

HUMMEL, K.
Tourmaline-bearing cinnabar veins of the Mazatzal Mountains, Arizona [discussion]: Econ. Geol., v. 22, p. 407-408 (1927)

HUNT, C. B.
1. Recent geology of Cane Wash, Monument Valley, Arizona: Science, v. 122, no. 3170, p. 583-585, illus., map (1955)
2. Pleistocene-Recent boundary in the Rocky Mountain region: USGS Bull. 996-A, p. 1-25 (1953)
3. Cenozoic history of the Colorado Plateau: USGS Prof. Paper 279, 99 p. (1956)

HUNT, G. W. P. (*see* Maddock, T.)

HUNT, W. F.

(and Kraus, E. H.) Note on the variable composition of melanochalcite: Am. Jour. Sci., 4th ser., v. 41, p. 211-214 (1916); [abst.]: Geol. Soc. Am. Bull., v. 27, p. 61 (1916)

HUNTER, A. M.

(and Henderson, R.) Boom days in old La Paz: Desert Mag., Sept. (1958)

HUNTER, J. F. (*see* Noble, L. F., 4)

HUNTINGTON, Ellsworth

1. (and Goldthwait, J. W.) The Hurricane fault in southwestern Utah: Jour. Geol., v. 11, p. 46-63, map (1903)
2. (and Goldthwait, J. W.) The Hurricane fault in the Toquerville district, Utah: Harvard Coll., Mus. Comp. Zool. Bull. 42, p. 199-259, map (1904)
3. The climatic factor as illustrated in arid America: Carnegie Inst. Wash. Pub. 192, 341 p., maps (1914)

HUNTINGTON, O. W. (*see* Kunz, G. F., 5)

HURLBUT, C. S., Jr.

1. (and Gonyer, F. A.) New group of phosphates [abst.]: Geol. Soc. Am. Proc. 1933, p. 440 (1933)
2. A new phosphate, bermanite, occurring with triplite in Arizona: Am. Mineral., v. 21, p. 656-661 (1936)

HUSSAKOF, Louis

1. Fishes from the Devonian of Arizona: Am. Mus. Novitates 1186, 9 p., illus. (1942); [abst.]: Geol. Soc. Am. Proc. 1933, p. 440 (1933)
2. Permian fishes from the Kaibab formation of Arizona [abst.]: Geol. Soc. Am. Bull., v. 54, no. 12, p. 1834 (1943)

HUTCHINSON, W. S.

The Vulture mine: Engr. Min. Jour., v. 111, p. 298-302 (1911)

HUTTON, C. O.

1. Sengierite from Bisbee, Arizona: Am. Mineral., v. 42, no. 5-6, p. 408-411, table (1957)
2. An occurrence of pseudomalachite at Safford, Arizona: Am. Mineral., v. 44, no. 11-12, p. 1298-1301, table (1957)
3. Yavapaiite, an anhydrous potassium, ferric sulphate from Jerome, Arizona: Am. Mineral., v. 44, p. 1105-1114, illus. (1959)
4. (and Vlisidis, A. C.) Papagoite, a new copper-bearing mineral from Ajo, Arizona: Am. Mineral., v. 45, p. 599-611, illus. (1960)

HYATT, A.

The chasms of the Colorado: Am. Naturalist, v. 2, p. 359-365 (1868)

HYDEN, H. J.

Uranium and other trace metals in crude oils of the Western United States: USGS Prof. Paper 300, p. 511-519 (1956)

IBRAHIM, M. S.

Subsurface geology and the chemical quality of ground water in Buckeye Valley, Arizona: Univ. Ariz., MS Thesis, 97 p. (1962)

IDDINGS, J. P.

Petrographic character of the lavas (Grand Canyon): USGS 14th Ann. Rep., pt. 2, p. 520-524 (1894)

IMSWILER, J. B.

Structural geology of the Safford Peak area, Tucson Mountains, Pima County, Arizona: Univ. Ariz., MS Thesis, 46 p. (1959)

INGERSON, F. E.

Comparison of the fabrics of inclusions and the adjacent intrusive rocks: Am.

Mineral., v. 24, no. 10, p. 607-623, maps (1939); [abst.]: v. 24, no. 3, p. 187-188 (1939)

INGHAM, G. R.
(and Barr, A. T.) Mining methods and costs at the New Cornelia Branch, Phelps Dodge Corporation, Ajo, Arizona: USBM, IC 6666, 18 p. (1932)

INTERNATIONAL BOUNDARY COMMISSION
Report upon the survey and remarking of the boundary between the United States and Mexico west of the Rio Grande, 1891-1896, pt. 2: 240 p., maps, atlas, album, Washington (1898); U. S. 55th Cong., 2nd sess., Sen. Ex. Doc. 247 (1898)

INTERNATIONAL CONFERENCE PEACEFUL USES ATOMIC ENERGY
Criteria of hydrothermal emplacement in Plateau uranium strata: 2d Geneva Proc., v. 2, p. 330-334 (1958)

IORNS, W. V.
(and Hembree, C. H., Phoenix, D. A., and Oakland, G. L.) Water resources of the Upper Colorado River Basin—basic data: USGS Prof. Paper 442, 1036 p. (1964)

IRISH, Ruth I. (*see* Warren, H. V., 2)

IRVIN, G. W.
Pyrometasomatic deposits at San Xavier mine: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 195-197 (1959)

IRWIN, J. H. (*see also* Akers, J. P., 11; Harshbarger, J. W., 9; Lewis, G. E., 2; Repenning, C. A., 2, 5)
1. (and Akers, J. P., and Cooley, M. E.) Geology of the Leupp quadrangle, Arizona: USGS Ground-Water Branch Open-file Rep., 24 p. (1961)
2. (and Akers, J. P., and Cooley, M. E.) Geology of the Leupp quadrangle: USGS Map I-352 (1962)

IRWIN, W. H.
(and Judd, W. R.) Engineering geology of Glen Canyon dam site, Colorado River, Arizona [abst.]: Geol. Soc. Am. Bull., v. 68, no. 12, p. 1751 (1957)

ISACHSEN, Y. W.
1. (and Mitcham, T. W., and Wood, H. B.) Age and sedimentary environment of uranium host rocks, Colorado Plateau: Econ. Geol., v. 50, no. 2, p. 127-134 (1955)
2. Geology of uranium deposits in the Shinarump and Chinle formations on the Colorado Plateau: USGS Prof. Paper 300, p. 253-280 (1956)

IVES, J. C.
Report upon the Colorado River of the West: U. S. 36th Cong., 1st sess., Sen. Ex. Doc., Gen. Rep., pt. 1, p. 13-131, maps (1861)

IVEY, J. B. (*see* Doeringsfeld, W. W.)

JACKLING, D. C.
1. The Ray Consolidated Copper Company of Arizona: Min. World, v. 31, p. 974 (1909)
2. Work of the Ray Consolidated: Min. Sci. Press, v. 104, p. 692-693 (1912)
3. Report of Ray Consolidated Copper Company of Arizona: Min. Engr. World, v. 40, p. 825-829 (1914)

JACKSON, C. F. (*see also* Johnson, F. W., 2)
(and Knaebel, J. B.) Sampling and estimation of ore deposits: USBM Bull. 356, 155 p. (1932)

JACKSON, E. D. (*see* Creasey, S. C., 9)

JACKSON, Robert L. (*see also* Harshbarger, J. W., 3)
1. The stratigraphy of the Supai formation along the Mogollon Rim, central Arizona: Univ. Ariz., MS Thesis, 82 p., maps (1951)

2. Stratigraphic relationships of the Supai formation of central Arizona: Plateau, v. 24, p. 84-91 (1951)
3. Pennsylvanian-Permian facies of the Supai formation in central Arizona: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 143-146, illus. (1952)

JACKSON, W. H. (*see* Black, R. A., 2)

JACOBS, E.
Valuation of mines in Arizona: Engr. Min. Jour., v. 106, p. 664-665 (1918)

JAFFE, H. W. (*see also* Kauffman, A. J.)
(and others) Lead-alpha age determinations of accessory minerals of igneous rocks (1953-1957): USGS Bull. 1097-B, p. 65-148 (1959)

JAGGER, T. A., Jr.
(and Palache, C.) Description of the Bradshaw Mountains quadrangle: USGS Folio 126, 11 p., maps (1905)

JAHNS, Richard H.
1. Masses of pegmatite quartz [abst.]: Geol. Soc. Am. Bull., v. 59, no. 12, pt. 2, p. 1374 (1948)
2. Lithium-bearing pegmatites near Wickenburg, Arizona [abst.]: Geol. Soc. Am. Bull., v. 60, no. 12, pt. 2, p. 1899 (1949)
3. Pegmatite deposits of the White Picacho district, Maricopa and Yavapai Counties, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 162, 105 p., illus., maps (1952)

JAKOSKY, J. J.
1. (and Wilson, C. H., and Daly, J. W.) Geophysical examination of Meteor Crater: Min. Jour., v. 14, no. 22, p. 5-6, 29-30 (1931)
2. Geophysical methods locate meteorite (Meteor Crater): Engr. Min. Jour., v. 133, p. 392-393 (1932)

JANSSEN, R E.
Natures bridges: Sci. Monthly, v. 57, no. 3, p. 210-219, illus. (1943)

JAQUAYS, D. W.
(and Gerhardt, A. W.) How low-iron chrysotile asbestos is mined and milled in central Arizona: Min. Jour., v. 19, no. 8, p. 54 (1957)

JASTER, M. C. (*see also* Rogers, C. L.; Withington, C. F., 1)
1. Perlite resources of the United States: USGS Bull. 1027-I, p. 380, map (1956)
2. Selected annotated bibliography of high-grade silica of the United States and Canada through December 1954: USGS Bull. 1019-H, 56 p. (1957)

JEFFERY, E. C.
A new Araucarian genus from the Triassic: Boston Soc. Nat. Hist. Proc., v. 34, p. 325-332 (1910)

JENKINS, O. P.
1. (and Wilson, E. D.) List of the United States Geological Survey publications relating to Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 104, 40 p. (1920)
2. (and Wilson, E. D.) A geological reconnaissance of the Tucson and Amole mountains: Univ. Ariz., Ariz. Bur. Mines. Bull. 106, p. 5-18, maps (1920)
3. Verde River lake beds near Clarkdale, Arizona: Am. Jour. Sci., 5th ser., v. 5, p. 65-81, maps (1923)

JENKINS, R. J. (*see* Butler, C. P.)

JENNINGS, E. P.
The copper deposits of the Kaibab Plateau, Arizona: AIME Trans., v. 34, p. 839-841 (1904); Min. Sci. Press, v. 88, p. 378 (1904)

JENSEN, M. L.
Sulfur isotopes and the origin of sandstone-type uranium deposits: Econ. Geol., v. 53, no. 5, p. 598-616 (1958)

JEROME, S. E.
1. Reconnaissance geologic study of the Black Canyon schist belt, Bradshaw Mountains, Yavapai and Maricopa Counties, Arizona: Univ. Utah, PhD Thesis, 160 p. (1956)
2. (and Cook, D. R.) Relation of mining districts to regional tectonics, with special reference to southern Arizona and southwestern New Mexico [abst.]: Min. Engr., v. 10, no. 1, p. 54-55 (1958)

JEWETT, John
The Verde mining district: Engr. Min. Jour., v. 72, p. 169-171 (1901)

JINKS, J. E. (*see also* Fair, C. L., 2)
The Margaret Wash section of the Mogul Fault, Pinal County, Arizona: Univ. Ariz., MS Thesis, 19 p. (1961)

JOBIN, D. A.
1. Regional transmissivity of the exposed sediments of the Colorado Plateau as related to the distribution of uranium deposits: USGS Prof. Paper 300, p. 207-211 (1956)
2. Relation of the transmissive character of the sedimentary rocks of the Colorado Plateau to the distribution of uranium ores: USGS Bull. 1124, p. 1-149 (1962)

JOESTING, H. R. (*see* Case, J. E.)

JOHANNSEN, Albert
Notes on the igneous rocks of western Arizona: USGS Bull. 352, p. 81-92 (1908)

JOHNSON, A. C.
(and Davis, C. W.) War development proves large vanadium reserves: Engr. Min. Jour., v. 146, no. 4, p. 105-107 (1945)

JOHNSON, C. H. (*see also* Gardner, E. D., 3)
Mining and milling methods at the Big Jim mine, Oatman, Arizona: USBM, IC 6824, 12 p. (1935)

JOHNSON, D. H. (*see* Witkind, I. J., 20)

JOHNSON, D. W.
1. Report on the geological excursion through New Mexico, Arizona, and Utah, summer of 1906: Tech. Quart., v. 19, p. 408-415 (1906)
2. A recent volcano in the San Francisco Mountain region, Arizona: Geog. Soc. Phila. Bull., v. 5, p. 6-11 (1907)
3. Current notes on land forms; a peneplain in the Grand Canyon district: Science, new ser., v. 26, p. 837-838 (1907)
4. A geological excursion in the Grand Canyon district: Boston Soc. Nat. Hist. Proc., v. 34, p. 135-161 (1909)
5. The southernmost glaciation in the United States: Science, new ser., v. 31, p. 218-220 (1910)
6. The physical history of the Grand Canyon district [abst.]: Science, new ser., v. 35, p. 199 (1912)
7. Planes of lateral corrasion: Science, new ser., v. 73, p. 174-177 (1931)
8. Origin of desert rock-cut surfaces [abst.]: Pan-Am. Geol., v. 56, p. 235-236 (1931)
9. Rock fans of arid regions: Am. Jour. Sci., 5th ser., v. 23, p. 389-420 (1932); [absts.]: Geol. Soc. Am. Bull., v. 43, p. 124 (1932); Pan-Am. Geol., v. 57, p. 58 (1932)
10. Rock planes of arid regions: Geog. Rev., v. 22, p. 656-665 (1932)
11. Evolution of the Grand Canyon district: Rice Institute Pamplet, v. 22, no. 1, p. 5-45, illus., maps (1935)
12. Current notes on geomorphology (graben, Grand Canyon): Jour. Geomorph. v. 3, no. 1, p. 84-85 (1940); no. 2, p. 183-186 (1940); v. 4, no. 1, p. 85-94 (1941); no. 2, p. 164-166 (1941); no. 3, p. 253-262 (1941)

JOHNSON, F. (*see* Crawford, W. P., 2)

JOHNSON, F. W.

1. Locating claims on the public domain: USBM, IC 6843, p. 11-18 (1936); Min. Jour., v. 20, no. 4, p. 3-4, 31-32 (1936)
2. (and Jackson, C. F.) Federal placer-mining laws and regulations and small-scale placer-mining methods: USBM Tech. Paper 591, 49 p. (1938); USBM, IC 6611-R, 37 p. (1938)

JOHNSON, G. H.

(and Soule, J. H.) Measurements of surface subsidence, San Manuel mine, Pinal County, Arizona: USBM, RI 6204, 36 p. (1963)

JOHNSON, G. R. (*see* Roach, C. H.)

JOHNSON, H. S., Jr.

1. (and Thordarson, W.) Geological investigations of radioactive deposits—semi-annual report Dec. 1, 1956, to May 31, 1957: USAEC, TEI-690 (Ariz., p. 381-383) (1957)
2. Alteration of Chinle siltstone and uranium emplacment, Arizona and Utah, discussion: Geol. Soc. Am. Bull., v. 75, no. 8, p. 775-776 (1964)

JOHNSON, P. W. (*see also* Dennis, P. E.; Feth, J. H., 8; Foster, R. W.; Peirce, H. W., 4)

1. Upper Santa Cruz basin (ground-water), Pima and Santa Cruz Counties: USGS Open-file Rep., p. 101-114 (1952)
2. Exploratory deep wells of the State of Arizona as of May 1, 1953: Ariz. State Land Dept. Mimeo. Rep., 19 p. (1953)
3. Memorandum on ground-water conditions in parts of Townships 10 and 11 South, Ranges 23 and 24 West, Yuma County, Arizona: USGS Ground-Water Branch Open-file Rep., 5 p. (1954)
4. (and Cahill, J. M.) Ground-water resources and geology of the Gila Bend and Dendora areas, Maricopa County, Arizona: USGS Ground-Water Branch Open-file Rep., 43 p., illus. (1955)
5. (and White, N. D., and Cahill, J. M.) Pumpage and ground-water levels in Arizona in 1955: Ariz. State Land Dept. Water Res. Rep. 1, 69 p., illus. (1956); USGS Water-Supply Paper 1409, p. 3-61 (1958)
6. (and White, N. D., and Wolcott, H. N.) Pumpage and ground-water levels in Arizona in 1954: USGS Water-Supply Paper 1326, p. 3-43, illus. (1957)
7. Exploratory deep wells of the State of Arizona as of June 1, 1957: Ariz. State Land Dept. Mimeo. Rep., 20 p. (1957)
8. Test holes in southern Arizona valleys: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 62-66 (1959)
9. Availability of additional water for Chiricahua National Monument, Cochise County, Arizona: USGS Ground-Water Branch Open-file Rep., 15 p. (1960); USGS Water-Supply Paper 1475-H, p. 209-216, map (1962)
10. Water in the Coconino sandstone for the Snowflake, Hay Hollow area, Navajo County, Arizona: USGS Ground-Water Branch Open-file Rep., 77 p., illus. (1960); Water-Supply Paper 1539-S, 46 p., map (1962)

JOHNSON, Robert

Quartz crystals in the Petrified Forests of Arizona: Mineralogist, v. 7, no. 12, p. 445, 462-463 (1939)

JOHNSON, R. W.

(and Moxham, R. M.) Airborne radioactivity survey, Defiance Uplift and Carrizo Mountains, Arizona: USGS Open-file Rep. (1953)

JOHNSON, Vard H. (*see also* McKelvey, V. E., 1)

1. The geology of the Helvetia mining district, Arizona: Univ. Ariz., PhD Thesis, 111 p., maps (1941)

2. Geology of the Helvetia mining district, Pima County, Arizona [absts.]: Econ. Geol., v. 44, p. 639-640 (1949); Geol. Soc. Am. Bull., v. 60, no. 12, pt. 2, p. 1900-1901 (1949)

JOHNSTON, B.
A newly discovered turquoise mine of prehistory, Mohave County, Arizona: Kiva, v. 29, no. 3, p. 76-83 (1964)

JOHNSTON, W. P.
1. Geology and ore deposits of the Copper Basin mining district, Yavapai County, Arizona: Univ. Utah, PhD Thesis (1955)
2. (and Lowell, J. D.) Geology and origin of mineralized breccia pipes in Copper Basin, Arizona: Econ. Geol., v. 56, no. 5, p. 916-940 (1961)

JONES, C. C.
Iron ores of the Southwest: American Mining Congress, 13th Annual Session Proceedings, p. 265-273 (1910)

JONES, D. J.
Sedimentary features and mineralization of the Salt Wash sandstone at Cove Mesa, Carrizo Mountains, Apache County, Arizona: USAEC, RME-3093, pt. 2, 40 p., illus., maps (1954)

JONES, E. L., Jr.
1. Gold deposits near Quartzsite, Arizona: USGS Bull. 620, p. 45-57, map (1915)
2. A reconnaissance in the Kofa Mountains, Arizona: USGS Bull. 620, p. 151-164, map (1915)
3. Manganese deposits of the Colorado River desert region: Min. Sci. Press, v. 117, p. 755-758 (1918); [abst.]: Wash. Acad. Sci. Jour., v. 9, p. 384-385 (1919)
4. (and Ransome, F. L.) Deposits of manganese ore in Arizona: USGS Bull. 710, p. 93-184, maps (1920)

JONES, E. L., 3rd (*see* Hardwick, W. R., 4)

JONES, H. N.
Selected annotated bibliography of the geology of uraniferous and radioactive native bituminous substances, exclusive of coals in the United States: USGS Bull. 1059-D, 26 p. (1958)

JONES, I. I. (*see* Halpenny, L. C., 2)

JONES, R. D.
Geology of the Cerro Colorado mining district: Univ. Ariz., MS Thesis, 59 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 42-43 (1958)

JONES, R. S. (*see also* Cushman, R. L., 1)
(and Cushman, R. L., and Hem, J. D.) Geology and groundwater resources of the Willcox basin, Cochise and Graham counties, Arizona: USGS Mimeo. Rep., 35 p., maps (1947)

JONES, R. W.
1. Origin of salt anticlines of Paradox Basin: AAPG Bull., v. 43, no. 8, p. 1869-1895, illus. (1959)
2. Structural evolution of part of southeastern Arizona: AAPG Mem. 2, p. 140-151 (1963)

JONES, S. M.
(and Bacheller, W. D.) Measured sections near Dos Cabezas, Arizona: N. Mex. Geol. Soc., Guidebook 4th Field Conf., p. 149, illus. (1953)

JONES, W. R.
The geology of the Sycamore Ridge area, Pima County, Arizona: Univ. Ariz., MS Thesis, 89 p., maps (1941)

JORALEMON, I. B. (*see also* Bonillas, Y. S.)
1. The Ajo copper mining district: AIME Bull., v. 92, p. 2011-2028, map (1914); Trans. v. 49, p. 593-609, map (1915); Engr. Min. Jour., v. 98, p. 663-665, map (1914)
2. Sampling and estimation of disseminated copper deposits: Ariz. Min. Jour., v. 5, no. 20, p. 16-17 (1922)
3. Romantic copper; its lure and lore: D. Appleton-Century Co., N. Y. and London, 294 p. (1935)
4. Geology and ore deposits of the Ajo quadrangle, Arizona, by James Gilluly, 1937 [review]; Econ. Geol., v. 33, no. 4, p. 467-469 (1938)
5. Age cannot wither, or varieties of geological experience: Econ. Geol., v. 47, no. 3, p. 243-259 (1952)

JOSEPH, P. E.
1. Manganese: Univ. Ariz., Ariz. Bur. Mines Bull. 4, 11 p. (1915)
2. Molybdenum: Univ. Ariz., Ariz. Bur. Mines Bull. 5, 9 p. (1915)
3. Asbestos: Univ. Ariz., Ariz. Bur. Mines Bull. 8, 8 p. (1915)
4. Mercury-quicksilver: Univ. Ariz., Ariz. Bur. Mines Bull. 12, 8 p. (1916)
5. Vanadium: Univ. Ariz., Ariz. Bur. Mines Bull. 18, 10 p. (1916)
6. Zinc: Univ. Ariz., Ariz. Bur. Mines Bull. 20, 12 p. (1916)
7. Antimony: Univ. Ariz., Ariz. Bur. Mines Bull. 22, 8 p. (1916)
8. Copper: Univ. Ariz., Ariz. Bur. Mines Bull. 37, 14 p. (1916)
9. Iron: Univ. Ariz., Ariz. Bur. Mines Bull. 43, 13 p. (1916)
10. Lead: Univ. Ariz., Ariz. Bur. Mines Bull. 45, 12 p. (1916)
11. Miscellaneous minerals: Univ. Ariz., Ariz. Bur. Mines Bull. 49, 6 p. (1917)

JOURNEAY, J. A. (*see also* Thurmond, R. E., 4)
Pyrometasomatic deposits at Pima mine: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 198-199 (1959)

JUDD, W. R. (*see* Irwin, W. H.)

JULIHN, C. E.
(and Moon, L. B.) Summary of Bureau of Mines exploration projects on deposits of raw material resources for steel production: USBM, RI 3801, 35 p. (1945)

KAHLMEIER, C. M.
Molybdenum resources and their value for the making of super steel: Ariz. Min. Jour., v. 4, no. 1, p. 18, 39 (1920)

KAISER, E. P.
1. Uraniferous quartzite, Red Bluff prospect, Gila County, Arizona: USGS Circ. 137, 10 p. (1951)
2. Red Hills (Tate) uranium prospect, Mohave County, Arizona: USAEC, TEM-217 (1951)
3. (and Page, L. R.) Distribution of uranium deposits in the United States: USGS Circ. 220, p. 1-7, maps (1952); [abst.]: Geol. Soc. Am. Bull. v. 62, p. 1537 (1951)
4. (and Herring, B. F., and Rabbitt, J. C.) Minor elements in some rocks, ores, and mill and smelter products: USAEC, TEI-415 (1954)

KAM, William (*see also* Callahan, J. T., 2)
1. Interim report on the ground-water resources of the McMullen Valley area, Maricopa, Yavapai, and Yuma Counties, Arizona: USGS Mimeo. Rep., 27 p., illus. (1957)
2. Geology and ground-water resources of McMullen Valley, Maricopa, Yavapai, and Yuma Counties, Arizona: Ariz. State Land Dept. Water Res. Rep. 8 (1961); USGS Water-Supply Paper 1665, 64 p. (1964)

KANGIESER, P. C.
Climate of the Southwest [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1727 (1959)

KANIA, J. E. A.
Some notes on the origin of pyritic copper deposits of the mesothermal type: Econ. Geol., v. 31, p. 453-471 (1936)

KANTNER, W. H.
Surface subsidence over the porphyry caving blocks, Phelps Dodge Corporation, Copper Queen Branch: AIME Trans., v. 109, p. 181-194, maps (1934)

KARKANAVALA, M. D.
The nature of arizonite: Econ. Geol., v. 54, no. 7, p. 1302-1309 (1959)

KARTCHNER, W. E.
The geology and ore deposits of a portion of the Harshaw district, Patagonia Mountains, Arizona: Univ. Ariz., PhD Thesis, 100 p., maps (1944)

KAUFFMAN, A. J.
(and Jaffe, H. W.) Chevkinite (Tscheffkinite) from Arizona: Am. Mineral., v. 31, no. 11-12, p. 582-588 (1946)

KEEFER, William R.
Permian Concha limestone and Rainvalley formation, southeastern Arizona: AAPG Bull., v. 45, no. 8, p. 1324-1334 (1961)

KEENER, Howard
The Patagonia district: Ariz. Min. Jour., v. 2, no. 1, p. 42-43 (1918)

KEHN, T. M.
Selected annotated bibliography of the geology of uranium-bearing coal and carbonaceous shale in the United States: USGS Bull. 1059-A, 28 p. (1957)

KEISER, W. G.
Dry placer mining on a large scale (Quartzsite, Yuma County): Min. Engr. World, v. 44, p. 999-1000 (1916)

KEITHLEY, H. S.
Apache vanadium mine (Gila County): Rocks and Minerals, v. 20, no. 12, p. 591 (1945)

KELLER, G. V.
1. Directional resistivity measurements in exploration for uranium on the Colorado Plateau: USGS Bull. 1083-B, 36 p. (1959)
2. (and Plouff, D., and Zietz, I.) Geophysical studies in support of geologic mapping in the Twin Buttes quadrangle, Arizona: [abst.]: Min. Engr. v. 12, no. 12, p. 1249 (1960)

KELLER, W. D. (*see also* Howell, P. W., 1; Kiersch, G. A., 8, 11; Wilson, R. L., 1)
1. Experimental work on red bed bleaching: Am. Jour. Sci., v. 18, p. 65-70 (1929)
2. (and Pickett, E. E.) Hydroxyl and water in perlite from Superior, Arizona: Am. Jour. Sci., v. 252, no. 2, p. 87-98, illus. (1954)
3. Clay minerals in the Morrison formation of the Colorado Plateau: USGS Bull. 1150, 90 p. (1962)

KELLEY, V. C.
1. Tectonics of the San Juan Basin: N. Mex. Geol. Soc., Guidebook of the San Juan Basin, p. 124-131, illus. (1951)
2. Monoclines of the Colorado Plateau: Geol. Soc. Am. Bull., v. 66, p. 789-804, illus. (1955)
3. Regional tectonics of the Colorado Plateau and relationship to the origin and distribution of uranium: Univ. N. Mex. Geol. Pub. 5, 120 p. (1955)
4. Influence of regional structure and tectonic history upon the origin and distribution of uranium on the Colorado Plateau: USGS Prof. Paper 300, p. 171-179 (1956)
5. Tectonics of the Black Mesa basin region of Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 136-145, illus. (1958)
6. (and Clinton, N. J.)Fracture systems and tectonic elements of the Colorado Plateau: Univ. N. Mex. Geol. Pub. 6, 104 p., illus. (1960)

KELLOGG, A. E.
Ed Schieffelin, the founder of Tombstone: Min. Jour., v. 14, no. 12, p. 7-8 (1930)

KELLOGG, C. M. (*sèe* Zaslow, B.)

KELLOGG, J. P.
Exploration drilling techniques on the Colorado Plateau: USAEC, RME-2, 25 p., illus. (1954)

KELLOGG, L. O.
Sketch of the geology and ore deposits of the Cochise mining district, Cochise County, Arizona: Econ. Geol., v. 1, p. 651-659 (1906)

KELLY, F. J.
Sulfur production and consumption in eight western states; Arizona, Colorado, Nebraska, New Mexico, North Dakota, South Dakota, Utah, and Wyoming: USBM, IC 8094, 85 p. (1962)

KELLY, G. H.
1. Arizona's greatest industry; some of the mining history: Ariz. Min. Jour., v. 4, no. 3, p. 18 (1920)
2. New activity in Aravaipa Canyon recalls old days: Ariz. Min. Jour., v. 9, no. 7, p. 20 (1925)

KELTON, F. C. (*see* Meinzer, O. E., 1)

KENDALL, K. K. (*see* Babcock, H. M., 6)

KENNEDY, D.
Discussion of "Large-scale mapping of Lake Powell" by Gessel and Rutledge: Am. Soc. Civil. Engr. Proc., v. 89, Paper 3563, Jour. Surveying and Mapping Div., no. SU 2, p. 91 (June, 1963)

KENNEDY, G. C. (*see also* Carter, N. L.)
The origin of continents, mountain ranges, and ocean basins: American Scientist, v. 47, no. 4, p. 491-504 (1959)

KEPPEL, R. V.
(and Renard, K. G.) Transmission losses in ephemeral stream beds: Am. Soc. Civil Engr. Proc., v. 88, Paper 3116, Jour. Hydraulics Div., no. HY 3, p. 59-68, illus. (May, 1962)

KERNS, J. R.
Geology of the Agua Verde Hills, Pima County, Arizona: Univ. Ariz., MS Thesis, 69 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 50 (1958)

KEROHER, G. C. (*see* Wilson, D.)

KERR, A. R. (*see* Wheeler, R. B.)

KERR, P. F. (*see also* Abdel-Gawad, A. M.; Bollin, E. M., 2; Barrington, J., 1, 2, 3; Hamilton, P. K.)
1. Tungsten mineralization in the United States: Geol. Soc. Am. Mem. 15, 241 p., maps (1946)
2. Alteration features at Silver Bell, Arizona: Geol. Soc. Am. Bull., v. 62, p. 451-480 (1951)
3. Rock alteration criteria in the search for uranium: USGS Prof. Paper 300, p. 627-632 (1956)
4. Criteria of hydrothermal emplacement in plateau uranium strata: 2nd Internat. Conf. on Peaceful uses of Atomic Energy, Proc., v. 2, p. 330-334 (1958)
5. Uranium emplacement in the Colorado Plateau: Geol. Soc. Am. Bull., v. 69, no. 9, p. 1072-1111 (1958)
6. (and Barrington, J.) Breccia pipe near Cameron Arizona—reply: Geol. Soc. Am. Bull., v. 74, no. 2, p. 233-237 (1963)
7. (and Abdel-Gawad, A. M.) Alteration of Chinle siltstone and uranium emplacement—reply: Geol. Soc. Am. Bull., v. 75, no. 8, p. 777-780 (1964)

KEYES, C. R.
1. Structures of basin ranges: Jour. Geol., v. 13, p. 63-70 (1905)

2. Rock floor of intermont plains of the arid region: Geol. Soc. Am. Bull., v. 19, p. 63-92 (1908)
3. Erosional origin of the Great Basin ranges: Jour. Geol., v. 17, p. 31-37 (1909)
4. Relations of present profiles and geologic structures in desert ranges: Geol. Soc. Am. Bull., v. 21, p. 543-564 (1910)
5. Deflation and the relative efficiencies of erosional processes under the conditions of aridity: Geol. Soc. Am. Bull., v. 21, p. 565-598 (1910)
6. Porphyry coppers: Min. Met. Soc. Am. Bull. 25, p. 316-320 (1910); Min. World, v. 33, p. 229-230 (1910)
7. Prospecting disseminated copper ore deposits: Engr. Min. Jour., v. 90, p. 1055-1056 (1910)
8. Coon Butte and meteoritic falls of the desert [abst.]: Geol. Soc. Am. Bull., v. 21, p. 773-774 (1910)
9. Abundance of meteorites on the Painted Desert and its bearing upon the planetesimal hypothesis of the origin of the earth: Acad. Sci. St. Louis Trans., v. 19, no. 9, p. 131-150 (1910)
10. Origin of certain bonanza silver ores of the arid region: AIME Bull., v. 55, p. 541-558 (1911); Trans., v. 42, p. 500-517 (1912)
11. Volcanic phenomena of Coon Butte region, Arizona [absts.]: Iowa Acad. Sci. Proc., v. 18, p. 99-100 (1911); Science, new ser., v. 34, p. 29 (1911)
12. Critical criteria on Basin Range structure: Science, new ser., v. 37, p. 226 (1913)
13. Angular amphitheaters of the Grand Canyon [abst.]: Science, new ser., v. 37, p. 457-458 (1913)
14. Certain so-called meteoric irons of Canyon Diablo [abst.]; Geol. Soc. Am. Bull., v. 24, p. 685-686 (1913)
15. False fault scarps of desert ranges [abst.]; Geol. Soc. Am. Bull., v. 26, p. 65 (1915)
16. Discovery of Gilbert's star (origin of Coon Butte, Arizona): Pan-Am. Geol., v. 37, p. 86-87 (1922)
17. Permian rocks of Grand Canyon: Pan-Am. Geol., v. 38, p. 147-149 (1922)
18. Framework of Arizona geology: Pan-Am. Geol., v. 38, p. 231-252 (1922)
19. Delimitations of sundry Arizona terranes: Pan-Am. Geol., v. 38, p. 335-339 (1922)
20. Grand Canyon's palatial section: Pan-Am. Geol., v. 38, p. 409-412 (1922)
21. Biotic resolution of Redwall limestone of Grand Canyon: Pan-Am. Geol., v. 39, p. 57-61 (1923)
22. Devonic unconformity in Arizona: Pan-Am. Geol., v. 39, p. 70-72 (1923)
23. Tres Amigos gold veins of Arizona: Pan-Am. Geol., v. 39, p. 159-160 (1923)
24. Cubist method of geological correlation: Pan-Am. Geol., v. 40, p. 357-374 (1923)
25. Black Mesa iron deposits of Plumosa district of Arizona: Pan-Am. Geol., v. 40, p. 383-384 (1923)
26. Porphyry coppers of Palomas Range of western Arizona: Pan-Am. Geol., v. 41, p. 76-78 (1924)
27. Gashed veins on the Queen of Sheba (Chiricahua Mountains): Pan-Am. Geol., v. 44, p. 60-62 (1925)
28. Desert ranges of Arizona: Pan-Am. Geol., v. 47, p. 376-378 (1927)
29. Relief of desert range country: Pan-Am. Geol., v. 51, p. 361-362 (1929)
30. Physiographic provinces in the desert: Pan-Am. Geol., v. 52, p. 129-150 (1929)
31. Reflection of submountain structures in desert range features: Pan-Am. Geol., v. 52, p. 201-210 (1929)
32. Stratigraphical affinities of Aubreyan limestones of Grand Canyon: Pan-Am. Geol., v. 54, p. 140-143 (1930)
33. Tonto synonymy in Arizona: Pan-Am. Geol., v. 54, p. 143-144 (1930)

34. Colossal Cave in Arizona: Pan-Am. Geol., v. 53, p. 365-366 (1930)
35. Earliest mention of Devonic rocks in Arizona: Pan-Am. Geol., v. 54, p. 377-380 (1930)
36. Age of some so-called Cambric sandstones: Pan-Am. Geol., v. 56, p. 78-80 (1931)
37. Supaian correlations in Arizona: Pan-Am. Geol., v. 58, p. 119-128 (1932)
38. Crack of doom in Great Basin: Pan-Am. Geol., v. 60, p. 219-222 (1933)
39. Modoc limestone of eastern Arizona: Pan-Am. Geol., v. 59, p. 221-222 (1933)
40. Fundamental crystalline complex in Arizona: Pan-Am. Geol., v. 61, p. 67-70 (1934)
41. Paleozoic diastrophism of Colorado: Pan-Am. Geol., v. 61, p. 107-132 (1934)
42. Siluric rocks in Arizona [abst.]: Pan-Am. Geol., v. 61, p. 140-141 (1934)
43. Terranal title Grand Canyon: Pan-Am. Geol., v. 61, p. 299-300 (1934)
44. Medley of Apache group in Arizona [abst.]: Pan-Am. Geol., v. 61, p. 302-306 (1934)
45. Possibility of early Carbonic Oshawanan sediments in Arizona: Pan-Am. Geol., v. 63, p. 223-240 (1935)
46. Early discovery of Mississippian Burlington limestone fauna in Arizona: Pan-Am. Geol., v. 63, p. 297-299 (1935)
47. Fault-faced basin range of El Picacho in Arizona [absts.]: Pan-Am. Geol., v. 63, p. 309 (1935); Geol. Soc. Am. Proc. 1935, p. 332 (1936)
48. Beginning and end of basin range hypothesis: Pan-Am. Geol., v. 64, p. 8-34 (1935)
49. Comanche in synonymy as terranal title: Pan-Am. Geol., v. 64, p. 59-62 (1935)
50. Earliest recognition of Cretacic rocks in Arizona region: Pan-Am. Geol., v. 64, p. 62-64 (1935)
51. Early Cretacic prospect from southeastern Arizona: Pan-Am. Geol., v. 64, p. 125-140 (1935)
52. Taxonomic status of Triassic Chinle formation: Pan-Am. Geol., v. 65, p. 61-63 (1936)
53. Eastward extension of Shinarump basilium: Pan-Am. Geol., v. 65, p. 68-71 (1936)
54. Proper title of so-called Lewis shales in Arizona: Pan-Am. Geol., v. 65, p. 74-75 (1936)
55. Coon Butte's little brother (Zuni volcanic crater): Pan-Am. Geol., v. 65, p. 149-154 (1936)
56. Navajo sandstone in synonymy: Pan-Am. Geol., v. 65, p. 301-302 (1936)
57. Validity of Dutton's Jurassic Zunian series in Arizona: Pan-Am. Geol., v. 65, p. 302-306 (1936)
58. Mesa Verde coal formation in Arizona: Pan-Am. Geol., v. 65, p. 306-310, map (1936)
59. Present doming of Grand Canyon region not first Colorado Plateau [abst.]: Pan-Am. Geol., v. 65, p. 374 (1936)
60. Todilto limestone in unique pose: Pan-Am. Geol., v. 66, p. 74-77 (1936)
61. Discovery of Conrad's type fossils—localities of the United States and Mexico Boundary Survey: Pan-Am. Geol., v. 66, p. 77-80 (1936)
62. Geological age of rim rocks of the Grand Canyon: Pan-Am. Geol., v. 66, p. 195-216 (1936)
63. Primary usage of Aubrey as terranal title: Pan-Am. Geol., v. 66, p. 222-224 (1936)
64. Marine Jurassic horizon of Montezuma: Pan-Am. Geol., v. 66, p. 224-226 (1936)
65. Passing of Supai as terranal title: Pan-Am. Geol., v. 66, p. 311-313 (1936)

66. Iowa Rockford fauna reported from Arizona: Pan-Am. Geol., v. 66, p. 316 (1936)
67. Santa Rita limestone of Arizona in synonymy: Pan-Am. Geol., v. 69, p. 295-296 (1938)
68. Nomenclature of pre-Cambric basement complex of Arizona: Pan-Am. Geol., v. 70, p. 65-67 (1938)
69. Basement complex of the Grand Canyon: Pan-Am. Geol., v. 70, p. 65-67, 91-116 (1938)
70. Validity of Grand Canyon formational title: Pan-Am. Geol., v. 70, p. 149-150 (1938)
71. Diversity of Escabrosa limestone of Arizona: Pan-Am. Geol., v. 70, p. 366-368 (1938)
72. Deltaic anomaly of the Supai of the Grand Canyon: Pan-Am. Geol., v. 71, p. 55-62 (1939)
73. Error of the three Archimedean limestones: Pan-Am. Geol., v. 71, p. 63-66 (1939)
74. Substitute title for Proterozoic Chiquito sandstone of Grand Canyon: Pan-Am. Geol. v. 71, p. 69 (1939)
75. Synonymy of Proterozoic Nankoweap title of Arizona: Pan-Am. Geol., v. 71, p. 70 (1939)
76. Why Pennsylvanian series occurs not in Grand Canyon region: Pan-Am. Geol., v. 71, p. 153-157 (1939)
77. Pre-occupation of Uncompahgran time title: Pan-Am. Geol., v. 71, p. 159-160 (1939)
78. Extension of Siluric Fusselmann limestone westward from type-locality: Pan-Am. Geol., v. 71, p. 231-235 (1939)
79. Chouteau fauna in Arizona: Pan-Am. Geol., v. 72, no. 4, p. 310-311 (1939)
80. Place of Devonic fauna of Bisbee, Arizona: Pan-Am. Geol., v. 72, no. 5, p. 365-367 (1939)
81. Composite character of Longfellow limestone of Arizona: Pan-Am. Geol., v. 73, no. 5, p. 363-364 (1940)
82. Devonic Ouray limestone of Colorado in Arizona: Pan-Am. Geol., v. 74, no. 1, p. 70-72 (1940)
83. Dragoon quartzite of Arizona: Pan-Am. Geol., v. 73, no. 4, p. 295-297 (1940)
84. Eastward extension of Aubreyan limestone from Grand Canyon: Pan-Am. Geol., v. 73, no. 3, p. 236-240 (1940)
85. Entitlement of ancient metamorphics in Arizona: Pan-Am. Geol., v. 73, no. 2, p. 148-150 (1940)
86. Eparchean interval in Arizona: Pan-Am. Geol., v. 73, no. 3, p. 211-228, map (1940); [abst.]: Geol. Soc. Am. Bull., v. 51, no. 12, pt. 2, p. 1960 (1940)
87. Equivalency and synonymy of Tohachi shales of northeast Arizona: Pan-Am. Geol., v. 74, no. 2, p. 157-160 (1940)
88. Great Mazatzal quartzite of Arizona; its horizon and synonymy: Pan-Am. Geol., v. 74, no. 2, p. 156-157 (1940)
89. Inutility of Triassic Chinle formation of Arizona: Pan-Am. Geol., v. 74, no. 4, p. 305-306 (1940)
90. Peneplanal unconformities through the ages in Arizona [abst.]: Pan-Am. Geol., v. 73, no. 5, p. 376 (1940)
91. Physiographic significance of Protozoic cardenas lava-flows of Grand Canyon: Pan-Am. Geol., v. 74, no. 3, p. 235-236 (1940)
92. Range of the Redwall of Grand Canyon: Pan-Am. Geol., v. 73, no. 4, p. 269-281 (1940)
93. Stratigraphic position of Apache group of Arizona: Pan-Am. Geol., v. 74, no. 2, p. 149-153 (1940)

94. Yaquian series of the Grand Canyon: Pan-Am. Geol., v. 74, no. 2, p. 154-156 (1940)
95. Ancient peneplanations of Grand Canyon region: Pan-Am. Geol., v. 76, no. 4, p. 275-298 (1941)
96. Eastern range of Dragoon quartzite of Arizona Cambric [abst.]: Pan-Am. Geol., v. 76, no. 1, p. 77 (1941)
97. Outlines of Arizona geology: Pan-Am. Geol., v. 74, no. 4, p. 251-289, maps (1940); no. 5, p. 331-366 (1940); v. 75, no. 1, p. 19-52, maps (1941)
98. Age diversity of certain carbonic limestones of Arizona: Pan-Am. Geol., v. 76, no. 1, p. 60-62 (1941)
99. Serial relations of Cambric and pre-Cambric sedimentation at Grand Canyon [abst.]: Pan-Am. Geol., v. 76, no. 1, p. 76 (1941)
100. Diversity of Gregory's Chinle formation: Pan-Am. Geol., v. 77, no. 1, p. 76-77 (1942)
101. Derelict Devonic fauna in far Southwest: Pan-Am. Geol., v. 77, no. 4, p. 311-312 (1942)
102. Revision of Devonic stratigraphy of Arizona: Pan-Am. Geol., v. 77, no. 3, p. 225-228 (1942)
103. Synonymy of Naco limestone of Bisbee, Arizona: Pan-Am. Geol., v. 77, no. 2, p. 155-156 (1942)
104. Triplicity of sub-Aubreyan peneplanation of Grand Canyon: Pan-Am. Geol., v. 77, no. 4, p. 309-310 (1942)

KHALAF, J. M.
The water resources of the Lower Colorado River Basin: Univ. Chicago, Dept. Geol. Research Paper 22, v. 2, 234 p., illus., maps (1951)

KIDWAI, Z. U.
The relationship of ground water to alluvium in the Tucson area, Arizona: Univ. Ariz., MS Thesis, 55 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 43 (1958)

KIERSCH, George A. (*see also* Dubois, R. L., 1; Haff, J. C., 2)
1. The geology and ore deposits of the Seventy-Nine mine, Gila County, Arizona: Univ. Ariz., PhD Thesis, 124 p., maps (1947)
2. Structural control and mineralization at the Seventy-Nine mine, Gila County, Arizona: Econ. Geol., v. 44, no. 1, p. 24-39, illus., map (1949)
3. Arizona zinc and lead deposits; Seventy-Nine mine area: Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 67-82, illus., map (1951)
4. Nomenclature of sedimentary rocks in southeastern Arizona and adjacent areas: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., Table 2, p. 6 (1952)
5. Geology of the Tornado-Tam O'Shanter peaks area, Dripping Spring Mountains, Arizona: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 86-90, map (1952)
6. Uses of clay in the development of water resources [abst.]: Geol. Soc. Am. Bull., v. 65, no. 12, p. 1273-1274 (1954)
7. Geological causes for failure of Lone Pine reservoir, east-central Arizona: Econ. Geol., v. 53, no. 7, p. 854-866, illus., map (1958); [abst.]: Geol. Soc. Am. Bull., v. 65, p. 1343 (1954)
8. Nonmetallic minerals — geology, evaluation and uses (with sections by Anthony, J. W., Dubois, R. L., Howell, P. W., Haff, J. C., Keller, W. D., Krumlauf, H. E., and Wilson R. L., which are not cited individually): Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 2, 105 p., illus., maps, Univ. Ariz. Press, Tucson (1955)
9. Construction materials—geology, evaluation, and uses (with sections by Haff, J. C., and Peirce, H. W., which are not cited individually): Mineral Resources Navajo-Hopi Indian Reseravtions, Arizona-Utah, v. 3, 81 p., illus., maps, Univ. Ariz. Press, Tucson (1955)

10. Bleaching clay deposits, Sanders-Defiance Plateau district, Navajo County, Arizona: Econ. Geol., v. 50, no. 5, p. 469-494, illus., maps (1955); [abst.]: Geol. Soc. Am. Bull., v. 66, p. 1654 (1955)
11. (and Keller, W. D.) Bleaching clay deposits: Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 2, p. 41-54, map, illus., Univ. Press, Tucson (1955)
12. (and Haff, J. C.) Puzzolan: Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 2, p. 84-88, maps, Univ. Ariz. Press, Tucson (1955)
13. (and Haff, J. C.) Natural aggregate: Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 3, p. 16-27, maps, Univ. Ariz. Press, Tucson (1955)
14. Metalliferous minerals and mineral fuels—geology, evaluation, and uses (with sections by Brown, S. C., Haff, J. C., Haskell, H. S., Krumlauf, H. E., Mayo, E. B., Sayner, D. B., and Wollman, Constance, which are not cited individually): Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 1, 75 p., illus., maps, Univ. Ariz. Press, Tucson (1956)

KING, Clarence
Production of the precious metals in the United States: USGS 2nd Ann. Rep., p. 24-37, 333-402 (Ariz., p. 354-355) (1882)

KING, J. B.
Occurrence of wulfenite in Arizona: Mineralogist, v. 8, no. 6, p. 261-262 (1940)

KING, J. S.
Section of Globe quadrangle holds old silver producers: Min. Jour., v. 12, no. 10, p. 16-17 (1928)

KING, J. W.
1. (and Ellsworth, P. C.) Geology and ore deposits of Mesa VII, Lukachukai District, Arizona: USAEC, RMO-803, 8 p., map (1951)
2. Geology and ore deposits of Mesa V, Lukachukai district, Arizona: USAEC, RMO-754, 13 p., map (1951)
3. Reconnaissance of Red Rock district, Cove Mesa, and Kinusta (Tree) Mesa, Arizona: USAEC, RMO-755, 9 p., illus. (1951)

KING, P. B.
1. An outline of the structural geology of the United States: 16th Int. Geol. Cong., Guidebook 28, 57 p. (1932)
2. (and others) Tectonic map of the United States (scale 1:2,500,000): AAPG (prepared under direction of Committee on Tectonics, National Research Council) (1944)

KING, R. U.
1. (and Moore, F. B.) Pitchblende deposits in the United States [abst.]: Geol. Soc. Am. Bull., v. 62, p. 1537-1538 (1951)
2. (and Moore, F. B., and Hinrichs, E. N.) Pitchblende deposits in the United States: USGS Circ. 220, p. 8-12, maps (1952)

KINKLE, A. R., Jr.
(and Peterson, N. P.) Copper in the United States: USGS Map MR-13 (1962)

KINNISON, J. E. (*see also* Bryant, D. L., 4)
1. Geology and ore deposits of the southern section of the Amole mining district, Tucson Mountains, Pima County, Arizona: Univ. Ariz., MS Thesis, 123 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 50 (1958)
2. Chaotic breccias in the Tucson Mountains, Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 49-57 (1959); [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1727-1728 (1959)
3. Structures of the Saginaw Hill area, Tucson Mountains, Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 146-151 (1959)

KINTZINGER, P. R.
Paleomagnetic survey of Triassic rocks from Arizona: Geol. Soc. Am. Bull., v. 68, no. 7, p. 931-932, illus. (1957)

KIRK, Edwin
The Lower Ordovician El Paso limestone of Texas and its correlatives: Am. Jour. Sci., 5th ser., v. 28, no. 168, p. 443-463 (1934)

KIRKBRIDE, G. A.
Oro Flame plans development at depth: Min. Jour., v. 14, no. 9, p. 34 (1930)

KISTER, L. R. (*see also* Gatewood, J. S., 2; Heindl, L. A., 23, 26)
1. (and Hardt, W. F.) Correlation of ground-water quality with different sediment types, lower Santa Cruz basin, Arizona: Ariz. Geol. Soc. Dig., v. 4, p. 79-85 (1961)
2. (and Hatchett, J. L.) Geohydrologic data in the Navajo and Hopi Indian Reservations—Arizona, New Mexico, and Utah; Part II, selected chemical analyses of the ground water: Arizona State Land Dept. Water Res. Rep. 12-B, 58 p. (1963)

KISTLER, R. W. (*see* Creasey, S. C., 10)

KLEINHAMPL, F. J. (*see* Cannon, H. L., 2)

KLEPPER, M. R.
(and Wyant, D. G.) Uranium provinces: USGS Prof. Paper 300, p. 13-17 (1956)

KLINCK, R. E.
A valley is born: *in* Land of room enough and time enough; Univ. of N. Mex. Press, Albuquerque, p. 1-10 (1953)

KNAEBEL, J. B. (*see* Jackson, C. F.)

KNAPP, L. M.
Exploration frontiers in Mesozoic sediments of the Four Corners Region [abst.]: Oil and Gas Jour., v. 52, no. 59, p. 210 (1954)

KNECHTEL, M. M.
1. Indian Hot Springs, Graham County, Arizona: Wash. Acad. Sci. Jour., v. 25, p. 409-413 (1935)
2. Geologic relations of the Gila conglomerate in southeastern Arizona: Am. Jour. Sci., 5th ser., v. 31, p. 81-92, map (1936)
3. Geology and ground-water resources of the valley of Gila River and San Simon Creek, Graham County, Arizona: USGS Water-Supply Paper 796, p. 181-222, maps (1938)

KNOERR, A.
(and Eigo, M.) Arizona's newest copper producer — the Christmas mine: Engr. Min. Jour., v. 164, no. 1, p. 55-67 (1963)

KNOPF, Adolph
Pyrometasomatic deposits: *in* Ore deposits of the Western States, AIME Lindgren Volume, p. 537-557 (1933)

KNOWLTON, F. H.
1. New species of fossil wood *(Araucarioxylon arizonicum)* from Arizona and New Mexico: U.S. Natl. Mus. Proc., v. 11, p. 1-4 (1888)
2. The fossil forests of Arizona: American Forestry, v. 19, p. 207-218 (1913)

KNUTSON, E. G. (*see* Agey, W. W.)

KOBERG, G. E. (*see also* Harbeck, G. E.)
Effect on evaporation of releases from reservoirs on Salt River Arizona: International Association of Scientific Hydrology Bull. 19, p. 37-44, Gentbrugge, Belgium (1960)

KOENIG, G. A.
1. On paramelaconite and the associated minerals: Acad. Sci. Phila. Proc. 1891, p. 284-291 (1891); [abst.]: Am. Jour. Sci., 3rd ser., v. 43, p. 158 (1892)

2. Ueber Paramelacomit and Footeit: Zeitschr. Kryst., v. 19, p. 597-603 (1891)
3. On the new species melanochalcite and Keweenawite; with notes on some other known species: Am. Jour. Sci., 4th ser., v. 14, p. 404-416 (1902)

KOHLER, M. A. (*see also* Harbeck, G. E.)
(and Nordensen, T. J., and Baker, D. R.) Evaporation maps for the United States: U.S. Weather Bureau Technical Paper 37 (1959)

KOLB, C. R. (*see* Van Lopik, J. R.)

KOMADINA, G. A. (*see* Thurmond, R. E., 4)

KONISHI, Kenji
(and Epis, R. C.) Some early Cretaceous calcareous algae from Cochise County, Arizona: Micropaleo., v. 8, no. 1, p. 67-77 (1962)

KONSELMAN, A. S.
Grubstaking of placer miners: Min. Jour., v. 17, no. 12, p. 5 (1933)

KOONS, E. D.
1. The Uinkaret volcanic field, Arizona: Plateau, v. 15, no. 4, p. 52-59, map (1943)
2. Geology of the Uinkaret Plateau, northern Arizona: Geol. Soc. Am. Bull., v. 56, no. 2, p. 151-180, illus., map (1945)
3. Geology of the eastern Hualapai Reservation: Plateau, v. 20, no. 4, p. 53-60 (1948); Science, v. 107, no. 2784, p. 475-476 (1948)

KORNFELD, J. A.
New Devonian strike sparks northeastern Arizona oil play: World Oil, v. 57, no. 1, p. 109-116 (1963)

KOSCHMANN, A. H.
(and Bergendahl, M. H.) Gold in the United States: USGS Map MR-24 (1962)

KOTTLOWSKI, F. E.
1. Pennsylvanian rocks of southwestern New Mexico and southeastern Arizona [abst.]: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 203-204 (1958)
2. Summary of Pennsylvanian sections in southwestern New Mexico and southeastern Arizona: N. Mex. Bur. Mines Miner. Res. Bull. 66, 163 p., maps, illus. (1960)
3. Paleozoic, Cretaceous beds offer good oil prospects in southern New Mexico: World Oil, v. 155, no. 1, p. 116-120 (1962)
4. (and Havenor, K. C.) Pennsylvanian rocks of the Mogollon Rim area, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 77-84 (1962)

KRAUS, E. H. (*see* Hunt, W. F.)

KREINS, E. R.
Results of a systematic study of the ratio of meteorite to oxidite at the Barringer Meteorite Crater of Arizona: Meteoritics, v. 1, p. 29-30 (1953)

KREIGER, Medora H.
1. Cenozoic geology of the Prescott quadrangle, Arizona [abst.]: Geol. Soc. Am. Bull., v. 63, p. 1336-1337 (1952)
2. Cambrian age of some of the basal Paleozoic sandstone in central Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1729 (1959)
3. Troy quartzite (Younger Precambrian) and Bolsa and Abrigo formations (Cambrian), northern Galiuro Mountains, southeastern Arizona: USGS Prof. Paper 424-C, p. 160-164 (1961)
4. Younger Precambrian "Troy" quartzite and the Cambrian formations in the northern end of the Galiuro Mountains, Arizona [abst.]: Geol. Soc. Am. Sp. Paper 68, p. 35-36 (1962)

KRUMB, Henry
The Inspiration Copper Company: Min. World, v. 33, p. 1146 (1910)

KRUMLAUF, H. E. (*see also* Anthony, J. W., 4; Kiersch, G. A., 8, 14; Mayo, E. B., 2)

(and Wollman, Constance) [Coal] mines: *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 1, p. 53-63, maps, Univ. Ariz. Press, Tucson (1956)

KRUTCH, J. W.
Paradox of a lava flow: Ariz. Highways, v. 35, no. 8, p. 13 (1959)

KRUTTSCHNITT, Julius, Jr.
Mining conditions in Arizona: Prog. Ariz., v. 2, no. 3, p. 12, 33 (1926)

KSANDA, C. J.
(and Henderson, E. P.) Identification of diamond in the Canyon Diablo iron: Am. Mineral., v. 24, no. 11, p. 677-680 (1939)

KUELLMER, F. J.
1. (and Carmen, J. H., and Renault, J. R.) Alkali feldspars from ore and non-ore bearing parts of some intrusive porphyries [absts.]: Econ. Geol., v. 53, no. 7, p. 931 (1958); Geol. Soc. Am. Bull., v. 69, no. 12, p. 1601 (1958)
2. Compositional variation of alkali feldspars in some intrusive rocks near Globe-Miami, Arizona: Econ. Geol., v. 55, no. 3, p. 557-562 (1960)

KUHN, P. J.
Oil and gas in the Four Corners: Natural Petroleum Bibliography, Amarillo, Texas, (Apache County, p. 75-80) (1958)

KUHN, T. H. (*see also* Butler, B. S., 15; Galbraith, F. W., 3; Short, M. N., 4)
1. Childs-Aldwinkle mine, Copper Creek, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 127-130, map (1938)
2. Geology and ore deposits of the Copper Creek area, Arizona: Univ. Ariz., PhD Thesis, 147 p., illus., maps (1940)
3. Pipe deposits of the Copper Creek area, Arizona: Econ. Geol., v. 36, p. 512-538, map (1941)
4. Bunker Hill district: Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 56-65, map (1951)

KULP, J. L. (*see* Ault, W. V.; Catanzaro, E. J., 2; Eckelmann, W. R.; Miller, D. S., 1, 3)

KUMKE, C. A. (*see also* Denton, T. C., 4; Duff, G. J.)
1. Sullivan copper mine, Cochise County, Arizona: USBM, RI 4015, 4 p. (1947)
2. Zonia copper mine, Yavapai County, Arizona: USBM, RI 4023, 6 p. (1947)
3. (and Mills, H. F.) Mining methods and practices at the Iron King mine, Shattuck-Denn Mining Corp., Yavapai County, Arizona: USBM, IC 7539, 17 p. (1950)
4. (and others) Mining investigations of manganese deposits in the Maggie Canyon area, Artillery Mountains region, Mohave County, Arizona: USBM, RI 5292, 87 p., illus. (1957)

KUNZ, G. F.
1. On the agatized woods and the malachite, azurite, etc. from Arizona: N.Y. Acad. Sci. Trans., v. 5, p. 9-11 (1885)
2. On remarkable copper minerals from Arizona: N.Y. Acad. Sci. Ann. 3, p. 275-278 (1885)
3. Agatized and jasperized wood of Arizona: N.Y. Acad. Sci. Trans., v. 5, p. 9-12 (1886); Pop. Sci. Monthly, v. 28, p. 362-367 (1886)
4. Crystals of hollow quartz from Arizona: N.Y. Acad. Sci. Trans., v. 6, p. 122-124 (1887)
5. (and Huntington, O. W.) On the diamond in the Canyon Diablo meteoric iron and on the hardness of carborundum: Am. Jour. Sci., 3rd ser., v. 46, p. 470-473 (1893); [abst.]: Engr. Min. Jour., v. 57, p. 394 (1894)
6. Precious stones: USGS 16th Ann. Rep., Pt. 4, p. 595-605 (1895); 20th Ann. Rep., Pt. 6, p. 580-581 (1899)

KUPFER, D. H. (*see* Anderson, C. A., 3)

KURODA, P. K. (*see* Senftle, F. E.)

KURTZ, E. B., Jr. (*see* Anderson, R. Y., 2)

KURTZ, W. L. (*see also* Wargo, J. G., 3)

Geology of a portion of the Coyote Mountains, Pima County, Arizona: Univ. Ariz., MS Thesis, 62 p. (1955)

LACY, W. C.

1. Structure and ore deposits of the east Sierrita area: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 184-192 (1959)
2. (Contributor to section on Minerals and Fuels): *in* Arizona, its people and resources; Univ. Ariz. Press., Tucson, Arizona (1960)
3. (and Titley, S. R.) Geological development in the Twin Buttes district: Min. Cong. Jour., v. 48, no. 4, p. 62-65 (1962)

LADOO, R. B.

1. Fluorspar deposits of New Mexico and Arizona: Ariz. Min. Jour., v. 7, no. 6, p. 5-6, 42-43 (1923); no. 7, p. 8, 41-44 (1923)
2. Fluorspar mining in the western states: USBM, RI 2480, 35 p. (1923)
3. Non-metallic minerals; occurrence — preparation — utilization: McGraw-Hill Book Co., N.Y., 686 p. (1925)
4. Fluorspar; its mining, milling, and utilization, with a chapter on cryolite: USBM Bull. 244, 184 p., illus. (1927)
5. (and Myers, W. M.) Nonmetallic minerals, 2nd ed.: McGraw-Hill Book Co., N.Y., 605 p. (1951)

LAIDLEY, R. A.

(and DuBois, R. L.) Dome-shaped volcanic gas vents in Arizona: Science, v. 145, no. 3628, p. 153-154 (1964)

LAKES, Arthur

1. Copper deposits of the Ajo basin, Gila basin, Arizona: Mines and Minerals, v. 21, p. 12-15 (1900)
2. Ore in anticlinals, as at Bendigo, Australia, and Tombstone, Arizona: Min. Sci. Press, v. 88, p. 193 (1904)
3. A trip through Arizona: interesting desert scenery and the relation it bears to the geology and mining interests of the region: Mines and Minerals, v. 24, p. 356-358 (1904)

LAMB, D. C. (*see* Hammer, D. F., 2)

LANCE, J. F. (*see also* Bryant, D. L., 3; Heindl, L. A., 20; Repenning, C. A. 5)

1. Late Quarternary fossils near Tucson, Arizona [abst.]: Geol. Soc. Am. Bull., v. 63, p. 1337 (1952)
2. Description of the Naco mammoth: Pt. 3, *of* Artifacts with mammoth remains, Naco, Arizona; Am. Antiquity, v. 19, no. 1, p. 18-24, illus. (1953)
3. Age of the Bidahochi formation, Arizona [abst.]: Geol. Soc. Am. Bull., v. 65, no. 12, p. 1276 (1954)
4. Precambrian rocks of northern Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 66-70 (1958)
5. Pleistocene capybara from Arizona [abst.]: Geol. Soc. Am. Bull., v. 69, no. 12, p. 1693-1694 (1958)
6. (and Wood, P. A.) New Miocene fossil locality from southwestern Arizona [abst.]: Geol. Soc. Am. Bull., v. 69, no. 12, p. 1694 (1958)
7. Precambrian rocks of southeastern Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 12-15 (1959)
8. Geologic framework of arid basins in Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1729-1730 (1959)
9. Faunal remains from the Lehner Mammoth site: Am. Antiquity, v. 25, no. 1, p. 35-39 (1959)
10. Stratigraphic and structural position of Cenozoic fossil localities in Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 155-160 (1960)

11. (Contributor to sections of physical environment and geology): *in* Arizona, its people and resources; Univ. Ariz. Press, Tucson (1960)
12. (and Downey, J. S., and Alford, M.) Cenozoic sedimentary rocks of Tonto Basin: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 98-100 (1962)

LAND, George
Gold at Dos Cabezas: Min. Jour., v. 14, no. 24, p. 28 (1913)

LANDIS, E. R. (*see* Hayes, P. T.)

LANG, W. B.
Annotated bibliography and index map of salt deposits in the United States: USGS Bull. 1019-J, 34 p., map (1957)

LANGBEIN, W. B.
1. (and Hains, C. H., and Culler, R. C.) Hydrology of stock-water reservoirs in Arizona: USGS Circ. 110, 18 p. (1951)
2. Water yield and reservoir storage in the United States: USGS Circ. 409, 5 p. (1959)

LANGE, A. L.
1. The role of caves in dating the Grand Canyon: Plateau, v. 27, no. 3, p. 1-7, illus. (1955)
2. Cave evolution in Marble Gorge of the Colorado River: Plateau, v. 29, no. 1, p. 12-21, illus. (1956)
3. Studies on the origin of Montezuma Well and Cave. Arizona: Cave Studies, no. 9, p. 39-53 (1957)

LANGENHEIM, R. L., Jr. (*see also* Epis, R. C., 2)
1. Critical Upper Devonian faunule from Cochise County, Arizona [abst.]: Geol. Soc. Am. Bull., v. 68, no. 12, p. 1833 (1957)
2. (and Epis, R. C.) Helothurian sclerites from the Mississippian Escabrosa limestone, Arizona: Micropaleo., v. 3, no. 2, p. 165-170, illus. (1957)
3. Mississippian stratigraphy in southwestern Utah and adjacent parts of Nevada and Arizona: Intermountain Assoc. Pet. Geol., Guidebook 12th Field Conf., p. 30-39 (1963)

LAPHAM, M. H.
(and Neill, N. P.) Soil Survey of the Solomonsville area, Arizona: U.S. Dept. Agr., Field Oper. Bur. Soils, 1903, adv. sheets, 30 p., maps (1904)

LARRABEE, D. M. (*see* Griffitts, W. R.)

LARSEN, E. S. (*see also* Hess, F. L., 3)
(and Vassar, H. E.) Chalcoalumite, a new mineral from Bisbee, Arizona: Am. Mineral., v. 10, p. 79-83 (1925)

LARSEN, E. S., 3rd (*see* Garrels, R. M., 2)

LARUE, E. C.
1. Colorado River and its utilization: USGS Water-Supply Paper 395, 231 p., maps (1916)
2. Water power and flood control of Colorado River below Green River, Utah: USGS Water-Supply Paper 556, 176 p., maps (1925)

LASKY, S. G.
1. (and Webber, B. N.) Artillery Mountain manganese district, Mohave County, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 133-136, map (1938)
2. (and Webber, B. N.) Manganese deposits in the Artillery Mountains region, Mohave County, Arizona: USGS Bull. 936-R, 31 p., maps (1944)
3. (and Webber, B. N.) Manganese resources of the Artillery Mountains region, Mohave County, Arizona: USGS Bull. 961, 86 p., maps (1949)

LASSON, G. D.
Engineering geology of Glen Canyon dam site, Colorado River, Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1731 (1959)

LAST, A. W. (see Michaelson, S. D.)

LAUDERMILK, J. D.
1. (and Munz, P. A.) Plants in the dung of Nothrotherium from Rampart and Muav Caves, Arizona: Carnegie Inst. Wash. Pub. 487, p. 271-281, illus. (1938)
2. Stone from time's beginning: Desert Mag., v. 7, no. 10, p. 4-8, illus (1944)
3. Fossil weather: Desert Mag., v. 7, no. 11, p. 19-23, maps (1944)
4. They left their prints in stone: Desert Mag., v. 12, no. 2, p. 22-24, illus. (1948)

LAUGHLIN, A. W.
Petrology of the Molino Basin area of the Santa Catalina Mountains, Arizona: Univ. Ariz., MS Thesis, 53 p. (1960)

LAUSEN, Carl (*see also* Darton, N. H., 13; Lindgren, W., 17)
1. Geology of the Old Dominion mine, Globe, Arizona: Univ. Ariz., MS Thesis, 91 p. (1923)
2. (and Wilson, E. D.) Gold and copper deposits near Payson, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 120, 44 p., map (1925); Ariz. Min. Jour., v. 10, no. 19, p. 5-7, 12-14 (1927)
3. Tourmaline-bearing cinnabar veins of the Mazatzal Mountains, Arizona: Econ. Geol., v. 21, p. 782-791 (1926)
4. (and Gardner, E. D.) Quicksilver (mercury) resources of Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 122, 112 p., maps (1927)
5. Piedmontite from the Sulphur Spring Valley, Arizona: Am. Mineral., v. 12, p. 283-287 (1927)
6. The occurrence of olivine bombs near Globe, Arizona: Am. Jour. Sci., 5th ser., v. 14, p. 293-306 (1927)
7. Hydrous sulphates formed under fumerolic conditions at the United Verde mine: Am. Mineral., v. 13, p. 203-229 (1928)
8. The pre-Cambrian greenstone complex of the Jerome quadrangle: Jour. Geol., v. 38, p. 174-183, map (1930)
9. Gold veins of the Oatman and Katherine districts, Arizona: Univ. Ariz., PhD Thesis, 155 p., maps (1931)
10. Geology and ore deposits of the Oatman and Katherine districts, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 131, 126 p., maps (1931)
11. The occurrence of minute quantities of mercury in the Chinle shales at Lees Ferry, Arizona: Econ. Geol., v. 31, p. 610-617 (1936)
12. The Oatman and Katherine districts, Arizona: *in* Ore deposits as related to structural features; Princeton Univ. Press, p. 226-229 (1942)

LAUTH, R. E. (*see* Brown, S. C., 8, 10)

LAVENDER, H. M.
Mining methods at the Campbell mine of the Calumet and Arizona Mining Company, Warren, Arizona: USBM, IC 6289, 19 p. (1930)

LAVERTY, R. A.
(and Gross, E. B.) Paragenetic studies of uranium deposits on the Colorado Plateau: USGS Prof. Paper 300, p. 195-201 (1956)

LAWSON, A. C.
The gold in the Shinarump (Chinle) at Paria: Econ. Geol., v. 8, p. 434-448 (1913)

LAWSON, W. C.
Preliminary stripping of the Morenci open pit, Arizona: AIME Trans., v. 141, p. 41-61, illus. (1940)

LAWTHERS, R. L.
(and Mark, H. R.) Bibliography of titanium deposits of the world: USGS Bull. 1019-G, 64 p. (1957)

LAYTON, D. W.
Stratigraphy and structure of the southwestern foothills of the Rincon Mountains, Pima County, Arizona: Univ. Ariz., MS Thesis, 87 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 51 (1958)

LEACH, R. B.
Pima County review: Ariz. Min. Jour., v. 2, no. 1, p. 35-39 (1918)

LE DUCHAT D'AUBIGNY, J.
Le bois fossil de l'Arizona dans les collections Francaises: Soc. Sci. Nancy Bull. mensuel, n.s., Fasc., 4, no. 2, p. 27-28 (1939)

LEE, C. A.
(and Borland, G. C.) The geology and ore deposits of the Cuprite mining district: Univ. Ariz., MS Thesis, 54 p., map (1935)

LEE, W. T.
1. The underground waters of Gila Valley, Arizona: USGS Water-Supply Paper 104, 71 p., map (1904)
2. Underground waters of Salt River Valley, Arizona: USGS Water-Supply Paper, 136, 196 p., map (1905)
3. Geology of the lower Colorado River: Geol. Soc. Am. Bull., v. 17, p. 275-285 (1906)
4. The late history of the lower Colorado River [abst.]: Science, new ser., v. 25, p. 390-391 (1907)
5. Geologic reconnaissance of a part of western Arizona: USGS Bull. 352, p. 9-80, map (1908)
6. Relation of the Cretaceous formations to the Rocky Mountains in Colorado and New Mexico: USGS Prof. Paper 95, p. 27-58 (Ariz., p. 47-48), maps (1915); [absts.]; Wash. Acad. Sci. Jour., v. 5, p. 29-30 (1915); Geol. Soc. Am. Bull., v. 26, p. 114 (1915)

LEGGE, J. A., Jr.
Paragenesis of the ore minerals of the Miami mine: Univ. Ariz., MS Thesis, 47 p. (1939)

LEHNER, R. E. (*see also* Anderson, C. A., 10)
1. Geology of the Clarkdale quadrangle, Arizona: USGS Bull. 1021-N, p. 511-592, illus., map (1958)
2. Cenozoic history of the Jerome region, Yavapai County, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 94-98 (1962)

LEHR, J. H.
Empirical studies of laminar flow in porous consolidated media: Univ. Ariz., PhD Thesis (1962)

LEIPER, Hugh
Octahedral diamond crystal found in Canyon Diablo meteorite: Mineral Hobbyist, v. 2, no. 1, p. 9, 22 (1953)

LEITH, C. K. (*see* Van Hise, C. R., 2)

LEMMON, D. M.
(and Tweto, O. L.) Tungsten in the United States: USGS Map MR-25 (1962)

LEMONE, D. V.
The Devonian stratigraphy of Cochise, Pima, and Santa Cruz Counties, Arizona, and Hidalgo County, New Mexico: Univ. Ariz., MS Thesis, 108 p. (1959)

LENON, Robert
Map of Santa Cruz County, Arizona showing patented claims and mines: Private Pub., Box 525, Patagonia, Arizona (1947)

LEONARD, F. C.
1. Small aerolites recovered from the site of the Holbrook, Arizona, fall of 1912: Pop. Astron., v. 49, no. 7, p. 384-387 (1941); Soc. Research Meteor. Contrib., v. 2, p. 228-291 (1942)
2. Crater Mound, Arizona: Soc. Research Meteor. Contrib., v. 3, no. 5, p. 249 (1946); Pop. Astron., v. 54, no. 3, p. 152-153 (1946)

3. On the place and name of the Ehrenburg, Yuma County, Arizona, fall: Soc. Research Meteor. Contrib., v. 3, no. 5, p. 249-250 (1946); Pop. Astron., v. 54, no. 3, p. 153 (1946)

LEONARD, R. J.
1. Pedestal rocks resulting from disintegration (Texas Canyon): Jour. Geol., v. 35, p. 469-474 (1927)
2. An earth fissure in southern Arizona: Jour. Geol., v. 37, p. 765-774 (1929)
3. Polygonal cracking in granite: Am. Jour. Sci., 5th ser., v. 18, p. 487-492 (1929)
4. Alteration of schist and porphyry by fire [abst.]: Pan-Am. Geol., v. 53, p. 316 (1930)

LEOPOLD, Luna B.
Climatic character of the interval between the Jurassic and Cretaceous in New Mexico and Arizona: Jour. Geol., v. 51, no. 1, p. 56-62, map (1943); [abst.]: AAPG Bull., v. 26, no. 5, p. 901 (1942)

LEWIS, A. S.
1. Goldfield mining camp: Ariz. Min. Jour., v. 3, no. 1, p. 48 (1919)
2. Ore deposits of Cave Creek district in Arizona: Engr. Min. Jour., v. 110, p. 713-716, map (1920)

LEWIS, D. D. (*see also* Skibitzke, H. E., 3)
Surface-water hydrology of arid lands [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1731 (1959)

LEWIS, G. E.
1. American Triassic mammal-like vertebrates [abst.]; Geol. Soc. Am. Bull. v. 69, no. 12, p. 1735 (1958)
2. (and Irwin, J. H., and Wilson, R. F.) Age of the Glen Canyon group (Triassic and Jurassic) on the Colorado Plateau: Geol. Soc. Am. Bull., v. 72, no. 9, p. 1437-1440 (1961)

LEWIS, W. S.
Origin of the crater: Desert Mag., v. 9, no. 11, p. 29 (1946)

LINCOLN, E. P.
Mammalian fauna from Wupatki ruin: Plateau, v. 34, no. 4, p. 129-134 (1962)

LINDBLOM, R. A. (*see* Dare, W. L., 1)

LINDGREN, W. (*see also* Hill, J. M., 4)
1. The gold production of North America, its geological derivation and probable future: Min. Sci. Press, v. 85, p. 177, 193, 206 (1902); International Mining Congress, 5th Annual Session Proceedings, p. 29-36 (1903)
2. Copper deposits at Clifton, Arizona: USGS Bull. 213, p. 133-140 (1903); Engr. Min. Jour., v. 75, p. 705-707 (1903)
3. The geological features of the gold production of North America [with discussion]: AIME Trans., v. 33, p. 790-845, 1077-1083 (1903); v. 34, p. 921 (1904); [reprinted]: *in* Ore deposits, AIME Emmons Volume, p. 424-449 (1913)
4. (and Hillebrand, W. F.) Minerals from the Clifton-Morenci district, Arizona: Am. Jour. Sci., 4th ser., v. 18, p. 448-460 (1904); USGS Bull. 262, p. 42-54 (1905)
5. The production of gold in the United States in 1904: USGS Bull. 260 (Ariz., p. 32, 36) (1904)
6. The production of silver in the United States in 1904: USGS Bull. 260 (Ariz., p. 41) (1904)
7. Description of the Clifton quadrangle: USGS Folio 129, 13 p., maps (1905)
8. The copper deposits of the Clifton-Morenci district, Arizona: USGS Prof. Paper 43, 375 p., maps (1905); [reviewed by Ransome, F. L.]: Econ. Geol., v. 1, p. 612-615 (1906)
9. The genesis of the copper deposits of Clifton-Morenci, Arizona: AIME Trans., v. 35, p. 511-550 (1905); [absts.]: Min. Rep., v. 50, p. 617 (1904): Min. Sci.

Press, v. 89, p. 438 (1904); [reprinted]: *in* Ore deposits, AIME Emmons Volume, p. 517-556 (1913)
10. Sketch of the geology and ore deposits of the Cherry Creek district, Arizona [discussion]: Econ. Geol., v. 1, p. 698-699 (1906)
11. Metallogenetic epochs: Econ. Geol., v. 4, p. 415 (1909); Can. Min. Inst. Jour., v. 12, p. 102-113 (1910)
12. Resources of the United States in gold, silver, copper, lead, and zinc: USGS Bull. 394 (Ariz., p. 121-154) (1909)
13. Mineral deposits: McGraw-Hill Book Co., N.Y., 833 p. (1913); 2nd ed.: 959 p. (1919); 3rd ed.: 1049 p. (1928); 4th ed.; 930 p., illus. (1933)
14. The igneous geology of the Cordillera and its problems: *in* Problems of American geology, Yale Univ., New Haven, p. 234-286 (1915)
15. Gold and silver deposits in North and South America: Pan American Sci. Cong., Washington, 2nd Proc., sec. 7, v. 8, p. 560-577 (1917); AIME Bull. 112, p. 721-746, maps (1916); Trans., v. 55, p. 883-909, maps (1917); Smithsonian Inst. Ann. Rep. 1917, p. 147-173 (1919)
16. Ore deposits of the Jerome and Bradshaw Mountains quadrangles, Arizona: USGS Bull. 782, 192 p., maps (1926)
17. (and Lausen, Carl) The pre-Cambrian greenstone complex of the Jerome quadrangle by Carl Lausen, a discussion: Jour. Geol., v. 38, p. 460-465 (1930)
18. Differentiation and ore deposition, Cordilleran region of the United States: *in* Ore deposits of the Western States, AIME Lindgren Volume, p. 152-180 (1933)
19. Coronadite "redivivus": Am. Mineral., v. 18, p. 548-550 (1933)

LINES, H. L.
Mining and milling methods and costs at the Ash Peak Mine, Duncan, Arizona: USBM, IC 7119, 26 p. (1940)

LINTER, R. E.
Beneficiation of barite at Arizona Barite Company, Mesa, Arizona: Denver Equipment Co. Bull. M4-B56, 8 p. (1950)

LIPPINCOTT, J. B.
Storage of water on Gila River, Arizona: USGS Water-Supply Paper 33, 98 p. (1900)

LITTLE, J. M.
Bisbee geology [discussion]: Engr. Min. Jour., v. 123, p. 970 (1927)

LITTLER, Janet (*see* Chao, E. C. T., 2, 3; Mead, C. W.)

LIVINGSTON, D. E. (*see also* Damon, P. E., 4, 10)
Older Precambrian rocks near Salt River Canyon, central Gila County, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 55 (1962)

LOCK, Alfred G.
Gold, its occurrence and extraction: E. and F. N. Spon (publishers), London and New York, 1229 p. (Ariz., p. 128-129) (1882)

LOCKE, Augustus (*see also* Billingsley, P., 1, 2, 3, 4; Merwin, H. E., 1)
1. Leached outcrops as guides to copper ore: Williams and Wilkins Co., Baltimore, 175 p. (1926)
2. The formation of certain ore bodies by mineral stoping: Econ. Geol., v. 21, p. 431-453, illus. (1926)
3. Disseminated copper deposits: *in* Ore deposits of the Western States; AIME Lindgren Volume, p. 616-623 (1933)

LOCKWOOD, F. C.
Early mines and mining in Arizona: *in* Dedication of the Douglas Memorial Building for Mining and Metallurgy; Univ. Ariz. Gen Bull. 5, p. 11-27 (1940)

LOEL, Wayne
Use of aerial photographs in geologic mapping: Min. Tech., Tech. Paper 809 (1938); AIME Trans., v. 144, p. 356-409, illus. (1941)

LOELTZ, O. J.
Quantitative ground-water investigations in the Lower Colorado River area: USGS Open-file Rep., 7 p. (1963)

LOEW, Oscar
1. Lieutenant Wheeler's Exposition nach Neu Mexico und Arizona: Petermanns Mitteilungen, v. 20, p. 401-416, 453-461, map, Gotha (1874)
2. Report upon the mineralogical, agricultural, and chemical conditions observed in portions of Colorado, New Mexico, and Arizona (including analyses of soils and a chapter on the eruptive rocks of Arizona and New Mexico): U.S. Geog. and Geol. Surveys West of 100th Mer. (Wheeler), v. 3, p. 569-661 (1875)
3. Ein geologischer Spaziergang durch Neu-Mexico und Arizona: Geographische Gesellschaft in München, Jbr. 6, zt. 42-51 (1880)

LOHR, E. W.
(and others) The industrial utility of public water supplies in the Mountain States: USGS Circ. 203, p. 79 (1952)

LOKKE, D. H.
Paleontological reconnaissance of subsurface Pennsylvanian in southern Apache and Navajo Counties, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 84-87 (1962)

LONG, Austin (*see* Damon, P. E., 7)

LONG, J. T., Jr. (*see* Olson, G. G.)

LONGWELL, C. R.
1. Geology of the Muddy Mountains, Nevada, with a section to the Grand Wash Cliffs in western Arizona: Am. Jour. Sci., 5th ser., v. 1, p. 39-62 (1921)
2. (and Miser, H. D., Moore, R. C., Bryan, K., and Paige, S.) Rock formations in the Colorado Plateau of southeastern Utah and northern Arizona: USGS Prof. Paper 132, p. 1-23 (1923)
3. Structural studies in southern Nevada and western Arizona: Geol. Soc. Am. Bull., v. 37, p. 551-583 (1926); [absts.]: p. 165 (1926); Pan-Am. Geol., v. 45, p. 164 (1926)
4. Geology of the Muddy Mountains, Nevada, with a section through the Virgin Range to the Grand Wash Cliffs, Arizona: USGS Bull. 798, 152 p., maps (1928)
5. Meteor Crater is not a limestone sink: Science, new ser., v. 73, p. 234-235 (1931)
6. Geology of the Boulder Reservoir floor: Geol. Soc. Am. Bull., v. 47, p. 1393-1476, maps (1936); [abst.]: Proc. 1934, p. 91 (1935):
7. Sedimentation in relation to faulting: Geol. Soc. Am. Bull., v. 48, p. 433-441 (1937); [abst.]: Proc. 1937, p. 125 (1938)
8. Tectonic map of the United States: AAPG Bull., v. 20, no. 12, p. 1767-1774 (1944); [absts.]: Oil and Gas Jour., v. 38, no. 48, p. 50 (1940); *with title,* Tectonic maps and tectonic provinces of the United States: AAPG Bull., v. 30, no. 5, p. 742 (1946); Oil and Gas Jour., v. 44, no. 48, p. 87 (1946)
9. Low-angle normal faults in the Basin and Range Province: Am. Geophys. Union Trans., v. 26, pt. 1, p. 107-118, maps (1945)
10. How old is the Colorado River?: Am. Jour. Sci., v. 244, no. 12, p. 817, 835, illus. (1946); [abst.]: Geol. Soc. Am. Bull., v. 56, no. 12, pt. 2, p. 1177 (1945)
11. Structure in the Arizona-Nevada boundary area [abst.]: Geol. Soc. Am. Bull., v. 60, p. 1905-1906 (1949)
12. Tectonic theory viewed from the Basin Ranges: Geol. Soc. Am. Bull., v. 61, p. 413-433, illus. maps (1950)

13. Megabreccia developed downslope from large faults: Am. Jour. Sci., v. 249, p. 343-355, map (1951)
14. Lower limit of Cambrian in the Cordilleran region: Wash. Acad. Sci. Jour., v. 42, no. 7, p. 209-212 (1952)
15. Geologic setting of Lake Mead: Chapt. C. *in* Pt. 1 *of* Comprehensive survey of sedimentation in Lake Mead, 1948-1949; USGS Prof. Paper 295, p. 11-20 (1960)
16. Reconnaissance geology between Lake Mead and Davis Dam, Arizona-Nevada: USGS Prof. Paper 374-E, 51 p. (1963)

LOOFBOUROW, R. W. (*see* Warren, H. V., 1)

LORD, E. C. E.
Petrographic report on rocks from the United States-Mexico boundary: U.S. Natl. Mus. Proc., v. 21, p. 773-782 (1899)

LORD, J. O.
Metal structure in Odessa, Texas, and Canyon, Diablo, Arizona Meteorites [abst.]: Pop. Astron., v. 49, no. 9, p. 493-500 (1941); Soc. Research Meteor. Contrib., v. 2, no. 4, p. 298-305 (1941)

LORD, N. W.
Analyses of coals in the United States: USBM Bull 22, pt. 1 (Ariz., p. 47) (1913)

LORING, W. B. (*see also* Galbraith, F. W., 9)
Geology and ore deposits of the Mountain Queen area, northern Swisshelm Mountains, Arizona: Univ. Ariz., MS Thesis, 65 p., maps (1947)

LOS ANGELES CHAMBER OF COMMERCE
Arizona mines (sales opportunities): Board of Supervisors, Los Angeles County, 36 p. (1943); (1946)

LOUGEE, R. J.
The Colorado Delta by Godfrey Glenton Sykes, 1937 [review]: Geomorphology, v. 1, no. 1, p. 79-80 (1938)

LOVE, S. K. (*see* Howard, C. S., 4)

LOVEJOY, E. M. P. (*see also* Miller, R. D.)
1. Hurricane fault problem, Utah and Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1732 (1959)
2. The Hurricane fault zone, and the Cedar Pocket Canyon-Shebit-Gunlock fault complex, southwestern Utah and northwestern Arizona: Univ. Ariz., PhD Thesis, 195 p. (1964)

LOVEMAN, M. H.
Geology of the Miami copper mine: Min. Sci. Press, v. 105, p. 146-148 (1912)

LOVERING, T. S.
1. Thermal gradients as a record of rate of oxidation and of recent climatic changes in Arizona [abst.]: Geol. Soc. Am. Bull., v. 56, no. 12, p. 1177-1178 (1945)
2. Geothermal gradients, recent climatic changes, and rate of sulfide oxidation in the San Manuel district, Arizona: Econ. Geol., v. 43, no. 1, p. 1-20 (1948)
3. (and Huff, L. C., and Almond, H.) Dispersion of copper from the San Manuel copper deposit, Pinal County, Arizona: Econ. Geol., v. 45, p. 493-514, illus. (1950)

LOWELL, J. D. (*see also* Johnson, W. P., 2)
1. Applications of cross-stratification studies to problems of uranium exploration Chuska Mountains, Arizona: Econ. Geol., v. 50, no. 2, p. 177-185, illus. (1955)
2. Occurrence of uranium in Seth-la-Kai diatreme, Hopi Buttes, Arizona: Am. Jour. Sci., v. 254, no. 7, p. 404-412, illus. map (1956)

LUCAS, F. A.
1. The fossil bison of North America; U.S. Natl. Mus. Proc., v. 21, p. 755-771 (1899)
2. Vertebrates from the Trias of Arizona: Science, new ser., v. 14, p. 376 (1901)
3. A new batrachian and a new reptile from the Trias of Arizona: U.S. Natl. Mus. Proc. v. 27, p. 193-195 (1904)

LUDDEN, R. W.
Geology of the Campo Bonito area, Oracle, Arizona: Univ. Ariz., MS Thesis, 52 p., maps (1950)

LUEDKE, R. G. (*see also* Shoemaker, E. M., 1)
(and Shoemaker, E. M.) Tectonic map of the Colorado Plateau: USGS Trace Elements Memo. Rep. 301 (1952)

LUFF, P. (*see* Needham, C. E., 1, 2; Woodward, G. E., 1, 2)

LUGN, R. V. (*see* Moore, H. J.; Shoemaker, E. M., 8, 10)

LULL, R. S.
Fossil footprints from the Grand Canyon of the Colorado: Am. Jour. Sci., 4th ser., v. 45, p. 337-346 (1918)

LUMHOLTZ, K. S. (Carl)
New trails in Mexico: 411 p., maps, New York (1912)

LUND, P. H.
Oil and gas prospects in Arizona: Oil Weekly, v. 117, no. 2, p. 54-56, map (1945)

LUNDBERG, Hans
Some geophysical data on the Meteor Crater in Arizona [abst.]: Geol. Soc. Am. Bull., v. 49, p. 1953 (1939)

LUNT, H. F.
The copper deposits of the Kaibab Plateau, Arizona [discussion]: AIME Trans., v. 34, p. 989-990 (1904)

LUQUER, L. M. (*see* Moses, A. J., 1)

LUTRELL, Estelle
Bibliography of Arizona mining, metallurgy, and geology: Univ. Ariz., Ariz. Bur. Mines Bull. 23, 49 p. (1915)

LUTTON, R. J.
1. Some structural features in Southern Arizona: Univ. Ariz., MS Thesis, 138 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 51 (1958)
2. Transverse structures in southern Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1733 (1959)
3. Pegmatites as a link between magma and copper-molybdenum ore: Mines Mag., v. 49, p. 15-19, 24, illus. (1959)
4. A lensoidal rhyolite near Twin Buttes, Arizona: Ariz. Geol. Soc. Dig., v. 4, p. 43-49 (1961)

LUTTRELL, G. W.
Bibliography of iron ore resources of the world (to January 1955): USGS Bull. 1019-D, 172 p. (1957)

LYLE, D. A.
1. Notes on mining districts in Nevada, California, and Arizona: U.S. 42nd Cong., 2nd sess., Sen. Ex. Doc. 65, p. 42-43, 45-46, 49-51 (1872)
2. Report of reconnaissance in Nevada and Arizona: U.S. 42nd Cong., 2nd Sess., Sen. Ex. Doc. 65, p. 73-89 (1872)

LYONS, P. L.
A gravity map of the United States: Tulsa Geol. Soc. Dig., v. 18, p. 33-43 (1950)

LYONS, T. R. (*see* Sandberg, G. W.)

LYYTIKAINEN, H. T. E.
An analysis of radar profiles over mountainous terrain: Photogramm. Engr. v. 26, no. 3, p. 403-412 (1960)

McALLISTER, J. F.
Geologic maps of the Ord quicksilver mine, Mazatzal Mountains, Arizona: USGS Open-file Rep. (1955)

McBIRNEY, Alexander, R.
1. Factors governing emplacement of volcanic necks: Am. Jour. Sci., v. 257, no. 6, p. 431-448 (1959)
2. Breccia pipe near Cameron, Arizona — discussion: Geol. Soc. Am. Bull., v. 74, no. 2, p. 227-232 (1963)

McCARN, H. L.
The Planet copper mines: Engr. Min. Jour., v. 78, p. 26-27 (1904)

McCARTHY, Donald P.
Geological evaluation of oil and gas possibilities of southwestern Arizona: *in* Oil, Gas, and Helium in Arizona, Arizona Development Board *for* Arizona Oil and Gas Conservation Commission, p. 30 (1961)

McCARTHY, Joe
United Verde probably was first mine known in State: Ariz. Min. Jour., v. 7, no. 10, p. 14-15 (1923)

McCLINTOCK, J. H.
1. Arizona, prehistoric, aboriginal, pioneer, modern: S. J. Clarke Pub. Co., Chicago, 3 vols. (1916)
2. Arizona's supremacy, production of wealth, mining, agriculture: Ariz. Min. Jour., v. 4, no. 1, p. 5, 7, 27-28 (1920)
3. A basket soon emptied: Ariz. Min. Jour., v. 5, no. 19, p. 27-28 (1922)
4. History of metal mining industry in territorial days: Ariz. Min. Jour., v. 5, no. 20, p. 7, 19-20 (1922)
5. The Calumet and Arizona: Engr. Min. Jour., v. 113, p. 209 (1922)
6. High grading at the old Vulture and Silver King: Min. Jour., v. 11, no. 19, p. 14 (1928)
7. Salt in the Southwest: Min. Jour., v. 12, no. 5, p. 15 (1928)

McCLURE, F. G.
Gold placers of Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 10, 15 p., map (1915)

McCLYMONDS, Neal E. (*see also* Akers, J. P., 3, 10, 11; Bryant, D. L., 7; Heindl, L. A., 32)
1. Stratigraphy and structure of the southern portion of the Waterman Mountains, Pima County, Arizona; Univ. Ariz., MS Thesis, 157 p. (1957)
2. The stratigraphy and structure of the Waterman Mountains, Pima County, Arizona [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 43-44 (1958)
3. Paleozoic stratigraphy of the Waterman Mountains, Pima County, Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz. p. 67-76 (1959)
4. Precambrian and Paleozoic sedimentary rocks on the Papago Indian Reservation, Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 77-84 (1959)
5. Stratigraphy and structure of the central Waterman Mountains, Pima County, Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1735-1736 (1959)
6. Effects of a buried anticline on ground water in Navajo sandstone in the Copper mine-Preston Mesa area, Coconino County, Arizona: USGS Prof. Paper 424-D, p. 79-81 (1961)

McCOLLY, R. A.
Geology of the Saguaro National Monument area, Pima County, Arizona: Univ. Ariz., MS Thesis, 80 p. (1961)

McCONNELL, A. B.
Review of mining in Arizona, 1910: Min. World, v. 34, p. 143-147 (1911)

McCORKELL, S. R.
Thumb Butte district, Arizona: Min. World, v. 33, p. 1002 (1910)

McCOY, S. Jr.
A description of the limestone blocks of the Tucson Mountain Chaos, Pima County, Arizona: Univ. Ariz., MS Thesis, 45 p. (1964)

McCRORY, F. J. (*see also* Wilson, E. D., 88)
1. (and O'Haire, R. T., compilers) Map of known metallic mineral occurrences of Arizona (Scale 1:1,000,000): Univ. Ariz., Ariz. Bur. Mines (1961)
2. (and O'Haire, R. T., compilers) Map of known nonmetallic mineral occurrences of Arizona (scale 1:1,000,000): Univ. Ariz., Ariz. Bur. Mines (1961)

McCULLOUGH, E. J., Jr. (*see also* Mayo, E. B., 10)
A structural study of the Pusch Ridge-Romero Canyon area, Santa Catalina Mountains, Arizona: Univ. Ariz., PhD Thesis, 67 p. (1963)

McCULLOUGH, R. A. (*see* Heindl, L. A., 22)

McDEVITT. George
Gold Cliff exploration property shows great promise for future: Ariz. Min. Jour., v. 5, no. 10, p. 26-28 (1921)

McDONALD, C. C.
Progress on water resource investigations in the Lower Colorado River area: USGS Open-file Rep., 4 p. (1963)

McDONALD, H. R. (*see also* Morrison, R. B., 4; Turner, S. F., 3, 13)
1. (and Padgett, H. D.) Geology and groundwater resources of the Verde River Valley near Fort McDowell, Arizona: USGS Mimeo. Rep., 99 p. (1945)
2. (and Bluhm, F. I.) Further investigations of the groundwater resources of the Verde River Valley near Fort McDowell, Arizona: USGS Mimeo. Rep., 20 p. (1946)
3. (and Wolcott, H. N., Bluhm, F. I., and Hem, J. D.) Geology and groundwater resources of Paradise Valley, Maricopa County, Arizona: USGS Mimeo. Rep., 34 p., map (1947)
4. (and Wolcott, H. N., and Hem, J. D.) Geology and groundwater resources of the Salt River Valley area, Maricopa and Pinal Counties, Arizona: USGS Mimeo. Rep., 45 p., maps (1947)
5. (and Wolcott, H. N., and Bluhm, F. I.) Geophysical investigation of possible aquifers in the vicinity of Williams and Moore Ranches, Verde River Valley, Arizona: USGS Ground-Water Branch Mimeo. Rep. 12 p. (1948)

McDONALD, J.
The big new kicker at ASARCO: Fortune Magazine, v. 67, no. 1, p. 77-83 (1963)

McGEE, W. J.
1. Map of the United States — areal distribution of geologic groups (preliminary compilation): USGS 5th Ann. Rep., p. 34-38 (1885); Annuaére Geologique Univ., Dagincourt, v. 2, p. 26-27, map (1886)
2. Sheet-flood erosion: Geol. Soc. Am. Bull., v. 8, p. 87-112 (1897); [absts.]: Am. Geol., v. 18, p. 228-229 (1896); Science, new ser., v. 4, p. 385 (1896)

McGOON, D. O., Jr.
Occurrences of Paleozoic carbonaceous deposits in the Mogollon Rim region: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 89-92 (1962)

McGOUGH, P. J.
References on the early history of the Tucson, Arizona, meteorites, the "Irwin-Ainsa" and "Carleton" irons: Pop. Astron., v. 51, no. 9, p. 511-518 (1943); no. 10, p. 563-567 (1943); Soc. Research Meteor. Contrib., v. 3, no. 2, p. 108-119 (1943)

McGRATH, J. G. (*see* Roach, C. H.)

McINNIS, W.
Molybdenum, a materials survey: USBM, IC 7784, (Ariz., p. 10) (1957)

McKAY, E. J. (*see* Foster, R. W.)

McKEE, E. D. (*see also* Camp, C. L., 8)

1. Ancient landscapes of the Grand Canyon region; the geology of Grand Canyon, Zion, Petrified Forest, and Painted Desert: Lockwood-Hazel Co., Atchison, Kan., 50 p. (1931)
2. Grand Canyon climates during the age of mammals: Mus. N. Ariz., Mus. Notes, v. 4, no. 10, p. 1-7 (1932)
3. Some *Fucoides* from Grand Canyon: Grand Canyon Nature Notes, v. 7, no. 8, p. 77-81 (1932)
4. The Coconino sandstone—its history and origin: Carnegie Inst. Wash. Pub. 440, p. 77-115, map (1934)
5. Remnants of the age of dinosaurs on south rim of Grand Canyon: Grand Canyon Nature Notes, v. 9, no. 5, p. 310-314 (1934)
6. An investigation of the light-colored cross-bedded sandstone of Canyon de Chelly, Arizona: Am. Jour. Sci., 5th ser., v. 38, p. 219-233 (1934)
7. Occurrence of Triassic sediments on the rim of Grand Canyon: Wash. Acad. Sci. Jour., v. 25, p. 184-187 (1935)
8. Some observations on the middle Permian marine formations of northern Arizona [abst.]: Wash. Acad. Sci. Jour., v. 25, p. 504 (1935)
9. A *Conularia* from the Permian of Arizona: Jour. Paleo., v. 9, p. 427-429 (1935)
10. Triassic pebbles in northern Arizona containing invertebrate fossils: Am. Jour. Sci., 5th ser., v. 33, p. 260-263 (1936)
11. Researches on the recording and classifying of bedding patterns in the Colorado River Delta and other modern deposits: Carnegie Inst. Wash. Yearbook 36, p. 340 (1937)
12. Researches on Paleozoic stratigraphy in western Grand Canyon: Carnegie Inst. Wash. Yearbook 36, p. 340-341 (1937)
13. Researches on Middle Permian strata of Grand Canyon National Park: Carnegie Inst. Wash. Yearbook 36, p. 341-343 (1937)
14. Researches on Paleozoic stratigraphy in Grand Canyon: Carnegie Inst. Wash. Yearbook 37, p. 358-359 (1938)
15. The environment and history of the Toroweap and Kaibab formations of northern Arizona and southern Utah: Carnegie Inst. Wash. Pub. 492, 268 p., maps (1938)
16. Original structures in Colorado River flood deposits of Grand Canyon: Jour. Sed. Pet., v. 8, no. 3, p. 77-83 (1938)
17. Some types of bedding in the Colorado River Delta: Jour. Geol., v. 47, p. 64-81 (1939)
18. Studies on the history of Grand Canyon Paleozoic formations: Carnegie Inst. Wash. Yearbook 38, p. 313-314 (1939)
19. Permian deposits of the Arizona-Utah basin: N. Y. Acad. Sci. Trans., ser. 2, v. 2, no. 6, p. 153-155 (1940)
20. Three types of cross-lamination in Paleozoic rocks of northern Arizona: Am. Jour. Sci., v. 238, no. 11, p. 811-824, maps (1940)
21. *Derbya Arizonensis,* new name for *D. Regularis McKee*: Jour. Paleo., v. 13, no. 1, p. 91 (1941)
22. Marginal Paleozoic seas of northern Arizona: [abst.]: Geol. Soc. Am. Bull., v. 52, no. 12, p. 2004 (1941)
23. (and Schenk, E. T.) The lower canyon lavas and related features at Toroweap in Grand Canyon: Jour. Geomorph., v. 5, no. 4, p. 245-273, map (1942)
24. Some stratigraphic principles illustrated by Paleozoic deposits of northern Arizona: Am. Jour. Sci., v. 241, no. 2, p. 105-108 (1943)
25. Tracks that go uphill (in Coconino sandstone, Grand Canyon, Arizona): Plateau, v. 16, no. 4, p. 61-72 (1944)

26. Small-scale structures in Coconino sandstone of northern Arizona: Jour. Geol., v. 53, no. 5, p. 313-325 (1945)
27. Oak Creek Canyon: Plateau, v. 18, no. 2, p. 25-32 (1945)
28. Cambrian history of the Grand Canyon region: Carnegie Inst. Wash. Pub. 563, 168 p. (1945)
29. Onyx marble in northern Arizona: Plateau, v. 10, no. 1, p. 9-14 (1946)
30. Paleozoic seaways in western Arizona: AAPG Bull., v. 31, no. 2, p. 282-292 (1947)
31. Experiments on the development of tracks in fine cross-bedded sand: Jour. Sed. Pet., v. 17, no. 1, p. 23-28 (1947)
32. Original colors preserved in fossil seashells: Plateau, v. 19, no. 3, p. 48-51 (1947)
33. Fossil life (and) features of the canyon country: *in* Ch. 2 *of* The inverted mountains—canyons of the west, R. Peattie, Ed.; Vanguard Press, N.Y., p. 67-82, illus. (1948)
34. Stratigraphic features of the Moenkopi formation [abst.]: Geol. Soc. Am. Bull., v. 59, p. 1377-1378 (1948)
35. Classification and interpretation of cross-lamination [abst.]: Geol. Soc. Am. Bull., v. 59, p. 1378 (1948)
36. Facies changes in the Colorado Plateau: Geol. Soc. Am. Mem. 39, p. 35-48 (1949)
37. Ripple marks of the Triassic Moenkopi formation [abst.]: Geol. Soc. Am. Bull., v. 60, p. 1941 (1949)
38. Opportunities for petroleum development in Arizona [abst.]: AAPG Bull., v. 34, p. 2379-2380 (1950)
39. Isopach studies in Arizona and adjoining areas [abst.]: Geol. Soc. Am. Bull., v. 61, p. 1557 (1950)
40. Sedimentary basins of Arizona and adjoining areas: Geol. Soc. Am. Bull., v. 62, p. 481-506, maps (1951)
41. Triassic deposits of the Arizona-New Mexico border area: N. Mex. Geol. Soc., Guidebook 2nd Field Conf., p. 85-92 (1951)
42. General geology of southern Arizona: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 1-5 (1952)
43. What are the prospects for oil and gas in northern Arizona?: Oil and Gas Jour., v. 51, no. 9, p. 78-79, illus. (1952)
44. Geology of northern Arizona with emphasis upon the prospects for oil and gas production: Interstate Oil Compact Commission Quart. Bull., v. 2, no. 1, p. 10-11 (1952)
45. Uppermost Paleozoic strata of northwestern Arizona and southwestern Utah: Utah Geol. Soc., Guidebook no. 7, p. 52-55 (1952)
46. (and Evensen, C. G., and Grundy, W. D.) Studies in sedimentology of the Shinarump conglomerate of northeastern Arizona: USAEC, RME-3089, 48 p., illus., tables (1953)
47. (and Weir, G. W.) Terminology for stratification and cross-stratification in sedimentary rocks: Geol. Soc. Am. Bull., v. 64, no. 4, p. 381-389, illus. (1953)
48. Stratigraphy and history of the Moenkopi formation of Triassic age: Geol. Soc. Am. Mem. 61, 133 p. (1954)
49. Relationship between fauna and lithology in the Moenkopi formation [absts.]: Jour. Sed. Pet., v. 24, no. 2, p. 136 (1954); Jour. Paleo., v. 28, no. 4, p. 508 (1954)
50. Paleotectonic maps of the Jurassic system (with a separate section on paleogeography by R. W. Imlay): USGS Map I-175, 6 p. (1956)
51. The Redwall limestone: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 74-77, illus. (1958)

52. Spatial relations of fossils and bedded cherts in the Redwall limestone, Arizona: USGS Prof. Paper 400-B, p. 461-463 (1960)
53. Lithologic subdivisions of the Redwall limestone in northern Arizona—their paleogeographic and economic significance: USGS Prof. Paper 400-B, p. 243-245 (1960)
54. Cycles in carbonate rocks: Am. Jour. Sci., v. 258, p. 230-233 (1960)
55. Triassic uplift along the west flank of the Defiance positive element, Arizona: USGS Prof. Paper 475-C, p. 28-29 (1963)
56. Nomenclature for lithologic subdivisions of the Mississippian Redwall limestone, Arizona: USGS Prof. Paper 475-C, p. 21-22 (1963)

McKELVEY, V. E.
1. (and Wiese, J. H., and Johnson, V. H.) Preliminary report on the bedded manganese of the Lake Mead region, Nevada and Arizona: USGS Bull., 948-D, p. 83-101, illus., maps (1949)
2. Search for uranium in the United States: USGS Bull. 1030-A, 64 p. (1955)
3. (and Everhart, D. L., and Garrels, R. M.) Summary of hypotheses of genesis of uranium deposits: USGS Prof. Paper 300, p. 41-54 (1956)

McKINNEY, W. A. (*see* Dale, V. B., 2)

McKNIGHT, E. T.
1. Mesothermal silver-lead-zinc deposits: *in* Ore deposits of the Western States, AIME Lindgren Volume, p. 592-593, 602 (1933)
2. Lead in the United States: USGS Map MR-15 (1962)
3. (and Newman, W. L. and Heyl, A. V.) Zinc in the United States: USGS Map MR-19 (1962)

McLEHANEY, J. D., Jr.
A study of subsidence due to mining by block caving, San Manuel mine, Pinal County, Arizona: Univ. Ariz., MS Thesis, 56 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 52 (1958)

McNAIR, A. H.
1. Paleozoic stratigraphy of part of northern Arizona: AAPG Bull., v. 35, no. 3, p. 532, maps (1951)
2. Summary of the pre-Coconino stratigraphy of southwestern Utah, northwestern Arizona, southeastern Nevada: Utah Geol. Soc., Guidebook no. 7, p. 45-51, illus. (1952)

McQUEEN, K.
1. Photogeologic map of the Lees Ferry SE quadrangle, Coconino County, Arizona: USGS Map I-169 (1956)
2. Photogeologic map of the House Rock Spring SE quadrangle, Coconino County, Arizona: USGS Map I-199 (1956)
3. Photogeologic map of the Paria Plateau NE quadrangle, Coconino County, Arizona: USGS Map I-228 (1956)
4. Photogeologic map of the Lees Ferry NW quadrangle, Coconino County, Arizona: USGS Map I-196 (1957)
5. Photogeologic map of the Lees Ferry NE quadrangle, Coconino County, Arizona: USGS Map I-222 (1957)
6. Photogeologic map of the Shinarump NE quadrangle, Coconino County, Arizona: USGS Map I-255 (1957)

MacALISTER, R. S., Jr.
How oil wells are completed in the Paradox Basin: Jour. Petroleum Tech., p. 18 (1959)

MacDOUGAL, D. T.
Across Papagueria: Am. Geog. Soc. Bull., v. 40, p. 705-725, maps (1908)

MACKALLOR, J. A.
Geology of the western part of the Cobabi mining district, Pima County, Arizona: Univ. Ariz., MS Thesis, 108 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 51-52 (1958)

MACKAY, D. K.
Geology of the Klene structure in Arizona: Oil Weekly, v. 93, no. 10, p. 44-46, map (1939)

MACKENZIE, F. D.
1. Pyrometasomatic deposits at the Mineral Hill and Daisy mines: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 193-194 (1959)
2. Geological interpretation of the Palo Verde mine based upon diamond drill core: Ariz. Geol. Soc. Dig., v. 6, p. 41-48 (1963)

MACKIN, J. H.
Timing of post-orogenic uplift in the Rocky Mountains and the Colorado Plateau [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1733-1734 (1959)

MACLENNAN, F. W.
1. History of the development of Miami Copper: Min. Jour., v. 13, no. 13, p. 9-11, 31-32 (1929)
2. Miami Copper Company method of mining low-grade ore body: AIME Trans., p. 39-86, illus. (1930)

MADDOCK, Thomas
(and Hunt, G. W. P., Wood, H. R., and Pattee, S. L.) Report of the Arizona Colorado River Commission, 1931-1932: 42 p., maps (1933)

MADDOCK, Thomas, Jr.
Water resources in Arizona [abst.]: Jour. Geophys. Research, v. 67, no. 9, p. 3533 (1962)

MADDOX, G. E.
Subsurface geology along northwest Rillito Creek: Univ. Ariz., MS Thesis, 232 p. (1960)

MAGIE, W. F.
Physical notes on Meteor Crater, Arizona: Am. Philo. Soc. Proc., v. 49, p. 41-48 (1910); [abst.]: Science, new ser., v. 31, p. 872-873 (1910)

MAGLEBY, D. N.
(and Mead, W. E.) Airborne reconnaissance project, Dripping Spring quartzite, Arizona: USAEC, RME-2023, 17 p., maps (1955)

MAHARD, R. H.
Late Cenozoic chronology of the upper Verde Valley, Arizona: Denison Univ. Sci. Lab. Jour., v. 41, art. 7, p. 97-127, illus., map (1949); [abst.]: Geol. Soc. Am. Bull., v. 59, p. 1339 (1948)

MAISE, C. R. (*see also* Hatfield, K. G.)
Geology of Bear Creek Canyon, Arizona-New Mexico: Univ. Utah, MS Thesis (1955)

MALDE, H. E. (*see also* Witkind, I. J., 20)
1. Serpentine pipes at Garnet Ridge, Arizona: Science, v. 119, no. 3096, p. 618 (1954)
2. Environment and man in arid America: Science, v. 145, no. 3628, p. 123-129 (1964)

MALLET, J. W.
A stony meteorite from Coon Butte, Arizona: Am. Jour. Sci., 4th ser., v. 21, p. 347-355 (1906)

MALOTT, C. A.
Karst features in the badlands shale areas of the Petrified Forest, National Monument Park, Arizona [abst.]: Indiana Acad. Sci. Proc. 1938, v. 48, p. 114-115 (1939)

MAMAY, S. H. (*see* Read, C. B., 7)

MAMMERICKX, Jacqueline

Quantitative observations on pediments in the Mohave and Sonoran deserts (Southwestern United States): Am. Jour. Sci., v. 262, no. 4, p. 417-435 (1964)

MANSFIELD, G. R.

(and Boardman, L.) Nitrate deposits of the United States: USGS Bull. 838, 107 p., illus. (1932)

MAPLE, Elwood (*see* Chernosky, E. J.)

MARCOU, Jules

1. A geological map of the United States, and the British provinces of North America (with explanatory text and geological sections): 92 p., map, Boston (1853); [review]: Am. Jour. Sci., 2nd ser., v. 17, p. 199-206 (1854)
2. Résumé de une section géologique des montagnes Rocheuses á sur la cóte de l'océan Pacifique: Soc. Geol. France Bull., 2nd ser., v. 11, p. 474-478, Paris (1854)
3. Résumé of a geological reconnaissance extending from Napoléon at the junction of the Arkansas with the Mississippi to the Pueblo de Los Angeles in California; explorations for a railway route from the Mississippi to the Pacific, route, near the 35th parallel, explored by Whipple: U.S. 33rd Cong., 1st sess. H. Ex. Doc. 129, v. 18, pt. 2, p. 40-48 (1855); 2nd sess., S. Ex. Doc. 78 and H. Ex. Doc. 91, v. 3, pt. 4, p. 165-171 (1856)
4. (and Gilbert, G. K., and Marvine, A. R.) Parts of central and western Arizona: Geological atlas, U.S. Geog. and Geol. Surveys W. of 100th Mer., sheet no. 75, folio, Washington (1877)

MARGERIE, Emmanuel de

1. Les plateaux du Colorado; paysage et structure géologique d'apres les travoux des géologues américains: Club Alpin Franc, Ann. 10, p. 417-449 (1884)
2. Deux accidents crateriformes; Crater Lake (Oregon) et Meteor Crater (Arizona): Ann. de Geog., Ann. 22, p. 172-184, Paris (1913)

MARK, H. R. (*see* Lawthers, R. L.)

MARKS, R. L.

Mining uranium on the rim of the Grand Canyon: Explosives Engr., v. 39, no. 6, p. 165-170 (1961)

MARLOWE, J. I.

1. Late Cenozoic geology of the lower Safford Valley—a preliminary report: Ariz. Geol. Soc. Dig., v. 3, p. 127-129 (1960)
2. Diatremes and ring intrusion on the San Carlos Indian Reservation: Ariz. Geol. Soc. Dig., v. 3, p. 151-154 (1960)
3. Late Cenozoic geology of the lower Safford Basin on the San Carlos Indian Reservation, Arizona: Univ. Ariz., PhD Thesis, 184 p. (1961)

MARRANZINO, A. P. (*see* Huff, L. C., 5)

MARSHALL, C. H.

1. Photogeologic map of the Short Creek SW quadrangle, Mohave County, Arizona: USGS Map I-140 (1956)
2. (and Pillmore, C. L.) Photogeologic map of the Short Creek NW quadrangle, Mohave County, Arizona: USGS Map I-141 (1956)
3. Photogeologic map of the Heaton Knolls NW quadrangle, Mohave County, Arizona: USGS Map I-143 (1956)
4. Photogeologic map of the Lost Spring Mountain SE quadrangle, Mohave County, Arizona: USGS Map I-144 (1956)
5. Photogeologic map of the Lost Spring Mountain NE quadrangle, Mohave County, Arizona: USGS Map I-145 (1956)

6. Photogeologic map of the Lost Spring Mountain NW quadrangle, Mohave County, Arizona: USGS Map I-146 (1956)
7. Photogeologic map of the Short Creek SE quadrangle, Mohave County, Arizona: USGS Map I-153 (1956)
8. Photogeologic map of the Fredonia SW quadrangle, Mohave County, Arizona: USGS Map I-160 (1956)
9. Photogeologic map of the Paria Plateau SE quadrangle, Coconino County, Arizona: USGS Map I-191 (1956)
10. Photogeologic map of the Jacob Lake NE quadrangle, Coconino County, Arizona: USGS Map I-194 (1956)
11. Photogeologic map of the Hurricane Cliffs-2 NE quadrangle, Mohave County, Arizona: USGS Map I-252 (1957)

MARTIN, A. H.
1. San Francisco district, Arizona: Min. World, v. 31, p. 368 (1909)
2. The Copper Creek mining district, Arizona: Min. World., v. 32, p. 515-516 (1910)

MARTIN, P. S. (*see also* Hevly, R. H., 1)
1. (and Shutler, R., Jr.) Paleoecology of the Rampart Cave ground sloth [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1734-1735 (1959)
2. (and Sabels, B. E., and Shutler, R., Jr.) Rampart Cave coprolite and ecology of the Shasta ground sloth: Am. Jour. Sci., v. 259, p. 102-127 (1961)
3. (and Gray, Jane) Pollen analysis and the Cenozoic: Science, v. 137, no. 3524, p. 103-111 (1962)
4. Early man in Arizona—the pollen evidence: Am. Antiquity, v. 29, no. 1, p. 67-73 (1963)

MARVIN, T. C.
The geology of the Hilton Ranch area, Pima County, Arizona: Univ. Ariz., MS Thesis, 60 p., maps (1942)

MARVINE, A. R. (*see also* Hayden, F. V., Marcou, J. 4)
Report on the geology of route from St. George, Utah, to Gila River, Arizona: U.S. Geog. and Geol. Surv. W. of 100th Mer., v. 3, p. 189-225 (1875)

MARX, G. W. (*see also* Smith, H. V., 3)
Quality of Arizona municipal supplies: Am. Water Works Assoc. Jour., v. 47, no. 1, p. 65-70 (1955)

MASON, Bryan
(and Wiik, H. B.) The Holbrook, Arizona, chondrite: Geochimica et Cosmochimica Acta, v. 21, no. 4, p. 276-284 (1960)

MASON, R. T.
Mining in northwestern Arizona: Min. Sci. Press, v. 114, p. 627-628 (1917)

MASSEY, A. C.
Old Goldfield Camp, Arizona: Min. World, v. 35, p. 148 (1911)

MASTERS, John A.
1. Uranium deposits on southwest rim of Lukachukai Mountains, northeast Arizona: USAEC, RMO-911, 10 p., maps (1951)
2. Geology of the uranium deposits of the Lukachukai Mountains area, northeastern Arizona: USAEC, RME-27, 11 p. (1953); Econ. Geol., v. 50, no. 2, p. 111-126, illus. (1955)
3. Pinta Dome Helium Gas Reserve, Apache County, Arizona: Interstate Oil Compact Commission, Phoenix, Ariz. (Dec. 5, 1960)
4. Pinta Dome gas field: Rocky Mountain Oil Reporter, v. 18, no. 2, p. 9-11, illus. (1961)

MATHENY, M. L. (*see* Wengerd, S. A., 1)

MATHEWS, R. D.
1. (and Mayhew, T. E.) Developments in Arizona and western New Mexico in 1961: AAPG Bull., v. 46, no. 6, p. 992-998 (1962)

2. (and Mayhew, T. E.) Developments in Arizona and western New Mexico: AAPG Bull., v. 47, no. 6, p. 1158-1164 (1963)
3. (and Mayhew, T. E.) Development in Arizona and western New Mexico, 1963: AAPG Bull., v. 48, no. 6, p. 993-998 (1964)

MATHEWSON, D. E.
Some notes on Precambrian structures in Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 9-11 (1960)

MATHEWSON, E. P.
Mining companies (Arizona and its heritage): Univ. Ariz. Bull., v. 7, no. 3, p. 169-175 (1936)

MATHIAS, W. F.
Detrital mineral studies of some Cenozoic sediments, Safford Valley, Arizona: Univ. Ariz., MS Thesis, 39 p. (1960)

MATTHES, F. E.
1. Influence of subsidiary dislocations in the strata of the Grand Canyon on the development of its topography [absts.]: Geol. Soc. Am. Bull., v. 38, p. 213 (1927); Pan-Am. Geol., v. 47, p. 318 (1927)
2. Influence of secondary faults on the development of the Grand Canyon topography [abst.]: Wash. Acad. Sci. Jour., v. 17, p. 233-234 (1927)
3. The Grand Canyon of the Colorado River: Text on back of topographic sheet, Bright Angel quadrangle, Arizona; USGS (1932)
4. An interlude of aggradation in the cycle of erosion of the Grand Canyon of the Colorado [abst.]: Assoc. Am. Geog. An., v. 22, no. 1, p. 68 (1932)

MAXSON, J. H. (*see also* Campbell, I., 2, 3, 6, 7, 9; Stark, J. T.)
1. (and Campbell, I.) Faulting in Bright Angel, Arizona [absts.]: Pan-Am. Geol., v. 59, p. 303-304 (1933); Geol. Soc. Am. Proc. 1933, p. 301 (1934)
2. (and Campbell, I.) Archean ripple mark in the Grand Canyon: Am. Jour. Sci., 5th ser., v. 28, p. 298-303 (1934)
3. (and Campbell, I.) Stream fluting and stream erosion: Jour. Geol., v. 43, p. 729-744 (1935): [absts.]: Pan-Am. Geol., v. 63, p. 306-307 (1935); Geol. Soc. Am. Proc. 1935, p. 330 (1936)
4. (and Campbell, I.) Structure of the Archean System in northern Arizona [abst.]: Geol. Soc. Am. Proc. 1937, p. 248 (1938)
5. (and Campbell, I.) Archean pseudo ripple mark in the Grand Canyon: Am. Jour. Sci., v. 237, no. 8, p. 606 (1939)
6. Colorado River system in the Grand Canyon [abst.]: Geol. Soc. Am. Bull., v. 51, no. 12, pt. 2, p. 1961 (1940)
7. Relationship of scenery to geology in the Grand Canyon: Calif. Inst. Tech. Contrib. no. 384, 11 p., illus. (1946)
8. Geology of the Bright Angel quadrangle, Arizona [abst.]: Geol. Soc. Am. Bull., v. 60, p. 1963-1964 (1949)
9. Lava flows in the Grand Canyon of the Colorado River, Arizona: Geol. Soc. Am. Bull., v. 61, p. 9-15, illus. (1950)
10. Algonkian and Ep-Algonkian faults of the Bright Angel quadrangle, Arizona [abst.]: Geol. Soc. Am. Bull., v. 63, p. 1338 (1952)
11. Geologic map of the Bright Angel quadrangle, Grand Canyon National Park, Arizona (text on back): Grand Canyon Nat. Hist. Assoc., Grand Canyon, Arizona (1961)

MAYES, Walter
A petrified wood locality in Arizona: Rocks and Minerals, v. 15, no. 8, p. 268 (1940)

MAYHEW, T. E. (*see* Mathews, R. D., 1, 2, 3)

MAYO, E. B. (*see also* Kiersch, G. A., 14)
1. Copper: *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 1, p. 19-32, maps, Univ. Ariz. Press, Tucson (1956)

2. (and Haff, J. C., and Krumlauf, H. E.) Manganese: *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 1, p. 39-47, maps, illus., Univ. Ariz. Press, Tucson (1956)
3. Lineament tectonics and some ore districts of the Southwest: Min. Engr., v. 10, no. 11, p. 1169-1175, illus. (1958)
4. Intrusions near Arizona-Sonora Desert Museum: Ariz. Geol. Soc. Dig., v. 1, p. 16 (1958)
5. Banerjee's study of the Oracle granite [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1735 (1959)
6. Volcanic geology of the northern Chiricahua Mountains: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 135-138 (1959)
7. Recent concepts of ore localization in southern Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1735 (1959)
8. Structure of the large phenocryst porphyry near Arizona-Sonora Desert Museum: Ariz. Geol. Soc. Dig., v. 4, p. 1-17 (1961)
9. Volcanic orogeny of the Tucson Mountains (a preliminary report): Ariz. Geol. Soc. Dig., v. 6, p. 61-82 (1963)
10. (and McCullough, E. J., Jr.) Emplacement of basement blocks in the Tucson Mountain Chaos near Tucson, Arizona: Ariz. Acad. Sci. Jour., v. 3, no. 2, p. 81-86 (1964)

MAYUGA, Manuel N.
1. The geology of the Empire Peak area, Pima County, Arizona: Univ. Ariz., MS Thesis, 74 p., maps (1940)
2. The geology and ore deposits of the Helmet Peak area, Pima County, Arizona: Univ. Ariz., PhD Thesis, 126 p., maps (1942)

MEAD, C. W.
(and Chao, E. C. T., and Littler, J.) Metallic spheroids from Meteor Crater, Arizona: *in* Astrologic studies—annual progress report, Aug. 25, 1961 to Aug. 24, 1962, Pt. C, Cosmochemistry and petrography; USGS Open-file Rep., p. 150-162 (1963); [abst.]: Am. Geophys. Union Trans., v. 44, no. 1, p. 87 (1963)

MEAD, T. C.
(and Carder, D. S.) Seismic investigations in the Boulder Dam area in 1940: Seismol. Soc. Am. Bull., v. 31, no. 4, p. 321-324, map (1941)

MEAD, W. E. (*see also* Magleby, D. N.)
(and Wells, R. L.) Preliminary reconnaissance of the Dripping Spring quartzite formation in Gila and Pinal Counties, Arizona: USAEC, RME-4037, 10 p. (1953)

MEARS, Brainerd, Jr.
1. Cenozoic faults, gravels and volcanics of Oak Creek Canyon, Arizona: Columbia Univ., PhD Thesis, 128 p. (1950)
2. Cenozoic geomorphic history of the Oak Creek Canyon region, Arizona [abst.]: Geol. Soc. Am. Bull., v. 61, no. 12, pt. 2, p. 1557 (1950)
3. Faulting in Oak Creek Canyon and a discussion of contrary bending: Plateau, v. 23, p. 26-31, illus. (1950)
4. "Reverse drag" on high-angle faults in Oak Creek Canyon, Arizona, [abst.]: Geol. Soc. Am. Bull., v. 62, p. 1539-1540 (1951)
5. Karst-like features in badlands of the Arizona Petrified Forest: Wyoming Univ., Dept. Geol. Contrib. Geol., v. 2, no. 1, p. 101-104 (1963)

MEDHI, P. K.
A geologic study of the Pontatoc Mine area, Pima County, Arizona: Univ. Ariz., MS Thesis, 44 p. (1964)

MEHL, M. G.
1. New reptiles from the Trias of Arizona and New Mexico: Science, new ser., v. 41, p. 735 (1915)

2. (and Toepelmann, W. C., and Schwartz, G. M.) New or little-known reptiles from the Trias of Arizona and New Mexico . . . : Univ. Okla. Bull., new ser., no. 103, 44 p. (1916)
3. A new phytosaur from the Trias of Arizona: Jour. Geol., v. 30, p. 144-157 (1922)
4. *Pseudopalatus pristinus*, a new genus and species of phytosaurs from Arizona: Univ. Mo. Studies, v. 3, no. 1 p. 3-22 (1928)

MEINECKE, Franz
Der Meteorcrater von Canyon Diablo in Arizona und seine Bedeutung fur die Entstehung der Mondkrater: Naturwissenschaftliche Wochenschrift, Bd. 24, p. 801-810, Berlin (1909)

MEINZER, O. E.
1. (and Kelton, F. C.) Geology and water resources of Sulphur Spring Valley, Arizona: USGS Water-Supply Paper 320, p. 9-213, map (1913)
2. (and Ellis, A. J.) Ground water in Paradise Valley, Arizona: USGS Water-Supply Paper 375, p. 51-75, map (1915)
3. Map of the Pleistocene lakes of the Basin and Range province and its significance: Geol. Soc. Am. Bull., v. 33, p. 541-552 (1922)
4. Plants as indicators of ground water: USGS Water-Supply Paper 557, 95 p., illus. (1927)
5. (and Wenzel, L. K., and others) Water levels and artesian pressure in observation wells in the United States in 1939: USGS Water-Supply Paper 886, 933 p. (1940)

MELHASE, John
Asbestos deposits of Arizona: Engr. Min. Jour.-Press, v. 120, p. 805-810, map (1925)

MELIN, R. E.
Selected annotated bibliography of the geology of sandstone-type uranium deposits in the United States: USGS Bull. 1059-C, 116 p. (1957)

MELTON, F. A.
1. Stream erosion and dune ridges in northeastern Arizona [abst.]: Geol. Soc. Am. Proc. 1934, p. 450 (1935)
2. Wind effects on headward elongations of canyons [abst.]: Pan-Am. Geol., v. 65, p. 160 (1936)
3. Wind-activity influence on headward elongation of plateau summit canyons in Arizona [abst.]: Geol. Soc. Am. Proc. 1935, p. 440 (1936)

MELTON, M. A.
1. Origin of the drainage of southeastern Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 113-122 (1960)
2. Intravalley variation in slope angles related to microclimate and erosional environment: Geol. Soc. Am. Bull., v. 71, p. 133-144 (1960)
3. Multiple Pleistocene glaciation of the White Mountains, Apache County, Arizona: Geol. Soc. Am. Bull., v. 72, no. 8, p. 1279-1281 (1961)

MENSCH, W. A.
1. Mohave County, Arizona: Mines and Minerals, v. 20, p. 169, 454 (1899-1900)
2. Aubrey mining district: Mines and Minerals, v. 20, p. 360 (1900)
3. The mining business: Mines and Minerals, v. 20, p. 503-504, 552-553 (1900)

MERRILL, F. J. H.
Evidences of glaciation in southern Arizona and northern Sonora: Science, new ser., v. 24, p. 116-118 (1906)

MERRILL, G. P.
1. The onyx marbles; their origin, composition, and uses, both ancient and modern: U.S. Natl. Mus. Rep. for 1893, p. 539-585 (1895)

2. On a peculiar form of metamorphism in siliceous sandstone: U.S. Natl. Mus. Proc., v. 32, p. 547-550 (1907); [abst.]: Science, new ser., v. 25, p. 965 (1907)
3. (and Tassin, W.) Contributions to the study of the Canyon Diablo meteorites: Smithsonian Misc. Collections, v. 50, pt. 2, p. 203-215 (1907)
4. The meteor crater of Canyon Diablo, Arizona; its history, origin, and associated meteoric irons: Smithsonian Misc. Collections, v. 50, p. 461-498 (1908)
5. Coon Butte or Meteor Crater [abst.]: Science, new ser., v. 29, p. 239-240 (1909)
6. The fossil forests of Arizona: 23 p., Washington (1911)
7. A recent meteorite fall near Holbrook, Navajo County, Arizona: Smithsonian Misc. Collections, v. 60, no. 9, 4 p. (1912)
8. The "fossil forest" of Arizona: Am. Mus. Jour., v. 13, no. 7, p. 311-316 (1913)
9. A retrospective view of the origin of Meteor Crater, Arizona: Astron. Soc. Pacific Pub., v. 32, no. 189, p. 259-264 (1920)
10. New Meteorites (Cold Bay, Alaska; Navajo, Arizona): Am. Jour. Sci., 5th ser., v. 3, p. 153-154 (1922)
11. On newly discovered meteoric irons from the Wallapai (Hualpai) Indian Reservation, Arizona: U.S. Natl. Mus. Proc., v. 72, art. 22, 4 p. (1927)

MERRIN, Seymour
The Cretaceous stratigraphy and mineral deposits of the east face of Black Mesa, Apache County, Arizona: Univ. Ariz., MS Thesis, 93 p. (1954)

MERWIN, H. E.
1. (and Locke, A., and Posnjak, E.) Sulphate minerals formed by oxidation of pyritic ore at Bisbee, Arizona [abst. with discussion]: Geol. Soc. Am. Bull., v. 35, p. 125-126 (1924); [abst.]: Pan-Am. Geol., v. 41, p. 159 (1924)
2. (and Posnjak, E.) Sulphate incrustations in the Copper Queen mine, Bisbee, Arizona: Am. Mineral., v. 22, no. 5, p. 567-571 (1937)

METZ, R.
The petrography of the Pantano beds in the Cienega Gap area, Pima County, Arizona: Univ. Ariz., MS Thesis, 66 p. (1963)

METZGER, D. G. (*see also* Twenter, F. R., 6)
1. Geology and ground-water resources of the northern part of the Ranegras Plain area, Yuma County, Arizona: USGS Open-file Rep., 47 p. (1951)
2. Wellton-Mohawk area (groundwater), Yuma County: USGS Open-file Rep., p. 165-176 (1952)
3. Geology and ground-water resources of the Harquahala Plains area, Maricopa and Yuma Counties, Arizona: Ariz. State Land Dept. Water Res. Rep. 3, 40 p., illus., map (1957)
4. Reconnaissance of the Water Resources of the Lonesome Valley area, Yavapai County, Arizona: USGS Ground-Water Branch Open-file Rep., 4 p., map (1957)
5. Availability of water along the south rim, Grand Canyon National Park, Arizona: USGS Ground-Water Branch Mimeo. Rep., 81 p. (1959)
6. Geology in relation to availability of water along the south rim, Grand Canyon National Park: USGS Water-Supply Paper 1475-C, 137 p. (1961)
7. Geohydrologic investigations of the lower Colorado River Valley: USGS Open-file Rep., 8 p. (1961)
8. Progress report on geohydrologic investigation in the Parker-Blythe-Cibola region: USGS Open-file Rep., 9 p. (1963)

METZGER, O. H.
Gold mining and milling in the Wickenburg area, Maricopa and Yavapai Counties, Arizona: USBM, IC 6991, 78 p. (1938)

MEUNIER, Stanislas
Observations nouvelles sur la structure des fers meteoriques de Canyon Diablo, Arizona; consequences quant aux circonstances de la chute de ces fers: Acad. Sci. Paris, Comptes rendus, v. 162, p. 171-173 (1916)

MEUSCHKE, J. L.
1. Airborne radioactivity survey of the Painted Desert area, Coconino and Navajo Counties, Arizona (with text): USGS Map GP-120 (1955)
2. Airborne radioactivity survey of the Pinto-Chinle area, Apache County, Arizona (with text): USGS Map GP-124 (1955)

MEYERS, J. S.
Evaporation from the seventeen western States: USGS Prof. Paper 272-D, 100 p. (1962)

MEYROWITZ, R. (*see* Thompson, M. E.)

MICHAELSON, S. D.
(and Ensign, B. H., Hubbard, S. J., and Last, A. W.) Water — a controlling factor of copper production: Min. Engr., v. 12, no. 7, p. 674-674D (1960)

MICHEL, Fred A., Jr.
Geology of the King mine, Helvetia, Arizona: Univ. Ariz., MS Thesis, 59 p. (1959)

MICHELL, W. D.
Applied geology at the Magma mine, Superior, Arizona: Min. Tech. v. 11, no. 5, Tech. Paper 2214, 12 p. (1947); AIME Trans., v. 178, p. 158-169, illus. (1948); [abst.]: Econ. Geol., v. 42, no. 4, p. 416 (1947)

MICHLER, N.
From the one hundred and eleventh meridian to the Pacific Ocean: U.S. and Mex. Boundary Surv. Rep. (Emory), v. 1, p. 101-125, Washington (1857)

MIELENZ, R. C.
Petrographic examination of rock core and surface samples in connection with geologic studies, Bridge Canyon investigations: U.S. Bur. Reclamation Petrographic Laboratory Rep. 37, 7 p., illus. (1942)

MIESCH, A. T.
1. (and Shoemaker, E. M., Newman, W. L., and Finch, W. I.) Chemical composition as a guide to the size of sandstone-type uranium deposits in the Morrison formation of the Colorado Plateau: USGS Bull. 1112-B, 45 p. (1960)
2. Classification of elements in Colorado Plateau uranium deposits and multiple stages of mineralization: USGS Prof. Paper 424-B, Art. 123, p. 289-291 (1961)
3. (and Riley, L. B.) Basic statistical measures used in geochemical investigations of Colorado Plateau uranium deposits: AIME Trans. 1961, v. 220, p. 247-251 (1961)
4. Distribution of elements in Colorado Plateau uranium deposits — a preliminary report: USGS Bull. 1147-E, 56 p. (1963)

MIEYR, George (*see* Ziesmer, H. M., 1)

MILKEY, R. G. (*see* Stieff, L. R., 1)

MILLER, A. K.
1. (and Furnish, W. M., Jr.) A second Permian specimen of the nautiloid Aulametacoceras: Jour. Paleo., v. 31, no. 4, p. 713-714, illus. (1957)
2. (and Furnish, W. M., Jr.) Permian ammonoids from the Colorado Plateau: Jour. Paleo., v. 32, no. 4, p. 682-683, illus. (1958)

MILLER, Donald S.
1. (and Kulp, J. L.) Isotopic study of some Colorado Plateau ores: Econ. Geol., v. 53, no. 8, p. 937-948 (1958)
2. The isotopic geochemistry of uranium, lead, and sulfur in the Colorado Plateau uranium ores: Columbia Univ., PhD Thesis (1960)
3. (and Kulp, J. L.) Isotopic evidence on the origin of the Colorado Plateau uranium ores: Geol. Soc. Am. Bull., v. 74, no. 5, p. 609-630 (1963)

MILLER, G. W.
The Verde mining district, Yavapai County, Arizona: Min. Sci. Press, v. 86, p. 70-71 (1903)

MILLER, H. W., Jr. (*see also* Damon, P. E., 12; Moore, R. A., 1)
1. The paleontological literature of Arizona; a review: Ariz. Geol. Soc. Dig., v. 3, p. 63-70 (1960)
2. Cretaceous rocks of the Mogollon Rim in Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 93-94 (1962)
3. Texas ammonites in Arizona?: Ariz. Geol. Soc. Dig., v. 6, p. 37-40 (1963)
4. (and Breed, W. J.) Lower Turonian (Cretaceous) ammonite from Mesa Redondo, Arizona: Plateau, v. 35, no. 4, p. 123-128 (1963)
5. Cretaceous dinosaurian remains from southern Arizona: Jour. Paleo., v. 38, no. 2, p. 378-384 (1964)
6. (and Breed, W. J.) *Metacoceras bowmani,* a new species of nautiloid from the Toroweap formation (Permian) of Arizona: Jour. Paleo., v. 38, no. 5, p. 877-880 (1964)

MILLER, James B.
Sedimentation studies in the Sabino Canyon area near Tucson, Arizona: Univ. Ariz., MS Thesis, 57 p. (1961)

MILLER, Joseph
Tonto Natural Bridge: Ariz. Highways, v. 22, no. 9, p. 26-29, illus. (1946)

MILLER, L.
Condor remains from Rampart Cave, Arizona: Condor, v. 62, p. 70 (1960)

MILLER, Richard D. (*see also* Munnerlyn, R. D.)
Copper-uranium deposit at the Ridenour mine, Hualapai Indian Reservation, Coconino County, Arizona, Part I (with supplement, Results of an aerial radiometric examination of the Ridenour mine district, Hualapai Indian Reservation, Coconino County, Arizona, by E. M. P. Lovejoy): USAEC, RME-2014, 23 p., maps (1954)

MILLER, Roswell, 3rd (*see* Harding, N.)

MILLER, S. A.
The petrified forest of Arizona: Cincinnati Society of Natural History Journal, v. 17, p. 56-58 (1894)

MILLER, V. C.
Pediments and pediment-forming processes near House Rock, Arizona: Jour. Geol., v. 58, p. 634-645, illus. (1950)

MILLS, C. E.
1. Mining methods of Verde district, Arizona: AIME Trans., v. 72, p. 381-423 (1925)
2. Ground movement and subsidence at the United Verde mine: AIME Trans., v. 109, p. 153-172, maps, illus. (1934)

MILLS, H. F. (*see also* Kumke, C. A., 3)
1. Ore occurrence at the Iron King mine, Arizona: Engr. Min. Jour., v. 142, no. 10, p. 56-57 (1941)
2. Mining at the Iron King-Arizona: Mining World, v. 6, no. 3, p. 13-16 (1944)
3. Iron King obtains fill by block-caving waste: Engr. Min. Jour., v. 147, no. 10, p. 68-69 (1946)
4. Occurrence of lead-zinc ore at Iron King mine, Prescott, Arizona: Min. Tech., v. 11, no. 4, Tech. Paper 2190, 4 p. (1947); [discussion]: Tech. Paper 2377, 3 p. (1948); AIME Trans., v. 178, p. 218-222, illus. (1948)

MILLS, N. K. (*see* Bradish, B. B.)

MILNES, P. R.
1. Operations in Yavapai County: Ariz. Min. Jour., v. 1, no. 8, p. 22-25 (1918)
2. Yavapai mining review: Ariz. Min. Jour., v. 2, no. 1, p. 44-45 (1918)

MILTON, D. J. (*see* Chao, E. C. T., 2, 3)

MILTON, M. C.
The Oro Blanco district of Arizona :Engr. Min. Jour., v. 96, p. 1005-1007 (1913)

MINARD, J. P.
1. Photogeologic map of the Paria Plateau SW quadrangle, Coconino County, Arizona: USGS Map I-171 (1956)
2. Photogeologic map of the Paria Plateau NW quadrangle, Coconino County, Arizona: USGS Map I-182 (1956)
3. Photogeologic map of the Emmet Wash NW quadrangle, Coconino County, Arizona: USGS Map I-192 (1956)
4. Photogeologic map of the Tanner Wash NW quadrangle, Coconino County, Arizona: USGS Map I-193 (1956)
5. Photogeologic map of the House Rock Spring NE quadrangle, Coconino County, Arizona: USGS Map I-198 (1956)
6. Photogeologic map of the House Rock Spring NW quadrangle, Coconino County, Arizona: USGS Map I-253 (1957)
7. Photogeologic map of the Buckskin Gulch SE quadrangle, Kane County, Utah, and Coconino County, Arizona: USGS Map I-260 (1957)

MINERAL INDUSTRY
The mineral industry, its statistics, technology, and trade: v. 1-46, for years 1892-1937; New York (1983-1938)

MINERAL RESOURCES OF THE UNITED STATES
Volumes published annually by USGS for years 1882-1923 (volumes for 1894-1899 published in Annual Reports of USGS). Volumes for 1924-1931 published by USBM. (Although mainly statistical, these volumes contain numerous brief descriptions of the mineral deposits and districts.)

MINERALS YEARBOOK
Volumes published annually by USBM. Supercedes Mineral Resources of the United States (1932-1962)

MING-SHAN SUN
1. Titanclinohumite in kimberlitic tuff, Buell Park, Arizona [abst.]: Geol. Soc. Am. Bull., v. 65, p. 1311 (1954)
2. The nature of chrysocolla from Inspiration mine, Arizona: Am. Mineral, v. 48, no. 5, p. 649-658 (1963)

MINHINNICK, H. J.
Some bonanza mines of Yuma County: Prog. Ariz., v. 2, no. 3, p. 25-26, 33 (1926)

MINING JOURNAL
1. United Arizona is planning for deep development work: v. 10, no. 14, p. 50 (1926)
2. Calumet and Arizona report indicates promising future: v. 10, no. 14, p. 61-63 (1926)
3. A list of recently active mines of Arizona with dividends paid up to November, 1927: v. 11, no. 14, p. 12 (1927)
4. Magma reports net profit during 1931: v. 15, no. 22, p. 22 (1932)
5. Phelps-Dodge Corporation shows marked gain in 1935: v. 19, no. 21, p. 10 (1936)
6. Magma Copper reports results of 1935 mine operations: v. 19, no. 22, p. 30 (1936)
7. Verde Extension reports results of 1936 operations: v. 20, no. 20, p. 14, (1937)
8. Magma Copper gives results of 1936 mine operations: v. 20, no. 22, p. 37 (1937)
9. Inspiration Consolidated reports profit for 1936: v. 20, no. 23, p. 6 (1937)
10. Miami report shows a marked increase in production: v. 20, no. 23, p. 37-38 (1937)

11. Annual report issued by Tom Reed Gold Mines Company: v. 21, no. 3, p. 37 (1937)
12. Active approved mining loan applications: v. 21, no. 7, p. 36 (1937)
13. Magma Copper reports profit despite increased costs: v. 21, no. 22, p. 43-44 (1938)
14. Miami Copper Company reports profitable year: v. 21, no. 23, p. 4 (1938)
15. Inspiration Consolidated reports profit for 1937: v. 21, no. 23, p. 6 (1938)
16. Phelps-Dodge Corporation makes annual report for 1938: v. 22, no. 21, p. 7, 38 (1939)
17. Magma Copper Company issues annual report for 1938: v. 22, no. 22, p. 31-32 (1939)
18. Shattuck-Denn reports loss for past year: v. 22, no. 22, p. 32 (1939)
19. Inspiration Consolidated makes report for year 1938: v. 22, no. 23, p. 32 (1939)
20. Bagdad Copper Corporation expansion: v. 25, no. 12, p. 7 (1941)
21. Work speeded to meet war needs (Phelps Dodge Corporation): v. 25, no. 22, p. 6-7 (1942)

MINING WORLD

1. Arizona's Bagdad copper: v. 5, no. 6, p. 15-18, 20 (1943)
2. Eagle Picher's San Xavier mine and Sahuarita mill: v. 6, no. 5, p. 25-26, 28 (1944)
3. Squaw Peak (molybdenum): v. 6, no. 9, p. 36 (1944)
4. Globe-Gila property shows substantial manganese out-put: v. 7, no. 1, p. 30 (1945)
5. Asbestos in Arizona; developments during the war: v. 7, no. 7, p. 21-24 (1945)
6. Chloride activity resumes: v. 8, no. 8, p. 34-38 (1946)
7. San Manuel; a coming porphyry: v. 8, no. 10, p. 44-46 (1946)
8. Castle Dome, an outgrowth of war: v. 8, no. 11, p. 40-47 (1946)
9. Copper Queen today: v. 8, no. 13, p. 28-32 (1946)
10. Arizona barite: v. 9, no. 1, p. 20 (1947)
11. Arizona-1947: v. 10, no. 4, p. 59 (1948)
12. Developing San Manuel: v. 11, no. 9, p. 18 (1949)
13. Perlite, coming nonmetallic: v. 11, no. 13, p. 22 (1949)
14. Arizona: v. 12, no. 5, p. 50 (1950)
15. U.S. mining report-Arizona: v. 13, no. 5, p. 55 (1951)
16. Bagdad learns to truck: v. 13, no. 10, p. 14 (1951)
17. Arizona — All time high copper output as four major mines develop: v. 14, no. 5, p. 57 (1952)
18. Miami block caving developments: v. 14, no. 10, p. 26 (1952)
19. Use of geophysics pays off at Pima with disclosure of copper ore body: v. 16, no. 11, p. 42 (1954)
20. A look at U.S. mining in 1954: v. 17, no. 5, p. 64 (1955)
21. Silverbell-ASARCO makes a mine at a long known deposit: v. 18, no. 4, p. 40 (1956)
22. Size of undercut stopes reduced as San Manuel production mounts: v. 18, no. 10, p. 74-80 (1956)
23. New open pit mine; v. 18, no. 3, p. 45 (1956)
24. Navajo Reservation uranium, how it's mined by Rare Metals: v. 19, no. 3, p. 48 (1957)
25. Geology and exploration point way for Banner's copper developments: v. 19, no. 12, p. 38 (1957)
26. How Western Gold mines uranium in Grand Canyon: v. 21, no. 1, p. 33 (1959)
27. U.S. mining in 1959 Arizona: v. 22, no. 5, p. 90 (1960)
28. Fast start at Mission: v. 22, no. 9, p. 26 (1960)

29. Kennecott sinks shaft to develop Safford copper deposit: v. 22, no. 10, p. 29 (1960)
30. Arizona asbestos industry growing steadily around Globe: v. 22, no. 10, p. 44 (1960)
31. Phelps Dodge pays $3,500,000 for 299 Arizona copper claims: v. 23, no. 2, p. 19 (1961)
32. United States mining highlights Arizona: v. 23, no. 5, p. 88 (1961)
33. Banner prepares to mine richer ore as Palo Verde shaft and initial development nears completion: v. 23, no. 12, p. 34 (1961)
34. Asarco's Mission copper: v. 24, no. 1, p. 21-42 (1962)
35. Arizona: v. 24, no. 5, p. 72 (1962)
36. Short tons of ore mined and short tons of waste stripped at U.S. open pit mines in 1958-1961: v. 24, no. 5, p. 95 (1962)
37. Short tons mined at U.S. underground mines 1950-1961: v. 24, no. 5, p. 97 (1962)
38. D. M. B. D. makes success of 60-ton a day copper-moly operation in Arizona: v. 24, no. 7, p. 27 (1962)
39. How HMS raises grade of Old Dick's copper-zinc ore: v. 24, no. 9, p. 12-17 (1962)
40. Story of Dave McGee, mining copper flux in Arizona: v. 25, no. 6, p. 20-21, 50 (1963)

MINTON, D. C., Jr.
Cost of equipping and developing a small gold mine (Golden Belt) in the Bradshaw Mountains quadrangle, Yavapai County, Arizona: USBM, IC 6735, 11 p. (1933)

MINTZ, Yale
Slate Mountain volcano-laccolith: Plateau, v. 14, no. 3, p. 42-47, maps (1942)

MIR AMOROS, J.
Vista al Gran Cañon del Colorado: Royal Acad. Ciene. y Artes Barcelona Mem., v. 32, no. 10, p. 323-341, illus., Barcelona, Spain (1957)

MISER, H. D. (*see* Longwell, C. R., 2)

MITCHAM, T. W. (*see also* Isachesen, Y. W., 1)
1. (and Evensen, C. G.) Uranium ore guides, Monument Valley district, Arizona: Econ. Geol., v. 50, no. 2, p. 170-176, illus. (1955)
2. Uranium ore guides, Monument Valley, Arizona [discussion]: Econ. Geol., v. 52, no. 5, p. 586-589 (1957)
3. Viking rocket photograph of Arizona, California and northern Mexico west of Tucson, Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. xvi-xix (1959)
4. (Contributor to section on Minerals and Fuels): *in* Arizona its people and resources; Univ. Ariz. Press, Tucson, Arizona (1960)

MITCHELL, G. J.
1. Ore deposition in the Warren district, Arizona: Engr. Min. Jour., v. 109, p. 874-875 (1920)
2. Vertical extent of copper ore minerals in the Junction mine, Warren district, Arizona: Engr. Min. Jour., v. 109, p. 1411-1412 (1920)
3. Replacement copper deposits in the Warren district (Bisbee): Engr. Min. Jour., v. 112, p. 246-250 (1921)
4. Rate of formation of copper-sulphate stalactites: Min. Met., no. 170, p. 33, (1921); [with discussion]: AIME Trans., v. 66, p. 64-65 (1922)

MITCHELL, John D.
1. John Clark's mine: Min. Jour., v. 18, no. 11, p. 24-25 (1934)
2. The Lost Mexican mine: Min. Jour., v. 18, no. 24, p. 5 (1935)
3. Bright yellow gold: Pay Dirt, no. 90, p. 12 (1945)
4. Don Joaquin and his gold mine: Min. Jour., v. 28, no. 23, p. 8-9 (1945)

5. The iron-bound chest: Min. Jour., v. 29, no. 6, p. 33 (1945)
6. The Lost Pick ledge: Min. Jour., v. 29, no. 1, p. 36 (1945)
7. The lost San Pedro silver mine: Min. Jour., v. 28, no. 22, p. 37-38 (1945)
8. The Lost Yuma ledge: Min. Jour., v. 28, no. 24, p. 39 (1945)
9. Montezuma's treasure: Pay Dirt, no. 92, p. 16 (1946)
10. The shoe cobbler's placer: Pay Dirt, no. 91, p. 16 (1946)
11. The Glory Hole gold: Pay Dirt, no. 93, p. 16 (1946)
12. The silver stairway: Pay Dirt, no. 96, p. 16 (1946)
13. San Xavier del Bac: Min. World, v. 9, no. 9, p. 41 (1947)
14. Lost silver mine of Colorado: Min. World, v. 9, no. 6, p. 45 (1947)
15. Shepherd's lost gold mine: Min. World, v. 9, no. 2, p. 49 (1947)
16. Lost vein of the San Tans: Min. World, v. 10, no. 7, p. 44 (1948)
17. Frenchie's lost gold ledge: Min. World, v. 11, no. 13, p. 26 (1949)
18. La Purisima Concepcion: Min. World, v. 12, no. 2, p. 17 (1950)
19. Lost Squaw Hollow ledge: Min. World, v. 12, no. 13, p. 19 (1950)
20. The organ grinder's gold mine: Min. World, v. 12, no. 9, p. 25 (1950)
21. Sweet-toned bells of Guevavi: Min. World, v. 12, no. 7, p. 20 (1950)
22. The Lost Dutchman gold mine: Min. World, v. 12, no. 4, p. 18 (1950)
23. Lost ledge of Four Peaks: Min. World, v. 13, no. 7, p. 21 (1951)
24. The Adams diggings: Min. World, v. 13, no. 9, p. 20 (1951)
25. Baboquivari's golden owls: Min. World, v. 13, no. 13, p. 39 (1951)
26. The Lost Jack Rabbit mine: Min. World, v. 13, no. 1, p. 17 (1951)
27. Lost ledge of Tinajas Altas: Min. World, v. 14, no. 7, p. 45 (1952)
28. The Black Maverick mine: Min. World, v. 14, no. 2, p. 45 (1952)

MITCHELL, R. J.
1. Shattuck Denn goes deeper for lower grade ores: Metal Min. and Process., v. 1, no. 10, p. 30-33 (1964)
2. Arizona's deepest mine switches from square-set to sand fill: Metal Min. and Process., v. 1, no. 12, p. 20-24 (1964)

MITCHELL, W. G.
Certain ore deposits of the Southwest (discussion): AIME Bull. 148, p. 735 (1919)

MITKE, C. A.
Shall the Indian Bureau control Arizona's future mines: Min. Jour., v. 17, no. 16, p. 3-4 (1934)

MOISSAN, Henri
Nouvelles recherches sur la météorite de Cañon Diablo: Acad. Sci. Paris, Comptes rendus, v. 139, p. 773-780 (1904); [abst.]: Am. Jour. Sci., 4th ser., v. 19, p. 191 (1905)

MONTGOMERY, E. L.
The geology and ground water investigation of the Tres Alamos Dam Site of the San Pedro River, Cochise County, Arizona: Univ. Ariz., MS Thesis, 69 p. (1963)

MOODIE, R. L.
The ancient life of Yuma County, Arizona: Sci. Monthly, p. 401-407, (Nov., 1930)

MOODY, J. D.
(and Hill, M. J.) Wrench-fault tectonics: Geol. Soc. Am. Bull., v. 67, p. 1207-1246 (1956)

MOOK, C. C. (*see also* Colbert, E. H., 4)
McElmo formation in northeastern Arizona [absts.]: Pan-Am. Geol., v. 53, p. 148-149 (1930); Geol. Soc. Am. Bull., v. 41, p. 107 (1930)

MOON, L. B. (*see* Julihn, C. E.)

MOORE, B. N. (*see also* Hewett, D. F., 6)

1. Some strontium deposits of southeastern California and western Arizona: AIME Tech. Pub. 599, maps (1935); Trans., v. 115, p. 356-377, maps (1935); [absts.]: Min. Met., v. 16, p. 115 (1935); Yearbook sec., p. 58 (1936)
2. Geologic map of the Happy Valley quadrangle, Arizona: USGS Open-file Rep. (1935)
3. (and Tolman, C. F., Jr., Butler, B. S., and Hernon, R. M.) Geology of the Tucson quadrangle, Arizona: USGS Open-file Rep., 20 p., maps (1941)

MOORE, E. L. (*see* Gregg, C. C.)

MOORE, F. B. (*see* King, R. V., 1, 2)

MOORE, H. J. (*see also* Shoemaker, E. M., 10)

(and Gault, D. E., Lugn, R. V., and Shoemaker, E. M.) Hypervelocity impact of steel into Coconino sandstone: Geophys. Lab. — Lawrence Radiation Lab. Cratering Symposium Proc., Wash. D.C. (1961); Univ. Calif. Lawrence Radiation Lab. Pub. UCRL-6438, pt. 2, p. N1-N23 (1961)

MOORE, H. R.

Apache Tears: Ariz. Highways, v. 37, no. 7, p. 8-11 (1961)

MOORE, Kirke T.

Vulture; a mining camp in Arizona: Univ. Ariz. Monthly, v. 4, p. 227-232 (1902)

MOORE, Raymond C. (*see also* Birdseye, C. H.; Gregory, H. E., 12; Longwell, C. R., 2)

1. On the stratigraphy of northeastern Arizona: AAPG Bull., v. 6, p. 47-49 (1922); Min. and Oil Bull., v. 8, p. 322-323, 326 (1922)
2. Structural features of the Colorado Plateau and their origin [abst.]: Geol. Soc. Am. Bull., v. 34, p. 88-89 (1923)
3. Geological observations on a traverse through the Grand Canyon of the Colorado [absts.]: Geol. Soc. Am. Bull., v. 35, p. 85-87 (1924); Pan-Am. Geol., v. 41, p. 143 (1924)
4. Geologic report of the inner gorge of the Grand Canyon of the Colorado River: USGS Water-Supply Paper 556, p. 125-171 (1925)
5. Origin of inclosed meanders on streams of the Colorado Plateau: Jour. Geol., v. 34, p. 29-57 (1926)
6. Significance of inclosed meanders in the physiographic history of the Colorado Plateau country: Jour. Geol., v. 34, p. 97-130 (1926)
7. Problems in the history of the Grand Canyon region [abst.]: Wash. Acad. Sci. Jour., v. 17, p. 272-274 (1927)

MOORE, Richard T. (*see also* Anthony, J. W., 3; Forrester, J. D., 2; Wilson, Eldred D., 74, 75, 77, 78, 79, 80, 81, 82, 84, 85, 92)

1. Minerals and metals of increasing interest — rare and radioactive minerals: Univ. Ariz., Ariz. Bur. Mines Bull. 163, 40 p., illus. (1953)
2. One hundred Arizona minerals: Univ. Ariz., Ariz. Bur. Mines Bull. 165, 35 p. (1955)
3. Geology of northwestern Mohave County, Arizona: Univ. Ariz., MS Thesis. 81 p., maps (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 52-53 (1958)
4. (and Wilson, E. D. and O'Haire, R. T.) Geologic Map of Coconino County Arizona (scale (1:375,000): Univ. Ariz., Ariz. Bur. Mines (1960)
5. Geologic cross-sections; sections 1, 4, and 7: Univ. Ariz., Ariz. Bur. Mines, Geologic Cross-Sections of Arizona, 3 sheets, index map (1962)

MOORE, Robert A.

1. (and Miller, H. W., Jr.) A dinosaur-bearing section of Cretaceous rocks in the Empire Mountains, Pima County, Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 57-61 (1960)
2. Cretaceous (?) stratigraphy of the southeast flank of the Empire Mountains, Pima County, Arizona: Univ. Ariz., MS Thesis, 55 p. (1960)

MOORE, R. G.
Inspiration Consolidated is preparing for open-pit mining: Pay Dirt, no. 106, p. 14 (1947)

MORGAN, W. C.
1. (and Tallmon, M. C.) A peculiar occurrence of bitumen and evidence as to its origin: Am. Jour. Sci., 4th ser., v. 18, p. 363-377 (1904)
2. (and Tallmon, M. C.) A fossil egg from Arizona: Univ. Calif., Dept. Geol. Bull., v. 3, p. 403-410 (1904); Am. Jour. Sci., 4th ser., v. 18, p. 363 (1904)

MORRIS, F. K.
Some pediments in Arizona [absts.]: Geol. Soc. Am. Bull., v. 43, p. 129-130 (1932); Pan-Am. Geol., v. 57, p. 60-61 (1932)

MORRIS, R. H. (*see also* Witkind, I. J., 18)
1. Photogeologic map of the Shinarump NW quadrangle, Coconino County, Arizona: USGS Map I-139 (1956)
2. Photogeologic map of the Fredonia NE quadrangle, Coconino and Mohave Counties, Arizona: USGS Map I-247 (1957)

MORRIS, T. G.
The Grand Canyon of Colorado: Liverpool Geol. Soc. Proc., v. 18, pt. 1, p. 1-3, illus. (1940)

MORRISON, R. B. (*see also* Halpenny, L. C., 1)
1. Groundwater resources of the Big Sandy Valley, Mohave County, Arizona: Ariz. State Water Commission, 6 p., map (1940); USGS Mimeo Rep., 6 p. (1940)
2. Records of wells and springs in Big Sandy Valley, Mohave County, Arizona, with water analyses by Hem, J. D.: Ariz. State Water Commission, 20 p., maps (1941)
3. Big Sandy Valley, Mohave County, Arizona—records of wells and springs, well logs, water analyses, and map showing locations of wells and springs: USGS Mimeo. Rep., 17 p. (1941)
4. (and McDonald, H. R., and Stuart, W. T.) Safford Valley, Graham County, Arizona—records of wells and springs, well logs, and water analyses: Ariz. State Water Commission, 102 p., map (1942)
5. (and Babcock, H. M.) Duncan-Virden Valley, Greenlee County, Arizona, and Hidalgo County, New Mexico—records of wells and springs, well logs, water analyses, and map showing locations of wells and springs: USGS Mimeo. Rep., 29 p. (1942)

MORSE, E. K. (*see* Booher, M. B.; White, N. D., 3, 4)

MOSES, A. J.
1. (and Luquer, L. M.) Alabandite from Tombstone, Arizona; wavelite from Florida: Columbia Univ., Sch. Mines Quart., v. 13, p. 236-239 (1892)
2. Mineralogical notes; the gangue of Arizona ettringite: Columbia Univ. Sch. Mines Quart., v. 14, p. 323-326 (1893)
3. Ettringite und alabandin von Tombstone, Arizona: Zeitschr. Kryst., v. 23, p. 16-19 (1893)
4. Mineralogical notes; ettringite from Tombstone, Arizona, and a formula for ettringite: Am. Jour. Sci., 3rd ser., v. 45, p. 488-492 (1893)
5. Contributions from the mineralogical department of Columbia College: Columbia Univ., Sch. Mines Quart., v. 16, p. 226-231 (1895)

MOSIER, McHenry (*see also* Gardner, E. D., 4)
(and Sherman, Gerald) Mining practice at Morenci Branch, Phelps Dodge Corporation, Morenci, Arizona: USBM, IC 6107, 33 p. (1929)

MOSS, R. G.
Buried Precambrian surface in the United States: Geol. Soc. Am. Bull., v. 47, no. 6, p. 935-966 (1936)

MOTT, L. C.
Mining activities and sales opportunities in the State of Arizona: Los Angeles County Chamber of Commerce Domestic Trade Report 68, 45 p. (1937); Report 77, 42 p. (1938)

MOUAT, M. M.
Manganese oxides from the Artillery Mountains area, Arizona: Am. Mineral., v. 47, no. 5-6, p. 744-752 (1962)

MOWRY, S.
1. The geography and resources of Arizona and Sonora: Am. Geog. Soc., San Francisco and New York, new ed. (1863)
2. Arizona and Sonora; geography, history, and resources of the silver region of North America: Harper & Bros., New York, 3rd ed., 251 p. (1864)

MOXHAM, R. M. (*see* Johnson, R. W.)

MOYER, F. T.
Gypsum and anhydrite: USBM, IC 7049, 45 p. (1939)

MUENCH, J. R.
1. Crater of the setting sun: Desert Mag., v. 9, no. 4, p. 5-8, illus. (1946)
2. The enchanted stone forest: Ariz. Highways, v. 34, p. 14-29 (1958)

MULCHAY, Roland B.
(and Velasco, J. R.) Sedimentary rocks at Cananea, Sonora, Mexico and tentative correlation with the sections at Bisbee and the Swisshelm Mountains, Arizona: AIME Trans., v. 199 (1954); Min. Engr., v. 6, no. 6, p. 628-632, illus. (1954)

MULLENS, T. E.
(and Freeman, V. L.) Lithofacies study of the Salt Wash member of the Morrison formation, Colorado Plateau: Geol. Soc. Am. Bull., v. 68, no. 4, p. 505-526 (1957)

MUNNERLYN, R. D.
(and Miller, R. D.) Helium-bearing natural gases of the United States: USBM, Bull. 617, 93 p. (1963)

MUNSON, E. (*see* Simons, F. S., 5)

MUNZ, P. A. (*see* Laudermilk, J. D., 1)

MURDOCK, Joseph (*see* Graton, L. C.)

MURPHY, J. F.
Preliminary report on titanium-bearing sandstone in the San Juan Basin and adjacent areas in Arizona, Colorado, and New Mexico: USGS Open-file Rep. (1956)

MURPHY, L. M. (*see* Bodle, R. R.)

MYERS, A. T. (*see also* Petersen, R. G., 1; Ross, C. S., 2)
(and Hamilton, J. C.) Rhenium in plant samples from the Colorado Plateau: USGS Prof. Paper 424-B, Art. 122, p. 286-288 (1961)

MYERS, W. M. (*see* Ladoo, R. B., 5)

MYRICK, R. M.
(and Collings, M. R.) Hydrologic aspects of the pinyon and juniper eradication project on the Fort Apache Reservation, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 140-143 (1962)

MYTTON, J. W. (*see* Pierce, A. P.)

NAMBA, M.
Geophysical study of Arizona Meteorite Crater: Pt. 10 *of* Some studies on Volcano Aso and Kujiu, Kumamoto Jour. Sci., ser. A., mathematics, physics, and chemistry, v. 2, no. 1, p. 85-89, illus., Kumamoto, Japan (1954)

NATIONS, Jack D.
1. The Black Prince limestone of southern Arizona: Univ. Ariz., MS Thesis, 52 p. (1961)
2. Evidence for a Morrowan age for the Black Prince limestone of southeastern Arizona: Jour. Paleo., v. 37, no. 6, p. 1252-1264 (1963)

NEALE, W. G.
(editor) The mines handbook—1926: v. 17, 2129 p. (1926)

NEEDHAM, A. B.
(and Storms, W. R.) Investigation of Tombstone district manganese deposits, Cochise County, Arizona: USBM, RI-5188, 34 p. (1956)

NEEDHAM, C. E.
1. (and Luff, P.) Arizona's metal production in 1945: Min. Jour., v. 29, no. 17, p. 6-7 (1946); no. 18, p. 2-3 (1946)
2. (and Luff, P.) Arizona Annual Report: Director of the Mint, fiscal year 1946-1947, p. 21-22 (1947); fiscal year 1947-1948, p. 18-19 (1948); fiscal year 1948-1949, p. 20-21 (1949); fiscal year 1949-1950, p. 20-21 (1950)

NEFF, A. W.
Comparisons between the salt anticlines of South Persia and those of the Paradox Basin: Four Corners Geol. Soc., Guidebook 3rd Field Conf., p. 56-64, illus. (1960)

NEILL, N. P. (*see* Lapham, M. H.)

NELSON, C.
Asbestos in Arizona is not well known: Ariz. Min. Jour., v. 6, no. 20, p. 3-4 (1923)

NELSON, F. J.
The geology of the Peña Blanca and Walker Canyon areas, Santa Cruz County, Arizona: Univ. Ariz., MS Thesis, 82 p. (1963)

NEURBURG, G. J.
(and Granger, H. C.) A geochemical test of diabase as an ore source for the uranium deposits of the Dripping Spring district, Arizona: Neues Jahrbuch für Mineralogie, Bd. 94, p. 759-797, illus., Stuttgart, Germany (1960)

NEVIUS, J. N.
1. The Castle Dome lead district, Arizona: Min. Sci. Press, v. 104, p. 854-855 (1912)
2. Resuscitation of the Octave gold mine: Min. Sci. Press, v. 123, p. 122-124 (1921)

NEWBERRY, J. S.
Geological report: *in* Report upon the Colorado River of the West (Ives), U.S. 36th Cong., 1st sess., Sen. Ex. Doc. and H. Ex. Doc. 90, pt. 3, 154 p., maps (1861); [abst.]: Am. Jour. Sci., 2nd ser., v. 33, p. 394-403 (1861)

NEWETT, G. A.
Calumet and Arizona operations are filled with achievement: Ariz. Min. Jour., v. 5, no. 3, p. 9-10 (1921)

NEWHOUSE, W. H.
1. Some relations of ore deposits to folded rocks (with discussion): AIME Trans. 1931, p. 224-251 (1931); Tech. Pub. 422, 25 p. (1931)
2. The source of vanadium, molybdenum, tungsten, and chromium in oxidized lead deposits: Am. Mineral., v. 19, p. 209-220 (1934)

NEWMAN, W. L. (*see also* McKnight, E. T., 3; Miesch, A. T., 1)
Distribution of elements in sedimentary rocks of the Colorado Plateau—preliminary report: USGS Bull. 1107-F (1962)

NEW MEXICO GEOLOGICAL SOCIETY
1. Guidebook of the south and west sides of the San Juan Basin, New Mexico and Arizona (includes papers by numerous authors which are cited individually): 2nd Field Conf., illus., maps (1951)

2. (prepared in cooperation with Arizona Geological Society) Guidebook of the Black Mesa Basin, northeastern Arizona (includes papers by numerous authors which are cited individually): 9th Field Conf., 205 p., illus., maps (1958)
3. (prepared in cooperation with Arizona Geological Society) Guidebook of the Mogollon Rim Region (includes papers by numerous authors which are cited individually); 13th Field Conf., 175 p., maps, illus. (1962)

NEWTON, A. M.
A cosmic bomb destroys a civilization (Did Canyon Diablo meteorite destroy "Cliff Dwellers"?) [abst.]: Pop. Astron., v. 54, no. 9, p. 484 (1946); Soc. Research Meteor. Contrib., v. 3, no. 5, p. 294 (1947)

NICHOLS, H. R.
Sedimentation studies at Lake Mead: Earth Sci. Dig., v. 5, p. 13-22, illus. (1950)

NICHOLS, Tad
Sunset Crater: Nat. Hist., v. 53, no. 10, p. 448-451, map (1944)

NICKELL, F. A.
Development and use of engineering geology: AAPG Bull., v. 26, no. 12, p. 1797-1826, maps, illus. (1942); [abst.]: v. 26, no. 5, p. 903 (1942)

NICOL, David
Paleoecology of three faunules in the Permian Kaibab formation at Flagstaff, Arizona: Jour. Paleo., v. 18, no. 6, p. 553-557 (1944); Plateau, v. 17, no. 3, p. 46-53 (1945)

NIEDERHOF, C. H. (*see* Cooperrider, C. K., 2)

NIERMEYER, J. F.
Kraters in sedimentair Gesteente in Arizona en Nieuw-Mexico: Nederlandsch Natuur en Geneeskundig Congres 14, Delft, 1913, Handelingen 14, p. 430-436 (1913)

NININGER, A. D. (*see* Nininger, H. H., 9)

NININGER, H. H.
1. Meteor craters vs. steam blowouts: Mines Mag., v. 23, no. 12, p. 7-8 (1933); [absts.]: Pan-Am. Geol., v. 60, p. 308-310 (1933); Min. Rev., v. 36, no. 2, p. 9-11 (1934)
2. Observations and suggestions regarding meteorite craters [abst.]: Geol. Soc. Am. Bull., v. 49, no. 12, pt. 2, p. 1956 (1938)
3. Diamonds in the Canyon Diablo, Arizona, meteorites: Pop. Astron., v. 47, no. 9, p. 504-507 (1939); Soc. Research Meteor. Contrib., v. 2, no. 2, p. 142-145 (1939)
4. A new type of nickel-iron meteorite from the vicinity of the Arizona Meteorite Crater: Pop. Astron., v. 48, no. 6, p. 328-332 (1940); Soc. Research Meteor. Contrib., v. 2, no. 3, p. 193-197 (1940)
5. Hunting prehistoric lion tracks in Arizona: Plateau, v. 14, no. 2, p. 21-27 (1941)
6. A comet strikes the earth; how to recognize meteorites; visitors from space: Desert Mag. Press, El Centro, Calif., 36 p., illus. (1942)
7. A new type of magnetometer survey at Barringer meteorite crater: Pop. Astron., v. 57, no. 1, p. 17-21 (1949)
8. Meteorites in as well as on the crater rim: Pop. Astron., v. 57, no. 7, p. 333-334 (1949)
9. (and Nininger, A. D.) The Nininger collection of meteorites: American Meteorite Museum, Winslow, Ariz., (catalog and history) (1950)
10. Structure and composition of Canyon Diablo meteorites as related to zonal distribution of fragments: Pop. Astron., v. 58, no. 4, p. 169-173 (1950)
11. A résumé of researches at the Arizona meteorite crater: Sci. Monthly, v. 72, no. 2, p. 75-86, illus. (1951)

12. Symmetries and asymmetries in Barringer Crater, Arizona: Earth Science, v. 7, no. 1, p. 17-19, illus. (1953)
13. Further notes on metallic spheroids at the Arizona meteorite crater [abst.]: Geol. Soc. Am. Bull., v. 65, no. 12, p. 1397-1398 (1954)
14. Impactite slag at Barringer Crater, Arizona: Am. Jour. Sci., v. 252, no. 5, p. 277-290, illus. (1954); [discussion with title "Notes on crater mound," by D. Hager, and reply]: no. 11, p. 695-700, illus., map (1954)
15. Arizona's meteorite crater: American Meteorite Museum, Sedona, Ariz., 232 p., illus. (1956)

NOBLE, E. A.
Genesis of uranium belts of the Colorado Plateau: *in* Genetic problems of uranium and thorium deposits; 21st Int. Geol. Cong., p. 26-39 (1960)

NOBLE, L. F. (*see also* Gregory, H. E., 11)
1. Contributions to the geology of the Grand Canyon, Arizona; the geology of the Shinumo area: Am. Jour. Sci., 4th ser., v. 29, p. 369-386, 497-528 (1910)
2. The Grand Canyon of the Colorado: Science, new ser., v. 34, p. 378-380 (1911)
3. The Shinumo quadrangle, Grand Canyon district, Arizona: USGS Bull. 549, 100 p., maps (1914); [abst.]: Wash. Acad. Sci. Jour., v. 5, p. 181-182 (1915)
4. (and Hunter, J. F.) A reconnaissance of the Archean complex of the Granite Gorge, Grand Canyon, Arizona: USGS Prof. Paper 98, p. 95-113 (1916); [abst.]: Wash. Acad. Sci. Jour., v. 7, p. 38 (1917)
5. Geologic history of the Bright Angel quadrangle, Arizona. Text on back of topographic sheet, Bright Angel quadrangle, Arizona: USGS (1918)
6. A section of the Paleozoic formations of the Grand Canyon at the Bass Trail: USGS Prof. Paper 131, p. 23-73 (1922)
7. Nitrate deposits in southeastern California, with notes on deposits in southeastern Arizona and southwestern New Mexico: USGS Bull. 820, 108 p., illus. (1931)

NOLAN, T. B. (*see also* Hewett, D. F., 6)
1. Epithermal precious metal deposits: *in* Ore deposits of the Western States; AIME Lindgren Volume, p. 623-630 (1933)
2. The Basin and Range province in Utah, Nevada, and California: USGS Prof. Paper 197-D, p. 141-196 (1943)

NORDENSEN, T. J. (*see* Kohler, M. A.)

NORMAN, G. W. H. (*see* Anderson, C. A., 10)

NORMAN, Sydney
Central Copper attracting attention outside Arizona: Ariz. Min. Jour., v. 6, no. 21, p. 17-18 (1923)

NORTON, J. J. (*see also* Griffitts, W. R.)
(and Schlegel, D. M.) Lithium resources of North America: USGS Bull. 1027-G, 23 p. (1955)

NOTMAN, Arthur
1. Geology of the Bisbee ore deposits: Inst. Min. Met. London Trans., v. 22, p. 550-562 (1913); Min. World, v. 38, p. 567-570 (1913); Engr. Min. Jour., v. 95, p. 557-559 (1913)
2. Economic history of the copper industry: *in* Copper Resources of the World, 16th Int. Geol. Cong., p. 21-30 (1935)
3. Estimated world reserves of copper: *in* Copper Resources of the world, 16th Int. Geol. Cong., p. 31-35 (1935)

NUTTING, P. G.
Adsorbent clays, their distribution, properties, production and uses: USGS Bull. 928-C, p. 127-221 (1943)

NYE, T. S.
Geology of the Paymaster mine, Pima County, Arizona: Ariz. Geol. Soc. Dig., v. 4, p. 161-168 (1961)

OAKLAND, G. L. (*see* Iorns, W. V.)

O'BRIEN, B. R.
Geology of Cienega Amarilla area, Catron County, New Mexico, and Apache County, Arizona: Univ. Texas, MS Thesis (1955); [abst.]: Ariz. Geol. Soc. Dig., v. 3, p. 181 (1960)

O'BRIEN, J. F.
1. Diamond drilling operations increasing in Oatman district: Ariz. Min. Jour., v. 5, no. 19, p. 20-21 (1922)
2. Gold properties at Oatman preparing for development: Ariz. Min. Jour., v. 5, no. 20, p. 25 (1922)

O'CONNELL, D. T.
Plesiosaur bones in Arizona [abst.]: Geol. Soc. Am. Proc. 1934, p. 376 (1935)

OERTELL, E. W. (*see* Grundy, W. D., 2)

O'HAIRE, Robert T. (*see* McCrory, F. J., 1, 2; Moore, R. T., 4; Wilson, E. D., 84, 85, 88)

OHERN, D. W.
The geology of the Grand Canyon province [abst.]: Tulsa Geol. Soc. Dig., p. 40-41 (1937)

OLK, J. F. (*see* Thurmond, R. E., 4)

OLSON, A. B.
Photogeologic map of the Paria SW quadrangle, Kane County, Utah, and Coconino County, Arizona: USGS Map I-263 (1957)

OLSON, G. G.
(and Long, J. T., Jr.) Arizona's natural resources: Research Consultants, Phoenix, Ariz., 47 p. (1957)

OLSON, H. J.
The geology of the Glove mine, Santa Cruz County, Arizona: Univ. Ariz., MS Thesis, 82 p. (1961)

OLSON, J. C.
1. (and Hinrichs, E. N.) Beryl-bearing pegmatites in the Ruby Mountains and other areas in Nevada and northwestern Arizona: USGS Bull. 1082-D, 64 p., illus. (1960)
2. (and Adams, J. W.) Thorium and rare earth in the United States: USGS Map MR-28 (1962)

OPDYKE, N. D.
1. (and Runcorn, S. K.) New evidence for reversal of the geomagnetic field near the Pliocene-Pleistocene boundary: Science, v. 123, no. 3208, p. 1126-1127 (1956)
2. (and Runcorn, S. K.) Remnant magnetization of lava flows in northern Arizona: Plateau, v. 29, no. 1, p. 1-5, tables (1956)

OPPEGARD, B. E. (*see* Colby, D. S.)

OPPENHEIMER, C. H. (*see* ZoBell, C. E.)

OSBORN, H. F.
The fossil tree bridge in the Arizona Petrified Forest: Science, new ser., v. 16, p. 991 (1902)

OSMOND, J. C.
Tectonic history of the Basin and Range Province in Utah and Nevada: Min. Engr., v. 12, no. 3, p. 251-265, maps (1960)

OSTERWALD, F. W. (*see also* Walker, G. W., 1)
Relation of tectonic elements in Precambrian rocks to uranium deposits in the Cordilleran foreland of western United States: USGS Prof. Paper 300, p. 329-336 (1956)

OSTRANDER, R. (*see* Foster, R. W.)

O'SULLIVAN, R. B.
1. Summary of coal resources of the Black Mesa coal field, Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 169-171, illus., map (1958)
2. (and Beikman, H.) Geology, structure, and uranium deposits of the Shiprock quadrangle, New Mexico and Arizona: USGS Map I-345 (1963)

OVERHOLT, J. L.
(and Vaux, G., and Rodda, J. L.) The nature of arizonite: Am. Mineral., v. 35, p. 117-119 (1950)

PABST, Adolf
1. Crystal structure and density of delafossite [abst.]: Am. Mineral., v. 22, no. 12, pt. 2, p. 10-11 (1937); v. 23, no. 3, p. 175-176 (1938)
2. (and Thomssen, R. W.) Davidite from the Quijotoa Mountains, Pima County, Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1739 (1959)

PACK, Frederick J.
Outstanding geological features of Colorado River basin: Pan-Am. Geol., v. 38, p. 289-298 (1922)

PADGETT, H. D. (*see* McDonald, H. R., 1)

PAGE, H. G. (*see also* Heindl, L. A., 26; Repenning, C. A., 3)
1. (and Repenning, C. A.) Late Cretaceous stratigraphy of Black Mesa, Navajo and Hopi Indian Reservations, Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 115-122, illus. (1958)
2. Water regimen of the Inner Valley of the San Pedro River near Mammoth, Arizona (A pilot study): USGS Water-Supply Paper 1669-I, 122 p. (1963): USGS Open-file Rep. (1962)

PAGE, L. R. (*see* Kaiser, E. P., 3; Stocking, H. E.)

PAGE, P. B. (*see* Chenoweth, W. L., 3)

PAIGE, Sidney (*see also* Longwell, C. R., 2)
Marble prospects in the Chiricahua Mountains, Arizona: USGS Bull. 380, p. 299-311 (1909)

PAKISER, L. C., Jr.
(and Black, R. A.) Exploring for ancient channels with refraction seismograph: Geophysics, v. 22, no. 1, p. 32-47, illus. (1957); [abst.]: Oil and Gas Jour., v. 54, no. 24, p. 129 (1955)

PALACHE, Charles (*see also* Jaggar, T. A., Jr.)
1. On connellite and chalcophyllite from Bisbee, Arizona: Am. Jour. Sci., 4th ser., v. 28, p. 537-540 (1909)
2. (and Shannon, E. V.) Higginsite, a new mineral of the olivenite group: Am. Mineral., v. 5, p. 155-157 (1920)
3. Notes on new or incompletely described meteorites in the mineralogical museum of Harvard University: Am. Jour. Sci., 5th ser., v. 12, p. 136-150 (1926)
4. (and Vassar, H. E.) A note on cyanotrichite: Am. Mineral., v. 11, p. 213-214 (1926)
5. Antlerite: Am. Mineral., v. 24, no. 5, p. 293-299 (1939)
6. Brochantite: Am. Mineral., v. 24, no. 8, p. 463-481 (1939)
7. Crystallographic notes; cahnite, stolzite, zincite, ultrabasite: Am. Mineral., v. 26, no. 7, p. 429-436 (1941)
8. Diaboleite from Mammoth mine, Tiger, Arizona: Am. Mineral., v. 26, no. 10, p. 605-612 (1941)
9. Paralaurionite (from Mammoth mine): Mineral. Mag., v. 29, no. 211, p. 341-345, illus. (1950)

PALMER, A. R. (*see* Gilluly, J., 7)

PALMER, Charles M.
Chrysocolla; a remarkable case of hydration: Am. Jour. Sci., 4th ser., v. 16, p. 46-48 (1903)

PALMER, Chase
Arizonite, ferric metatitanate: Am. Jour. Sci., 4th ser., v. 28, p. 353-356 (1909)

PALMER, L. A.
The Oatman district, Arizona: Engr. Min. Jour., v. 101, p. 895-900 (1916); Min. Sci. Press, v. 113, p. 193-196 (1916)

PAN-AMERICAN GEOLOGIST
1. Extremely old fossil: v. 70, p. 151-152 (1938)
2. Rarity of pre-Cambric fossils: v. 70, p. 228-229 (1938)

PAPKE, Keith G.
Geology and ore deposits of the eastern portion Hilltop mine area, Cochise County, Arizona: Univ. Ariz., MS Thesis, 99 p., maps (1952)

PARENT, H. L.
The trees that turned to stone (Petrified Forest): Pacific Disc., v. 16, no. 2, p. 2-9 (1963)

PARK, C. F., Jr. (*see also* Colton, H. S., 3,4; Schwartz, G. M., 3)
1. Geology of the San Xavier district: Univ. Ariz., MS Thesis, 30 p., map (1929)
2. Government Cave: Mus. N. Ariz., Mus. Notes, v. 2, no. 6, p. 1-3, map (1929)

PARK, John C.
(Contributor to section on land and resources): *in* Arizona, its people and resources; Univ. Ariz. Press, Tucson, Arizona (1960)

PARKE, J. G.
Report of explorations for that portion of a railroad route near the thirty-second parallel of latitude lying between Doña Ana, on the Rio Grande, and Pimas Villages, on the Gila: U.S. Pacific R. R. Expl., U.S. 33rd Cong., 1st sess., H. Ex. Doc. 129, 53 p. (1855); U.S. 33rd Cong., 2nd sess., S. Ex. Doc. 78 and H. Ex. Doc. 91, v. 2, 22 p. (1856)

PARKER, E. W.
Conditions of the coal-briquetting industry in the United States: USGS Bull. 316, (Ariz., p. 477-479) (1907)

PARKER, R. L.
Niobium and tantalum in the United States: USGS Map MR-36 (1963)

PARRISH, I. S. (*see* Finch, W. I., 2)

PARRY, C. C.
1. General geological features of the country: *in* Report on the U.S. and Mexican boundary survey (Emory); U.S. 34th Cong., 1st sess., S. Ex. Doc. 108 and H. Ex. Doc. 135, v. 1, pt. 2, p. 1-23 (1857)
2. Preliminary report: *in* Report of surveys across the continent in 1867-1868 (Palmer); p. 196-228, Phila. (1869)

PARSONS, A. B.
1. The porphyry coppers: AIME, 581 p. (1933)
2. Sixty years of copper mining in the southwest: *in* Dedication of the Douglas Memorial Building for Mining and Metallurgy; Univ. Ariz. Gen. Bull. 5, p. 27-48 (1940)
3. The porphyry coppers in 1956: AIME, 270 p., illus. (1957)

PARSONS, L. A.
Steam-shovel operations at the United Verde mine: Min. Sci. Press, v. 122, p. 453-454 (1921)

PASHLEY, E. F., Jr.
1. Subsidence cracks in alluvium near Casa Grande, Arizona: Ariz. Geol. Soc. Dig., v. 4, p. 95-101 (1961)

2. A reinterpretation of the anticlinal structure exposed in the northwest face of Pusch Ridge, Santa Catalina Mountains, Arizona: Ariz. Geol. Soc. Dig., v. 6, p. 49-54 (1963)

PATTEE, S. L. (*see* Maddock, T.)

PATTISON, H. M. (*see also* Chronic, Halka)
Life in an ancient Arizona sea: Plateau, v. 21, no. 1, p. 1-6 (1948)

PAULSON, H.
Castle Dome's new orebody: Min. World, v. 10, no. 11, p. 23 (1948)

PAVLIDES, L. (*see* Crittenden, M. S.)

PAY DIRT
(Miscellaneous items of news pertaining to the mineral industry): issued monthly from April 25, 1938.

PAYNE, A. L.
Geology and uranium deposits of the Colorado Plateau: Stanford Univ., PhD Thesis (1959)

PEABODY, F. E.
1. Current crescents in the Triassic Moenkopi formation: Jour. Sed. Pet., v. 17, no. 2, p. 73-76, illus. (1947)
2. A short history of *Chirotherium*, the "hand animal" of the Triassic: Plateau, v. 20, no. 2, p. 23-28 (1947)
3. Articulated skeleton and skin impression of a capitosaurid labyrinthodont [abst.]: Geol. Soc. Am. Bull., v. 58, no. 12, pt. 2, p. 1262 (1947)
4. Reptile and amphibian trackways from the Lower Triassic Moenkopi formation of Arizona and Utah: Univ. Calif., Dept. Geol. Sci. Bull., v. 27, no. 8, p. 295-468 (1948); [abst.]: Geol. Soc. Am. Bull., v. 57, no. 12, pt. 2, p. 1261 (1946)
5. Gilmore's split-toed footprint from the Grand Canyon Hermit shale formation: Plateau, v. 29, no. 2, p. 41-43, illus. (1956)
6. Ichnites from the Triassic Moenkopi formation of Arizona and Utah: Jour. Paleo., v. 30, no. 3, p. 731-740, illus. (1956)
7. Colton's *Chirotherium:* Plateau, v. 30, no. 1, p. 17-19, illus. (1957)

PEALE, A. C. (*see also* Hayden, F. V.)
U.S. Geol. and Geog. survey of the territories embracing Colorado and parts of adjacent territories (Hayden): Ann. Rep. 1874, p. 73-180, Washington (1876); [abst.]: Am. Jour. Sci., 3rd ser., v. 11, p. 496-497 (1876)

PECORA, W. T.
Coesite craters and space geology: Geotimes, v. 5, no. 2, p. 16-19 (1960)

PEIRCE, Frederick L.
Structure and petrography of part of the Santa Catalina Mountains: Univ. Ariz., PhD Thesis, 86 p. (1958); [abst.]: Ariz. Geol. Soc. Dig., v. 1., p. 53-54 (1958)

PEIRCE, H. W. (*see also* Kiersch, G. A., 9; Wilson, E. D., 77, 80)
1. (Reports on dimension stone): *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 3, p. 60-75, map, illus., Univ. Ariz. Press, Tucson (1955)
2. Permian sedimentary rocks of the Black Mesa basin area: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 82-87, illus. (1958)
3. (and Roseveare, G. R.) Globe to Superior and return, road log: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 26-31 (1962)
4. (and Cooley, M. E., Johnson, P. W., and Breed, W. J.) Globe to Flagstaff via Payson, Jerome, and Sedona, road log: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 31-50 (1962)
5. Stratigraphy of the DeChelly sandstone of Arizona and Utah: Univ. Ariz., PhD Thesis, 206 p. (1962)

6. Internal correlation of the Permian DeChelly sandstone-Defiance Plateau, Arizona: *in* Contributions to the geology of northern Arizona, Mus. N. Ariz. Bull. 40, p. 15-32 (1964)

PELLEGRIN, A. L.
Rare minerals in southern Arizona: Min. World, v. 34, p. 450 (1911)

PELLETIER, J. D.
Geology of the San Manuel mine: Min. Engr., v. 9, no. 7, p. 760-762, illus. (1957)

PENCK, Albrecht
Geomorphologische probleme im fernen Westen Nordamerikas: Preussicche Akad. Wissenschaft, Sitzungsbericht 1929, p. 12-15, 187-218 (1929)

PENFIELD, S. L. (*see also* Wells, H. L.)
1. Analysis of jarosite from the Vulture mine, Arizona: Am. Jour. Sci., 3rd ser., v. 21, p. 160 (1881)
2. Crystallized vanadinite from Arizona and New Mexico: Am. Jour. Sci., 3rd ser., v. 32, p. 441-443 (1886)
3. On spangolite, a new copper mineral: Am. Jour. Sci., 3rd ser., v. 39, p. 370-378 (1890); Zeitschr. Kryst, v. 18, p. 499-506 (1890); Yale Bicentennial Pub., Contrib. Mineral., p. 168-175, Charles Scribner's Sons, New York (1901)

PENG, Chi-jui
The Mountain Maid ore body, Bisbee, Arizona: Univ. Ariz., MS Thesis, 36 p., maps (1949)

PENNINGTON, J. W.
Mercury; a materials survey: USBM, IC 7941 (Ariz., p. 52) (1959)

PEPLOW, E. H. Jr., (*see also* Dunning, C. H., 4)
(and Dunning, C. H.) Miracle of the mines: Ariz. Highways, v. 36, no. 11, p. 12-35 (1960)

PERKINS, E. S.
Review of mining in Arizona: Min. Engr. World, v. 36, p. 200-203 (1912)

PERRY, D. V.
Genesis of the contact rocks at the Abril mine, Cochise County, Arizona: Univ. Ariz., MS Thesis, 97 p. (1964)

PERRY, S. H. (*see also* Henderson, E. P., 1, 2)
The San Francisco Mountains meteorite: Am. Jour. Sci., 5th ser., v. 18, p. 202-218 (1934)

PETAR, A. V. (*see also* Tyler, P. M., 2)
1. Sillimanite, kyanite, andalusite, and dumortierite: USBM, IC 6255, 19 p. (1930)
2. Molybdenum: USBM Econ. Paper 15, 38 p. (Ariz., p. 18-19) (1932)

PETEREIT, A. H.
Crystallized native copper from Bisbee, Arizona: Am. Jour. Sci., 4th ser., v. 23, p. 232 (1907)

PETERS, W. C.
Economic position of western barite deposits: Min. Engr., v. 10, no. 9, p. 972-976 (1958)

PETERSEN, R. G.
1. (and Hamilton, J. C., and Myers, A. T.) Occurrence of rhenium associated with uraninite in Coconino County, Arizona: Econ. Geol., v. 54, no. 2, p. 254-267 (1959); [abst.]: Geol. Soc. Am. Bull., v. 68, no. 12, p. 1778 (1957)
2. (and Phoenix, D. A.) Preliminary geologic map of the Paria Plateau NE quadrangle, Arizona: USGS Map MF-214 (1959)
3. Preliminary geologic map of the Emmett Wash NE quadrangle, Arizona: USGS Map MF-215 (1959)

4. Detrital-appearing uraninite grains in the Shinarump member of the Chinle formation in northern Arizona: Econ. Geol., v. 55, no. 1, p. 138-149 (1960)
5. Preliminary geologic map of the Paria Plateau SE quadrangle, Coconino County, Arizona: USGS Map MF-196 (1961)
6. (and Wells, J. D.) Preliminary geologic map of the Emmett Wash NW quadrangle, Coconino County, Arizona: USGS Map MF-197 (1961)

PETERSON, A. M.
Summary of the airborne radiometric survey of the Southern California project, southeastern California and southwestern Arizona: USAEC, RME-2080, 10 p., map (1956)

PETERSON, D. E. (*see* Robinson, G. M.)

PETERSON, D. W. (*see also* Roberts, R. J.)
1. Geology of the Haunted Canyon quadrangle, Arizona: USGS Map GQ-128 (1960)
2. Origin of the dacite near Superior and Globe, Arizona: Stanford Univ., PhD Thesis (1961); USGS Open-file Rep., 130 p. (1961); [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1740 (1959)
3. Flattening ratios of pumice fragments in an ash-flow sheet near Superior, Arizona: USGS Prof. Paper 424-D, p. 82-84 (1961)
4. Dacitic ash-flow sheet near Superior and Globe, Arizona: USGS Open-file Rep., 130 p. (1961)
5. Preliminary geologic map of the western part of the Superior quadrangle, Pinal County, Arizona: USGS Map MF-253 (1962)
6. (and Roberts, R. J.) Relations between the crystal content of welded tuffs and the chemical and magmatic composition [abst.]: Sci. Council Japan, Symposium Volcanology, p. 59-60 (1962)

PETERSON, H. V. (*see* Hains, C. F.)

PETERSON, N. P. (*see also* Butler, B. S., 15; Kinkle, A. R., Jr.)
1. Geology and ore deposits of the Mammoth mining camp, Pinal County, Arizona: Univ. Ariz., PhD Thesis, 171 p., maps (1938)
2. Geology and ore deposits of the Mammoth mining camp area, Pinal County, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull., 144, 63 p., supplement, maps (1938)
3. Mammoth mining camp area, Pinal County, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 124-127 (1938)
4. (and Creasey, S. C.) Some copper deposits in the Old Hat mining district, Pima County, Arizona: USGS Open-file Rep., 12 p., maps (1943)
5. (and Swanson, R. W.) The Christmas copper mine, Gila County, Arizona: USGS Open-file Rep., 40 p., maps (1944)
6. (and Gilbert, C. M. and Quick, G. L.) Hydrothermal alteration on the Castle Dome copper deposit (Miami, Ariz.) [absts.]: Geol. Soc. Am. Bull., v. 56, no. 12, pt. 2, p. 1190 (1945); Econ. Geol., v. 40, no. 8, p. 602 (1945)
7. Phosphate minerals in the Castle Dome copper deposit, Arizona: Am. Mineral., v. 32, no. 9-10, p. 574-582 (1947)
8. Geology of Castle Dome copper deposit, Arizona: Min. Tech., v. 12, no. 2, Tech. Paper 2302, 11 p. (1948)
9. Arizona zinc and lead deposits; lead and zinc deposits in the Globe-Miami district, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 156, p. 98-112, illus. (1950)
10. (and Gilbert, C. M., and Quick, G. L.) Geology and ore deposits of the Castle Dome area, Gila County, Arizona: USGS Bull. 971, 134 p., maps (1951)
11. Structural history of the Globe-Miami district: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 122-127, map (1952)
12. Castle Dome copper deposit: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 128-131, illus., map (1952)

13. (and Gilbert, G. M., Quick, J. V., and others) Geologic map of a portion of the Inspiration quadrangle, Arizona: USGS Open-file Rep., 2 maps (1953)
14. Copper Cities copper deposits, Globe-Miami district, Arizona: Econ. Geol., v. 49, p. 362-377, illus. (1954)
15. Geology of the Globe quadrangle, Arizona: USGS Map GQ-41, with text (1954)
16. Structural control of Globe-Miami district, Arizona [abst.]: AIME Min. Geol. Geophys. Div. 1954 Ann. Meeting, Absts. Tech. Papers, p. 17 (1954)
17. (and Swanson, R. W.) Geology of the Christmas copper mine, Gila County, Arizona: USGS Bull. 1027-H, p. 351-373, illus., maps (1956)
18. Preliminary geologic map of the Pinal Ranch quadrangle, Arizona: USGS Map MF-81 (1961)
19. Geology and ore deposits of the Globe-Miami district, Arizona: USGS Prof. Paper 342, 151 p. (1962)
20. Geology and ore deposits of the Globe quadrangle: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 158-162 (1962)

PETERSON, R. C.
The structural geology of the Sabino Canyon fold, Santa Catalina Mountains, Pima County, Arizona: Univ. Ariz., MS Thesis, 37 p. (1963)

PETRAFESO, F. A. (*see* Frischknecht, F. C., 2, 3, 4, 5, 6)

PETRUNKEVITCH, Alexander
Calcitro fisheri, a new fossil arachnid: Am. Jour. Sci., v. 243, no. 6, p. 320-329 (1945)

PFISTER, A. J. (*see* Stewart, L. A., 6)

PHALEN, W. C.
1. Celestite deposits in California and Arizona: USGS Bull. 540-T, p. 521-533 (1914)
2. Salt resources of the United States: USGS Bull. 669, 284 p., maps (1919); [abst.]: Wash. Acad. Sci. Jour., v. 9, p. 600 (1919)

PHELPS DODGE CORPORATION
Annual report for 1924: Ariz. Min. Jour., v. 8, no. 23, p. 13-14, 55-57 (1925)

PHELPS, Harlow D.
Exploration of the Copper Butte mine, Mineral Creek mining district, Pinal County, Arizona: USBM, RI 3914, maps (1946)

PHOENIX, D. A. (*see also* Iorns, W. V.; Petersen, R. G., 2)
1. Fe^{++} and Fe^{+++} ratios in saturated and unsaturated sandstone, Oljeto syncline, Navajo County, Arizona [abst.]: Geol. Soc. Am. Bull., v. 68, no. 12, p. 1841 (1957)
2. Sandstone cylinders as possible guides to paleomovement of ground water: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 194-196, illus. (1958)
3. General geology of the Lees Ferry-Glen Canyon dam area: Jour. Geophys. Research, v. 64, no. 6, p. 693 (1959)
4. Proposed classification of groundwater provinces; hydrologic units, and chemical types of groundwater in the upper Colorado River Basin: USGS Prof. Paper 424-C, p. 125-127 (1961)
5. Geology of the Lees Ferry area, Coconino County, Arizona: USGS Bull. 1137, 85 p., maps (1963)

PICARD, M. D.
1. Geology of Pennsylvanian gas in Four Corners region (with sections by Brown, B. R., Loleit, A. J., and Parker, J. W.): AAPG Bull., v. 44, no. 9, p. 1541-1569 (1960)
2. Carbon dioxide, nitrogen, and helium in Mississippian of Four Corners region, preliminary statement: Four Corners Geol. Soc., Guidebook 3rd Field Conf., p. 138-140, illus. (1960)

3. (and Brown, B. R.) Revised lower Paradox member (Pennsylvanian) cross section in Four Corners region: AAPG Bull., v. 45, no. 9, p. 1578-1579 (1961)
4. Occurrence and origin of Mississippian gas in Four Corners region: AAPG Bull., v. 46, no. 9, p. 1681-1700 (1962)

PICKARD, B. O.
1. The Apache mines of the Owl Head district, Arizona: Min. Sci., v. 65, p. 473-475 (1912)
2. Bunker Hill mining district of Pinal County, Arizona: Min. Sci., v. 66, p. 281-282 (1912)

PICKERING, W. H.
The chance of collision with a comet, iron meteorites, and Coon Butte: Pop. Astron., v. 17, p. 329-339 (1909)

PICKETT, E. E. (*see* Keller, W. D., 2)

PIERCE, A. P.
(and Mytton, J. W., and Gott, G. B.) Radioactive elements and their daughter products in the Texas Panhandle and other oil and gas fields in the United States: USGS Prof. Paper 300, p. 527-532 (1956)

PIERCE, W. D.
1. Fossil arthropods from onyx-marble: S. Calif. Acad. Sci. Bull., v. 50, pt. 1, p. 34-49, illus. (1951)
2. Insect fossils in onyx marble, and modern entrapment in calcite waters: Geol. Soc. Am. Bull., v. 62, no. 12, pt. 2, p. 1523 (1951)

PIERCE, W. G.
(and Rich, E. I.) Summary of rock salt deposits in the United States as possible storage sites for radioactive waste materials: USGS Bull. 1148 (Ariz., p. 47-49) (1962)

PIKE, William S., Jr.
Intertonguing marine and non-marine Upper Cretaceous deposits of New Mexico, Arizona, and southwestern Colorado: Geol. Soc. Am. Mem. 24, 103 p., illus. (1947)

PILKINGTON, H. D.
1. A mineralogic investigation of some garnets from the Catalina Mountains, Pima County, Arizona: Ariz. Geol. Soc. Dig., v. 4, p. 117-123 (1961)
2. Structure and petrology of a part of the east flank of the Santa Catalina Mountains, Pima County, Arizona: Univ. Ariz., PhD Thesis, 155 p. (1962)

PILLMORE, C. L. (*see also* Marshall, C. H., 2; Witkind, I. J., 18)
1. Photogeologic map of the Springdale SW quadrangle, Kane and Washington Counties, Utah, and Mohave County, Arizona: USGS Map I-132 (1956)
2. Photogeologic map of the Short Creek NE quadrangle, Mohave County, Arizona: USGS Map I-142 (1956)
3. Photogeologic map of the Virgin SE quadrangle, Washington County, Utah, and Mohave County, Arizona: USGS Map I-179 (1956)
4. Photogeologic map of the Kanab SW quadrangle, Kane County, Utah, and Mohave County, Arizona: USGS Map I-138 (1956)

PINE, G. L.
Sedimentation studies in the vicinity of Willcox Playa, Cochise County, Arizona: Univ. Ariz., MS Thesis, 38 p. (1963)

PIPER, A. M.
1. Investigations of underground-water problems in Arizona, California, New Mexico, and Oregon: Am. Geophys. Union Trans. 13th Ann. meeting, p. 308-310 (1932)
2. (and Poland, J. F.) Character and structure of volcanic rocks near Kingman, Arizona, with respect to water-yielding capacity: USGS Ground-Water Branch Open-file Rep., 14 p. (1959)

PITKIN, J. A. (*see* Andreason, G. E.)

PLAFKER, Lloyd
Geological reconnaissance of the Cenozoic Walnut Grove Basin, Yavapai County, Arizona: Univ. Ariz., MS Thesis, 62 p. (1956)

PLATEN, Paul
Untersuchungen fossiler Holzer aus dem Westen der Vereinigten Staaten von Nordamerika: Naturforschende Gesellschaft zu Leipzig, Sitzungsb., Jg. 34, p. 1-164 (1908)

PLATT, J. M.
The Turquoise mining district, Arizona: Engr. Min. Jour., v. 87, p. 213 (1909)

PLATT, W. S.
Land-surface subsidence in the Tucson area: Univ. Ariz., MS Thesis, 38 p. (1963)

PLATTS, J. B. (*see* Schrader, F. C., 11)

PLOUFF, Donald (*see also* Keller, G. V., 2)
1. Regional gravity survey of the Carrizo Mountains area, Arizona and New Mexico: USGS Open-file Rep., 30 p., illus. (1958)
2. Gravity survey near Tucson, Arizona: USGS Prof. Paper 424-D, p. 258-259 (1961)

PLUMMER, W. L.
Successful dry placer operations at Plomosa, Arizona: Min. Engr. World, v. 45, p. 1-3 (1916)

POGUE, J. E.
On a cerussite twin from the Mammoth mine, Pinal County, Arizona: Am. Jour. Sci., 4th ser., v. 35, p. 90-92 (1913)

POLAND, J. F. (*see* Piper, A. M., 2; Turner, S. F., 26)

POMEROY, J. S.
1. Photogeologic map of the House Rock Spring SW quadrangle, Coconino County, Arizona: USGS Map I-254 (1957)
2. Photogeologic map of the Hurricane Cliffs-2 NW quadrangle, Mohave County, Arizona: USGS Map I-293 (1959)

POOLE, F. G. (*see also* Stewart, J. H., 1)
1. (and Williams, G. A.) Direction of sediment transport in the Triassic and associated formations of the Colorado Plateau: USGS Prof. Paper 300, p. 227-231 (1956)
2. Stream directions in Triassic rocks of the Colorado Plateau: USGS Prof. Paper 424-C, Art. 199, p. 139-141 (1961)
3. Wind directions in late Paleozoic to middle Mesozoic time on the Colorado Plateau: USGS Prof. Paper 450-D, Art. 163, p. 147-150 (1962)

POPOFF, C.
The geology of the Rosemont mining camp, Pima County, Arizona: Univ. Ariz., MS Thesis, 107 p., maps (1940)

POSNJAK, E. (*see* Merwin, H. E., 1,2)

POTTER, G. M.
(and Havens, R.) Concentration of oxide manganese ores from the Adams and Woody properties, Coconino County, near Peach Springs, Arizona: USBM, RI-4439, 10 p. (1949)

POULSON, E. N.
1. (and Youngs, F. O.) Soil survey of the upper Gila Valley area, Arizona: U.S. Dept. Agr., Bur. Chem. and Soils, ser. 1933, no. 15, p. 1-41 (1938)
2. (and Wildermuth, R., and Harper, W. G.) Soil survey of the Casa Grande area, Arizona: U.S. Dept. Agr., Bur. Plant Indust., ser. 1936, no. 7, p. 1-94 (1941)

POWELL, J. W.

1. Report of the survey of the Colorado River of the West: U.S. 42nd Cong., 3rd sess., H. Misc. Doc. 76, 16 p. (1873)
2. Some remarks on the geological structure of a district of country lying to the north of the Grand Canyon of the Colorado: Am. Jour. Sci., 3rd ser., v. 5, p. 456-565 (1873)
3. Report of explorations in 1873 of the Colorado of the West and its tributaries: Smithsonian Inst. Pub., Washington, 36 p., (1874); U.S. 43rd Cong., 1st sess., H. Misc. Doc. 265, 29 p. (1874)
4. Remarks on the structural geology of the valley of the Colorado of the West: Philo. Soc. Wash. Bull., v. 1, p. 48-51 (1874)
5. Exploration of the Colorado River of the West and its tributaries explored in 1869, 1870, 1871, and 1872: 291 p., map, Washington (1875); [absts.]: Sci. Am. Suppl., v. 5, p. 1869-1871, 1917-1919, 1965-1967; v. 6, p. 2075-2077, 2139-2141 (1876); Pop. Sci. Monthly, v. 7, p. 385-399, 531-542, 670-680 (1876); Am. Jour. Sci., 3rd ser., v. 10, p. 303-304 (1876); Am. Naturalist, v. 10, p. 736-739 (1876)
6. Report on the geology of the eastern portion of the Uinta Mountains, etc.: U.S. Geol. and Geog. Survey Terr., 2nd div., Washington (1876)
7. Arid lands: USGS 11th Ann. Rep., pt. 2, p. 201-289 (1891)
8. Canyons of the Colorado: The Chautaugua-Century Press, 400 p. (1895)
9. Physical features of the Colorado River basin [abst.]: USGS Water-Supply Paper 395, p. 12-16 (1916)

PRATT, J. H.

1. Gold deposits of Arizona: Engr. Min. Jour., v. 73, p. 795-796, map (1902)
2. Arizona asbestos deposits: Min. World, v. 23, p. 17 (1905)

PRICE, T. M.

Aggregate production at Hoover Dam: AIME Trans., v. 109, p. 397-417, illus. (1934)

PRICE, William E., Jr.

1. Rim rocks of Sycamore Canyon, Arizona: Univ. Ariz., MS Thesis, 93 p., maps (1948); [abst.]: Geol. Soc. Am. Bull., v. 59, no. 12, pt. 2, p. 1380 (1948)
2. The Moenkopi formation at Sycamore Canyon: Plateau, v. 21, p. 49-54, illus. (1949)
3. Cenozoic gravels on the rim of Sycamore Canyon Arizona: Geol. Soc. Am. Bull., v. 61, p. 501-507, illus. (1950)
4. The Kaibab formation of Sycamore Canyon: Plateau, v. 23, p. 11-16, illus. (1950)

PRISER, John

Operation underground: Desert Mag., v. 11, no. 4, p. 4-7, illus. (1948)

PROBERT, F. H.

1. Secondary enrichment: Engr. Min. Jour., v. 76, p. 958-959 (1903)
2. (and Earling, R. B.) The estimation of ore reserves: Engr. Min. Jour., v. 92, p. 1179-1180 (1911)
3. Copper Butte, Arizona, a volcanic throat: Engr. Min. Jour., v. 94, p. 499-500 (1912)
4. The Three R Mine, Patagonia district, Arizona: Min. Sci. Press, v. 109, p. 174-176 (1914)
5. Oatman, Arizona (geology and mineralization): Min. Sci. Press, v. 112, p. 17-20 (1916)

PROUT, J. W.

The silver-lead deposits of the Mowry mine, Mowry, Santa Cruz County, Arizona: Univ. Ariz., MS Thesis, 18 p., maps (1907)

PROUTY, R. W.
Mining activities and sales opportunities in the state of Arizona: Los Angeles County Chamber Commerce Domestic Trade Rep. 87, 29 p. (1939)

PROVOT, F. A.
Jerome mining district geology: Engr. Min. Jour., v. 102, p. 1028-1031 (1916)

PULIDO, A. D. (*see* Skibitzke, H. E., 1)

PULLEN, J. B.
Modified mining methods in the United Verde mine: Min. Tech. v. 5, no. 1, Tech. Paper 1273, 18 p. (1941); AIME Trans., v. 153, p. 24-41, illus. (1943)

PUMPELLY, Raphael
1. Mineralogical sketch of the silver mines of Arizona: Calif. Acad. Sci. Proc., v. 2, p. 127-139 (1863)
2. Across America and Asia: 454 p., New York (1870)
3. Statistics of iron, coal (copper), etc.: USGS 2nd Ann. Rep., p. 26-31 (1882)
4. My reminiscences: 2 vols., 844 p., maps, New York (1918)

PURINGTON, C. W.
The Vulture mine, Arizona: Min. Sci. Press, v. 94, p. 308-310 (1907)

PUTMAN, C. C.
Land and leasing in the Salt Anticline area of the Paradox Basin: Four Corners Geol. Soc., Guidebook 3rd Field Conf., p. 23-25 (1960)

PUTMAN, G. W.
1. (and Burnham, C. W.) Distribution of minor elements in some igneous rocks of central and northwestern Arizona [abst.]: Geol. Soc. Am. Bull., v. 71, no. 12, p. 1950 (1960)
2. (and Burnham, C. W.) Trace elements in igneous rocks, Northwest and Central Arizona: Geochimica et Cosmochimica Acta, v. 27, p. 53-106 (1964)

PYE, N. (*see* Balchin, W. G. V.)

PYE, Willard D. (*see also* Havenor, K. C., 2; Thomas, G. C., 3)
1. Geologic framework of Arizona and southwestern United States — a program of research: Ariz. Geol. Soc. Dig., v. 1, p. 30 (1958)
2. Stratigraphic history of southeastern Arizona and adjacent areas [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1742 (1959)
3. Silurian and Devonian stratigraphy southeastern Arizona and southwestern New Mexico: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 25-30 (1959)
4. Marine sedimentation in southern Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 5-12, illus. (1959)
5. Catalogue of principal sedimentary formation names in southern Arizona and northern Sonora: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 274-281 (1959)
6. Preliminary petrographic study of some Cretaceous coals in Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 109-110 (1960)
7. (Contributor to section on minerals and fuels): *in* Arizona, its people and resources; Univ. Ariz. Press, Tucson, Arizona (1960)
8. General review of Arizona oil and gas possibilities and principles controlling oil and gas accumulation: *in* Oil, Gas, and Helium in Arizona, Arizona Development Board *for* Arizona Oil and Gas Conservation Commision, p. 42 (1961)

QUAIDE, W. L.
Geology of central Peloncillo Mountains, Hidalgo County, New Mexico: Univ. Calif., Thesis (1951)

QUAYLE, T. W.
Mining methods and practices at the United Verde Copper Mine, Jerome, Arizona: USBM, IC 6440, 32 p. (1931)

QUEEN, J. R.
Water supply of the central Arizona area: USGS Ground-Water Branch, Open-file Rep., 18 p. (1951)

QUICK, G. L. (*see* Creasey, S. C., 1, 7; Peterson, N. P., 6, 10, 13)

QUINN, J. H.
New Pleistocene Asinus from southwestern Arizona: Jour. Paleo., v. 32, no. 3, p. 603-610, illus. (1958)

QURASHI, M. M.
1. (and Barnes, W. H., and Berry, L. G.) The space group of conichalcite: Am. Mineral., v. 38, no. 5-6, p. 557-559, illus. (1953)
2. (and Barnes, W. H.) Descloizite and conichalcite, Part 1: *in* Pt. 1 *of* The structures of the minerals of the descloizite and adelite groups; Am. Mineral., v. 39, no. 5-6, p. 416-435, illus. (1954)

RAABE, Robert C.
Structure and petrography of the Bullock Canyon, Buehman Canyon area, Pima County, Arizona: Univ. Ariz., MS Thesis, 50 p. (1959)

RABBITT, J. C. (*see* Kaiser, E. P., 4)

RADER, L. F. (*see* Coats, R. R., 3)

RALSTON, O. C.
Possibilities of zinc production in Arizona: Min. Jour., v. 14, no. 7, p. 11 (1930)

RAMBOSEK, A. J. (*see* Wells, R. L.)

RAMPACEK, C. (*see* Freeman, G. A.)

RAND, L. R.
(and Sturgis, E. B., editors) The mines handbook: v. 18, pt. 1, 2058 p. (1931)

RANSOM, J. E.
1. Arizona's Salt River asbestos: Asbestos, v. 36, no. 3, p. 2-10 (1954)
2. Petrified flotsam along the Colorado: Desert Mag., v. 17, no. 4, p. 8-11, illus. (1954)
3. Arizona gem trails and the Colorado Desert of California — a field guide for the gem hunter, the mineral collector, the uranium hunter: Mineral. Pub. Co., Portland, Ore., 96 p., illus. (1955)
4. Serpentine miners of Salt Creek Canyon: Desert Mag., v. 19, no. 4, p. 13-16, illus. (1956)
5. Bradshaw bonanza: Desert Mag., v. 22, no. 11, p. 27-29 (1959)

RANSOME, F. L. (*see also* Bonillas, Y. S.; Jones, E. L., Jr., 4; Lindgren, W., 8)
1. Faulting and mountain structure in central Arizona [abst.]: Science, new ser., v. 15, p. 711 (1902)
2. Geology of the Globe copper district, Arizona: USGS Prof. Paper 12, 168 p., maps (1903)
3. Copper deposits of Bisbee, Arizona: USGS Bull. 213, p. 149-157 (1903)
4. The copper deposits of Bisbee, Arizona: Engr. Min. Jour., v. 75, p. 444-445 (1903)
5. The geology and ore deposits of the Bisbee quadrangle, Arizona: USGS Prof. Paper 21, 168 p., maps (1904)
6. Description of the Globe quadrangle, Arizona: USGS Folio 111, 17 p., maps (1904)
7. Description of the Bisbee quadrangle, Arizona: USGS Folio 112, 17 p., maps (1904); reprint: 19 p., maps (1914)
8. The geology and copper deposits of Bisbee, Arizona: AIME Trans., v. 34, p. 618-642, map (1904)
9. Geology of the Bisbee district, Arizona: Engr. Min. Jour., v. 81, p. 1103 (1906)
10. The copper deposits of the Clifton-Morenci district, Arizona [review of USGS Prof. Paper 43 by Waldemar Lindgren]: Econ. Geol., v. 1, p. 612-615 (1906)

11. A comparison of some Paleozoic and pre-Cambrian sections in Arizona [abst.]: Science, new ser., v. 27, p. 68-69 (1908)
12. Pre-Cambrian sediments and faults in the Grand Canyon of the Colorado: Science, new ser., v. 27, p. 667-669 (1908)
13. Criteria of downward sulphide enrichment: Econ. Geol., v. 5, p. 205-220 (1910)
14. Geology at Globe, Arizona: Min. Sci. Press, v. 100, p. 256-257 (1910)
15. Geology of the Globe district, Arizona: Min. Sci. Press, v. 102, p. 747-748 (1911)
16. Activities in the Turquoise copper district, Arizona: Min. Engr. World, v. 36, p. 1359-1361, map (1912)
17. Notes on the Bisbee district, the Globe and Miami districts, Ray and Jerome, Arizona: USGS Bull. 529, p. 179-187, 192-193 (1913)
18. The Turquoise copper mining district, Arizona: USGS Bull. 530, p. 125-134, map (1913)
19. Protore, term for unenriched pyritic material: Econ. Geol., v. 8, p. 721 (1913)
20. Copper deposits near Superior, Arizona: USGS Bull. 540, p. 139-158, map (1914); [extract]: Ariz. Min. Jour., v. 6, no. 3, p. 26-27 (1922)
21. Quicksilver deposits of the Mazatzal Range, Arizona: USGS Bull. 620, p. 111-128 (1915)
22. The Paleozoic section of the Ray quadrangle, Arizona: Wash. Acad. Sci. Jour., v. 5, p. 380-388 (1915)
23. The Tertiary orogeny of the North American Cordillera and its problems: *in* Problems of American geology, p. 287-376, maps, Yale Univ., New Haven (1915)
24. Some Paleozoic sections in Arizona and their correlation: USGS Prof. Paper 98, p. 133-166 (1916); [abst.]: Wash. Acad. Sci. Jour., v. 6, p. 681-682 (1916)
25. The copper deposits of Ray and Miami, Arizona: USGS Prof. Paper 115, 192 p., maps (1919); [abst.]: Wash. Acad. Sci. Jour., v. 11, p. 57-58 (1921); [extracts]: Ariz. Min. Jour., v. 3, no. 11, p. 25 (1920); v. 5, no. 23, p. 12, 62 (1922)
26. Deposits of manganese ore in Arizona; Bisbee and Tombstone districts: USGS Bull. 710, p. 96-119, maps (1920)
27. Ore deposits of the Sierrita Mountains, Pima County, Arizona: USGS Bull. 725, p. 407-428 (1922)
28. Description of the Ray quadrangle: USGS Folio 217, 24 p., maps (1923)
29. Geology of the Oatman gold district, Arizona: USGS Bull. 743, 58 p., map (1923); [extracts]: Ariz. Min. Jour., v. 7, no. 9, p. 5-6, 14-18; no. 10, p. 9, 41-45 (1923)
30. Ancient high-level potholes near the Colorado River [abst.]: Science, new ser., v. 57, p. 593 (1923)
31. Basin range structure at Jerome, Arizona: Science, new ser., v. 61, p. 659-660 (1925)
32. Historical sketch: USGS Water-Supply Paper 499, p. 3-23 (1925)
33. Geology as related to high dams: Engr. News-Record, v. 101, p. 657-659 (1928)
34. General geology and summary of ore deposits: *in* Ore deposits of the Southwest; 16th Int. Geol. Cong., Guidebook 14, p. 1-23, maps (1932)
35. Historical review of geology as related to western mining: *in* Ore deposits of the Western States, AIME Lindgren Volume, p. 1-16 (1933)
36. The geologic features of the occurrence of copper in North America: *in* Copper resources of the world; 16th Int. Geol. Cong., p. 37-64 (1935)
37. Verde fault, Arizona [absts.]: Pan-Am. Geol., v. 64, p. 70 (1935); Geol. Soc. Am. Proc. 1935, p. 347 (1936)

RAPHAEL, J. M.
Crustal disturbances in the Lake Mead area: U.S. Bureau Reclamation, Engr. Mon. 21, 14 p., illus. (1954)

RASOR, C. A. (*see also* Butler, B. S., 9; Tenney, J. B., 11)
1. Mineralogy and petrography of the Tombstone mining district, Arizona: Univ. Ariz., PhD Thesis, 115 p. (1937); [abst.]: Univ. Ariz., Ariz. Bur. Mines Bull. 143, p. 50-66 (1938)
2. Bromyrite from Tombstone, Arizona: Am. Mineral., v. 23, p. 157-159 (1938)
3. Manganese mineralization at Tombstone, Arizona: Econ. Geol., v. 34, p. 790-803 (1939)
4. Loellingite from Arizona: Am. Mineral., v. 31, no. 7-8, p. 406-408 (1946)

RATH, Gerhard vom
1. Arizona: Studien und Wahrnehmungen: Sammlg v Vorträgen 14, p. 239-350, Heidelberg (1885); Separate: 112 p., 2nd ed., Heidelberg (1888)
2. Mineralien aus den Vereinigten Staaten: Niederrhein Ges Bonn, Sitzungsberichte 43, p. 21-34 (1886)

RAUP, R. B. (*see* Granger, H. C., 1, 3; Stewart, J. H., 2)

RAVITZ, S. F. (*see* Romslo, T. M., 1)

RAY, R. G.
1. Photogeologic map, Setsiltso Springs-3 quadrangle, Navajo Indian Reservation, Apache County, Arizona: USGS Trace Elements Memo. Rep. 402 (1952)
2. Photogeologic map, Setsiltso Springs-4 quadrangle, Navajo Indian Reservation, Apache County, Arizona: USGS Trace Elements Memo. Rep. 404 (1952)
3. Photogeologic map, Setsiltso Springs-5 quadrangle, Navajo Indian Reservation, Apache County, Arizona: USGS Trace Elements Memo. Rep. 439 (1952)
4. Photogeologic map, Agathla Peak-1 quadrangle, Navajo Indian Reservation, Navajo County, Arizona: USGS Trace Elements Memo. Rep. 441 (1952)
5. Photogeologic map, Agathla Peak-8 quadrangle, Navajo Indian Reservation, Navajo County, Arizona: USGS Trace Elements Memo. Rep. 440 (1952)

RAYDON, G. T.
Geology of the northeastern Chiricahua Mountains, Arizona: Univ. Calif., MA Thesis (1952)

RAYMER, R. G.
Early copper mining in Arizona: Pacific Historical Review, v. 4, no. 2, p. 123-130 (1935)

RAYMOND, R. W.
1. Mineral resources of the states and territories west of the Rocky Mountains: U.S. Treas. Dept., 256 p., Washington (1869)
2. Statistics of mines and mining in the states and territories west of the Rocky Mountains, 2nd rep.: U.S. Treas. Dept., Washington, 805 p., (1870); 3rd rep.: 566 p. (1872); 4th rep.: 566 p. (1873); 5th rep.: 550 p. (1873); 6th rep.: 585 p., (1874) 7th rep.: 540 p. (1875); 8th rep.: 519 p. (1877)

READ, C. B.
1. (and Sample, R. D. and Sullwold, H. H., Jr.) Copper deposits of the White Mesa mining district, Coconino County, Arizona: USGS Open-file Rep., 16 p., maps (1943)
2. Stratigraphy of the outcropping Permian rocks around the San Juan Basin: N. Mex. Geol. Soc., Guidebook of the San Juan Basin, p. 80-84, illus. (1951)
3. (and Wanek, A. A.) Correlation of Permian rocks in northeastern Arizona and adjoining parts of New Mexico and Utah: USGS Prof. Paper 424-C, p. 156-159 (1961)

4. (and Ash, S. R.) Stratigraphic significance of the Cretaceous fern *tempskya* in the western conterminous United States paleobotany: USGS Prof. Paper 424-D, p. 250-254 (1961)
5. (and Wanek, A. A.) Stratigraphy of outcropping Permian rocks in parts of northeastern Arizona and adjacent areas: USGS Prof. Paper 374-H, p. 1-10 (1961)
6. (and Wanek), A. A.) Permian stratigraphy of northwestern New Mexico and adjacent parts of Arizona and Utah [abst.]: N. Mex. Geol. Soc., Guidebook 12th Field Conf., p. 198 (1961)
7. (and Mamay, S. H.) Upper Paleozoic floral zones and floral provinces of the United States: USGS Prof. Paper 454-K, 35 p., plates (1964)

REAGAN, A. B.

1. Age of the lavas of the plateau region: Am. Geol., v. 32, p. 170-177 (1903)
2. Geology of the Fort Apache region in Arizona: Am. Geol., v. 32, p. 265-308, map (1903)
3. What is the age of the Aubrey limestone of Rocky Mountains: Indiana Acad. Sci. Proc. 1903, p. 235 (1904)
4. Some fossils from the lower Aubrey and upper Red Wall limestones in the vicinity of Fort Apache, Arizona: Indiana Acad. Sci. Proc. 1903, p. 237-246 (1904)
5. The fossils of the Red Wall compared with those of the Kansas coal measures: Indiana Acad. Sci. Proc. 1903, p. 249-251 (1904); Centralblatt für Mineralogie, p. 609-611, Stuttgart (1907)
6. Correlation notes: Science, new ser., v. 34, p. 127-128 (1911)
7. Coal near Pinedale, Navajo County, Arizona: Science, new ser., v. 34, p. 271-272 (1917)
8. Mineral resources of Fort Apache region, Arizona: Min. World, v. 35, p. 1274 (1911)
9. Correlation of the formations described in the Fort Apache region in Arizona with similar formations in other parts of the State: Kansas Acad. Sci. Trans., v. 29, p. 178-180 (1920)
10. Probable Eocene glacial deposits in the Fort Apache region, Arizona: Indiana Acad. Sci. Proc. 1919, p. 355-358 (1921); Kansas Acad. Sci. Trans., v. 30, p. 126-129 (1922)
11. Stratigraphy of the Hopi Buttes volcanic field, Arizona: Pan-Am. Geol., v. 41, p. 355-366, map (1924)
12. Recent changes in the Plateau region: Science, new ser., v. 60, p. 283-285 (1924)
13. Stream aggradation through irrigation: Pan Am. Geol., v. 42, p. 335-344 (1924)
14. Geology of Fort Apache region, Arizona [abst.]: Pan-Am. Geol., v. 42, p. 375 (1924)
15. Identification of two fossil leaves from Iowa, one from Arizona: Indiana Acad. Sci. Proc., v. 34, p. 141-142 (1925)
16. Petrified forest of the Ganado: Pan-Am. Geol., v. 43, p. 97-98 (1925)
17. Life and mythology of Ganado petrified forest: Pan-Am. Geol., v. 43, p. 238-239 (1925)
18. Late Cretacic formations of Black Mesa, Arizona: Pan-Am. Geol., v. 44, p. 285-294 (1925)
19. Extension of Cretacic Laramie formation into Arizona: Pan-Am. Geol., v. 46, p. 193-194 (1926)
20. Fossils from the Mancos-Dakota-Tununk formation in the vicinity of Steamboat, Arizona: Indiana Acad. Sci. Proc., v. 36, p. 119-127 (1927)
21. Contributions to the geology of the Navajo Country, Arizona, with notes on the archaeology [abst.]: Stanford Univ., PhD Thesis (1925)
22. Gravels in the Navajo country: Am. Mineral., v. 12, p. 414-415 (1927)

23. Mineral resources of the Navajo country: Min. Jour., v. 11, no. 18, p. 3-4, 15 (1928)
24. Dakotan fossils incorporated in Recent deposits: Pan-Am. Geol., v. 50, p. 69-70 (1928)
25. Pleistocene mollusks from Hopi Buttes: Pan-Am. Geol., v. 51, p. 337-338 (1929)
26. Some geological notes of the Upper Cretaceous of Black Mesa, Arizona: Kansas Acad. Sci. Trans., v. 35, p. 232-252 (1932)
27. The Tertiary-Pleistocene of the Navajo country in Arizona, with a description of some of its included fossils: Kansas Acad. Sci. Trans., v. 35, p. 253-259 (1932)
28. Geological notes on the Fort Apache region, Arizona: Kansas Acad. Sci. Trans., v. 35, p. 260-273, map (1932)
29. Utilization of the Navajo country: Iowa Acad. Sci. Proc., v. 41, p. 215-238, maps (1934)

REBER, L. E., Jr.
1. The mineralization at Clifton-Morenci: Econ. Geol., v. 11, p. 528-573 (1916)
2. Geology and ore deposits of Jerome district: AIME Trans., v. 66, p. 3-26, map (1922); [absts.]: Min. Met., no. 161, p. 25-27 (1920); Engr. Min. Jour., v. 110, p. 566 (1920); Ariz. Min. Jour., v. 6, no. 5, p. 10-12, 77-79 (1922)
3. Jerome district: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 41-65, maps (1938)

REBER, S. J.
Pre-Cambrian exposures in southwest Utah, southeast Nevada, and northwest Arizona: Utah Geol. Soc., Guidebook 7, p. 43-44 (1952)

REED, C. A.
A new mammalian fossil locality in the Pliocene of Arizona: Plateau, v. 22, p. 75-77 (1950)

REED, E. F.
(and Simmons, W. W.) Geological notes on the Miami-Inspiration mine: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 153-158, map (1962)

REEDALL, H. C.
Tonopah Mining Company enters Arizona: Min. Jour., v. 16, no. 12, p. 10-11 (1932)

REESIDE, J. B., Jr. (*see also* Baker, A. A., 1, 2, 3, 4, 7; Cobban, W. A.; Gilluly, J., 7)
1. (and Bassler, H.) Stratigraphic sections in southwestern Utah and northwestern Arizona: USGS Prof. Paper 129, p. 53-77 (1922)
2. Two new unionid pelecypods from the Upper Triassic: Wash. Acad. Sci. Jour., v. 17, p. 476-478 (1927)
3. (and Baker, A. A.) The Cretaceous section in Black Mesa, northern Arizona: Wash. Acad. Sci. Jour., v. 19, p. 30-37 (1929)
4. Maps showing thickness and general character of the Cretaceous deposits in the western interior of the United States: USGS Oil and Gas Investigation Map 10 (1944)
5. Paleoecology of the Cretaceous seas of the western interior of the United States: *in* Treatise on Marine ecology and paleoecology, Geol. Soc. Am. Mem. 67, v. 2, p. 505-542, maps (1957)

REGELMAN, E. S.
1. The development of asbestos in Arizona: Ariz. Min. Jour., v. 10, no. 14, p. 5-6 (1926)
2. Asbestos and its importance as a national asset: Min. Cong. Jour., v. 13, p. 176-179 (1927)

REHKEMPER, L. J.
Petrology of Springerville area, Apache County, Arizona: Univ. Texas, MS Thesis (1956); [abst.]: Ariz. Geol. Soc. Dig., v. 3, p. 181-182 (1960)

REICHE, Parry
1. Memorandum report on Lone Pine Reservoir: U.S. Dept. Agr., Soil Conservation Service Open-file Rep., Albuquerque, N. Mex., 5 p., maps (1936)
2. Quaternary deformation in the Cameron district of the Plateau province: Am. Jour. Sci., 5th ser., v. 34, no. 200, p. 128-138, maps (1937)
3. The Toreva block, a distinctive landslide type: Jour. Geol., v. 45, no. 5, p. 538-548, maps (1937)
4. An analysis of cross-lamination; the Coconino sandstone: Jour. Geol., v. 46, p. 905-932 (1938)
5. Erosion stages of the Arizona Plateau as reflected in a headwater drainage area: Plateau, v. 13, no. 4, p. 53-64, maps (1941)

REID, J. A.
1. Sketch of the geology and ore deposits of the Cherry Creek district, Arizona: Econ. Geol., v. 1, p. 417-436 (1906)
2. Secondary changes at Cherry Creek, Arizona: Min. Sci. Press, v. 94, p. 31-33 (1907)

REID, Robert R.
Some Devonian sections in southeastern Arizona and their correlation: Univ. Ariz., MS Thesis, 54 p. (1928)

REILLY, P. T.
Aerial discoveries in the Grand Canyon: Plateau, v. 32, no. 3, p. 68-72 (1960)

REINHARDT, E. V.
1. Uranium-copper deposits near Copper Canyon, Navajo Indian Reservation, Arizona: USAEC, RMO-902 (1952)
2. Practical guides to uranium ores on the Colorado Plateau: USAEC, RMO-1027, 13 p. (1952)

RENARD, K. G. (*see* Keppel, R. V.)

RENAULT, J. R. (*see* Kuellmer, F. J., 1)

REPENNING, C. A. (*see also* Akers, J. P., 1; Harshbarger, J. W., 3, 5, 6, 9, 13; Page, H. G., 1)
1. (and Halpenny, L. C., and Hem, J. D.) Water-supply investigations of Keams Canyon area, Hopi Indian Reservation, Navajo County, Arizona: USGS Ground-Water Branch Open-file Rep., 42 p. (1951)
2. (and Irwin, J. H.) Bidahochi formation of Arizona and New Mexico: AAPG Bull., v. 38, no. 8, p. 1821-1826 (1954)
3. (and Page, H. G.) Late Cretaceous stratigraphy of Black Mesa, Navajo and Hopi Indian Reservations, Arizona: AAPG Bull., v. 40, no. 2, p. 255-294, illus. (1956)
4. (and Harshbarger, J. W.) Recent revisions in Mesozoic stratigraphic nomenclature in the Navajo country [abst.]: N. Mex. Geol. Soc., Guidebook 8th Field Conf., p. 249-250 (1957)
5. (and Lance, J. F., and Irwin, J. H.) Tertiary stratigraphy of the Navajo country: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 123-129, illus. (1958)

RESSER, C. E.
Cambrian fossils of the Grand Canyon: Carnegie Inst. Wash. Pub. 563, p. 171-220 (1946) [abst.]: Geol. Soc. Am. Bull., v. 52, no. 12, p. 1928-1929 (1941)

REYNER, M. L.
(and Ashwill, W. R., and Robinson, R. L.) Geology of uranium deposits in Tertiary lake sediments of southwestern Yavapai County, Arizona: USAEC, RME-2057, 34 p., illus., maps (1956)

RHOADES, R. F.
Examination of proposed concrete aggregate deposits for Davis Dam: U.S. Bur. Reclamation Petrographic Rep. 23, 7 p., illus. (1941)

RICE, C. T.
Disseminated ores at Miami: Mines and Methods, v. 1, p. 269-275 (1910)

RICE, M.
Petrographic notes on the ore deposits of Jerome, Arizona: AIME Bull. 141, p. 1497-1502 (1918); Trans., v. 61, p. 60-65 (1920)

RICH, E. I. (see Pierce, W. G.)

RICHARD, K. E.
1. (and Courtright, J. H.) Structure and mineralization at Silver Bell, Arizona: Min. Engr. v. 6, no. 11, p. 1095-1099, illus., map (1954); AIME Trans. 1954, v. 199 (1955); [discussion by T. W. Mitcham and reply by authors]: Min. Engr., v. 7, no. 3, p. 300 (1955); AIME Trans. 1955, v. 202 (1956)
2. (and Courtright, J. H.) Some geologic features of the Mission copper deposit: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 200-204 (1959)
3. (and Courtright, J. H.) Some Cretaceous-Tertiary relationships in southeastern Arizona and New Mexico: Ariz. Geol. Soc. Dig., v. 3, p. 1-7 (1960)

RICHARDS, R. W.
The Dragoon, Arizona, tungsten deposits: Min. Sci., v. 57, p. 93-94 (1908)

RICHARDSON, Toney
Where tree stumps turned to stone: Desert Mag., v. 10, no. 1, p. 19-21 (1946)

RICHIE, R. L.
Greenback Company pushing development work: Ariz. Min. Jour., v. 9, no. 19, p. 11, 22 (1926)

RICHMOND, G. M.
Quaternary stratigraphy of the La Salle Mountains, Utah: USGS Prof. Paper 324, 131 p. (1962)

RICHTER, Rudolf
1. "Das grosste Ding der Erde"; Die Colorado-Schlucht Grand Canyon: Natur und Volk, Band 65, Heft 1, p. 1-22 (1935)
2. Lava als Tal-Sperre in heimischer Vergangenheit und fremder Gegenwart: Natur und Volk, Band 68, Heft 11, p. 521-528, illus., map (1938)

RICKARD, Forbes
Notes on tungsten deposits in Arizona: Engr. Min. Jour., v. 78, p. 263-265 (1904)

RICKARD, T. A.
1. The genesis of ore deposits (discussion): AIME Trans., v. 24, p. 942-956 (1895); Posepny Volume, p. 211-226 (1902)
2. Vein walls: AIME Trans., v. 26, p. 193-241 (1896)
3. The story of the U. V. X. bonanza: Min. Sci. Press, v. 116, p. 47-52 (1918)
4. The Apache trail, Arizona: Min. Sci. Press, v. 116, p. 257-265 (1918); Ariz. Min. Jour., v. 2, no. 1, p. 62-66 (1918)
5. Tom Reed Gold Mines vs. United Eastern Company: Min. Sci. Press, v. 122, p. 677-681 (1921)
6. The story of the New Cornelia: Engr. Min. Jour.-Press, v. 115, p. 7-10 (1923)
7. A great mining adventure (United Verde Extension): Engr. Min. Jour.-Press, v. 117, p. 959-963 (1924)
8. Taxation of mines in Arizona: Engr. Min. Jour.-Press, v. 117, p. 722-724 (1924)
9. The later story of the New Cornelia enterprise: Engr. Min. Jour., v. 119, p. 285-289 (1925)
10. The exploration of the Southwest: *in* A history of American mining; AIME Series, p. 249-276 (1932)
11. Copper mining in Arizona: *in* A history of American mining; AIME Series, p. 277-300 (1932)
12. The U. V. X., a mining adventure: *in* A history of American mining; AIME Series, p. 365-379 (1932)

13. The great diamond hoax: *in* A history of American mining; AIME Series, p. 380-396 (1932)

RICKETTS, L. D.
1. Relation of mining to the development of the State: Min. Sci. Press, v. 124, p. 7-9 (1922); Ariz. Min. Jour., v. 5, no. 17, p. 8-9 (1922)
2. Inspiration Consolidated Company (Report, 1924): Ariz. Min. Jour., v. 9, no. 1, p. 18-20 (1925)

RICKETTS, P. P.
Phoenix mine, Arizona: Engr. Min. Jour., v. 33, p. 309 (1887)

RIDGWAY, R. H.
Manganese (general information): USBM, IC 6729, 30 p. (1933)

RIES, Heinrich
Economic geology: John Wiley & Sons, New York, 435 p., illus. (1905); 2nd ed.: 451 p., illus. (1907); 3rd ed.: 589 p., illus. (1914); 4th ed.: 856 p., illus. (1916); 5th ed.: 843 p., illus. (1925); 6th ed.: 860 p., illus. (1930)

RIGGS, E. S.
Dinosaur footprints from Arizona: Am. Jour. Sci., 4th ser., v. 17, p. 423-424 (1904)

RIGGS, J. L.
Old traditions of the lost mines of the west: Ariz. Min. Jour., v. 7, no. 4, p. 32-34 (1923)

RILEY, L. B. (*see* Miesch, A. T., 3)

RINEHART, J. S.
1. Some observations on high-speed impact (Meteor Crater): Pop. Astron., v. 58, p. 458-464, illus. (1950); Meteor. Soc. Contrib., v. 4, no. 4, p. 299-305, illus. (1950)
2. Distribution of meteorite debris about the Arizona meteorite crater: Smithsonian Contrib. Astrophys., v. 2, no. 7, p. 145-160, illus. (1958); [discussion by H. C. Dake]: Mineralogist, v. 26, no. 9, p. 216, 218 (1958)
3. Recent findings at the Arizona Meteorite Crater: Foote Prints, v. 30, no. 2, p. 15-22, illus. (1958)

RINEHART, R. E.
Arizona: Min. World, v. 30, p. 187-189 (1909)

RITTER, E. A.
Oatman and the Tom Reed-Gold Road mining district, Arizona: Min. World, v. 44, p. 645-648 (1916)

ROACH, C. H. (*see also* Thompson, M. E.; Shoemaker, E. M., 9)
(and Johnson, G. R., McGrath, J. G., and Sterrett, T. S.) Thermoluminescence investigations at Meteor Crater, Arizona: USGS Prof. Paper 450-D, Art. 149, p. 98-103 (1962)

ROBERTS, H. M.
Occurrence of lead-zinc ore at Iron King mine (discussion): AIME Tech Pub. 2377, p. 3 (1948)

ROBERTS, R. J. (*see also* Peterson, D. W., 6)
(and Peterson, D. W.) Suggested magmatic differences between welded "ash" tuffs and welded crystal tuffs, Arizona and Nevada: USGS Prof. Paper 424-D, Art. 320, p. 73-79 (1961)

ROBERTSON, R. S.
Chinle stratigraphy of St. Johns vicinity, Apache County, Arizona: Univ. Texas, MS Thesis (1956); [abst.]: Ariz. Geol. Soc. Dig., v. 3, p. 182 (1960)

ROBIE, E. H.
The Meteor Crater project: Engr. Min. Jour., v. 125, p. 850-852 (1928)

ROBINSON, C. S. (*see* Romslo, T. M., 5)

ROBINSON, Daniel O.
The mineral composition of the colloidal clay fractions of some Arizona soils: Univ. Ariz., MS Thesis, 54 p. (1947)

ROBINSON, G. M.
(and Peterson, D. E.) Notes on earth fissures in southern Arizona: USGS Circ. 466, 7 p. (1962)

ROBINSON, George
A history of the Clifton-Morenci district: Min. Jour., v. 13, no. 1, p. 7-8 (1929)

ROBINSON, H. H.
1. The Tertiary peneplane of the Plateau district, and adjacent country, in Arizona and New Mexico: Am. Jour. Sci., 4th ser., v. 24, p. 109-129, 174, map (1907)
2. A new erosion cycle in the Grand Canyon district, Arizona: Jour. Geol., v. 18, p. 742-763 (1910)
3. The single cycle development of the Grand Canyon of the Colorado: Science, new ser., v. 34, p. 88-91 (1911)
4. The San Franciscan volcanic field, Arizona: USGS Prof. Paper 76, 213 p., maps (1913); [abst.]: Wash. Acad. Sci. Jour., v. 4, p. 195-196 (1914)

ROBINSON, R. F. (*see* Cook, A.)

ROBINSON, R. L. (*see* Reyner, M. L.)

ROBINSON, T. W.
Phreatophyte research in western United States, October 1958 to March 1959: USGS Circ. 413, 14 p. (1959)

ROBINSON, W. I.
Two new fresh-water gastropods from the Mesozoic of Arizona: Am. Jour. Sci., 4th ser., v. 40, p. 649-651 (1915)

ROCKS AND MINERALS
1. Vanadinite: v. 13, p. 98-99 (1938)
2. Gem olivine from Arizona: v. 19, no. 11, p. 347 (1944)
3. Precious serpentine locality in Arizona: v. 20, no. 2, p. 63 (1945)
4. Mineralight finds valuable ore body in Arizona: v. 20, no. 5, p. 202 (1945)

RODDA, J. L. (*see* Overholt, J. L.)

ROE, H.
Geological structures mapped in Apache County, Arizona: Oil and Gas Jour., v. 36, no. 10, p. 29-30 (1937)

ROGERS, A. F.
1. Delafossite, a cuprous metaferrite from Bisbee, Arizona: Am. Jour. Sci., 4th ser., v. 35, p. 290-294 (1913)
2. The optical properties and morphology of bisbeeite (Grand Canyon): Am. Mineral., v. 7, p. 153-154 (1922)
3. A unique occurrence of lechatelierite or silica glass: Am. Jour. Sci., 5th ser., v. 19, p. 195-202 (1930)
4. Anauxite as a secondary mineral in some volcanic rocks of California and Arizona [absts.]: Pan-Am. Geol., v. 58, p. 72-73 (1932); Geol. Soc. Am. Bull., v. 44, pt. 1, p. 159-160 (1933)

ROGERS, C. L.
(and Jaster, M. C.) Titanium in the United States: USGS Map MR-29 (1962)

ROLFE, B. N.
Surficial sediments in Lake Mead: Jour. Sed. Pet., v. 27, no. 4, p. 378-386, illus. (1957)

ROLLER, J. C. (*see* Diment, W. H.)

ROLLINS, Ralph
Life story of Black Jack Newman: Min. Jour., v. 13, no. 7, p. 5-8, 28-30 (1929)

ROMSLO, T. M. (*see also* Cummings, J. B., 3)
1. (and Ravitz, S. F.) Arizona manganese-silver ores: USBM, RI 4097, 13 p. (1947)
2. Antler copper-zinc deposit, Mohave County, Arizona: USBM, RI 4214, 14 p. (1948)
3. Investigation of Keystone and St. George copper-zinc deposits, Cochise County, Arizona: USBM, RI 4504, 21 p., maps (1949)
4. Investigation of the Lake Shore copper deposits, Pinal County, Arizona: USBM, RI 4706, 24 p. (1950)
5. (and Robinson, C. S.) Copper Giant deposits, Pima County, Arizona: USBM, RI 4850, 9 p., illus. (1952)

RONBECK, A. C. (*see* Schwartz, G. M., 8)

ROOSEVELT, Quentin
(and Burden, J. W.) A new species of antilocaprine, *Tetrameryx onusrosagris*, from a Pleistocene cave deposit in southern Arizona: Am. Mus. Novitates, no. 754, 4 p. (1934)

ROOT, W. A.
1. Mining in western Arizona and eastern California: Min. World, v. 30, p. 929-932 (1909)
2. Dredge mining operations in Santa Rita Mountains, Arizona: Min. Engr. World, v. 42, p. 377 (1915)

ROPER, W. J. (*see* Schmitt, H. A., 6)

ROSE, Dan
"Fools-for-luck" in the discovery of mines (McMillan, McMorris, and Nugget): Ariz. Min. Jour., v. 8, no. 19, p. 13, 22 (1925)

ROSE, H. L., Jr. (*see* Crittenden, M. D.)

ROSE, L.
Vorkommen und Gewinnung der an Durchbruchgesteine gebundenen Kupfererze in den Wustengebieten des sudwestlichen Nordamerikas: Glückauf, Jg. 47, nos. 1-5, p. 1-14, 69-81, 101-110, 141-155, 181-194, illus. (1911)

ROSE, N. A. (*see* Guyton, W. F.)

ROSENZWEIG, Abraham
(and Grumer, J. W., and Gardiner, L.) Widespread occurrence and character of uraninite in the Triassic and Jurassic sediments of the Colorado Plateau: Econ. Geol., v. 49, no. 4, p. 351-361, illus. (1954); [discussion]: v. 50, no. 2, p. 233-234 (1955); [absts.]: Econ. Geol., v. 47, no. 7, p. 776 (1952); Geol. Soc. Am. Bull., v. 63, no. 12, pt. 2, p. 1293 (1952); Am. Mineral., v. 38, no. 3-4, p. 357-358 (1953)

ROSEVEARE, George H. (*see* Foster, R. W.; Peirce, H. W., 3; Wilson, E. D., 39, 52, 54, 74, 75)

ROSHOLT, J. N., Jr.
(and Shields, W. R., and Garner, E. L.) Isotopic fractionation of uranium in sandstone: Science, v. 139, no. 3551, p. 224-226 (1963)

ROSKRUGE, G. J.
Official map of Pima County, Arizona: Tucson (1893)

ROSS, C. A. (*see* Sabins, F. F., Jr., 4)

ROSS, C. P.
1. Geology of the lower Gila region, Arizona: USGS Prof. Paper 129, p. 183-197, maps (1922); [abst.]: Wash. Acad. Sci. Jour., v. 10, no. 2, p. 51-52 (1920)
2. Routes to desert watering places in the lower Gila region, Arizona: USGS Water-Supply Paper 490-C, p. 1-4, 271-315, maps (1922)
3. The lower Gila region, Arizona; a geographic, geologic, and hydrologic reconnaissance with a guide to desert watering places: USGS Water-Supply paper 498, 237 p., maps (1923)

4. Geology and ore deposits of the Aravaipa and Stanley mining districts, Graham County, Arizona: USGS Bull. 763, 120 p., maps (1925); [extracts]: Ariz. Min. Jour., v. 9, no. 16, p. 9-10, 43-46; no. 18, p. 7-8, 36; no. 20, p. 18-23; no. 22, p. 15-16, 52; no. 23, p. 5-6, 61-63; v. 10, no. 1, p. 18-19 (1926)
5. Ore deposits of the Saddle Mountain and Banner mining districts, Arizona: USGS Bull. 771, 72 p., maps (1925); [extracts]: Ariz. Min. Jour., v. 10, no. 24, p. 3-5, 12-13; v. 11, no. 1, p. 6-7, 20; no. 3, p. 5-6; no. 6, p. 7, 54-56; no. 8, p. 6; no. 9, p. 8 (1927)
6. Quicksilver deposits: *in* Ore deposits of the Western States, AIME Lindgren Volume, p. 652-654 (1933)
7. The Belt Series in Montana: USGS Prof. Paper 346 (Ariz., p. 108) (1963)

ROSS, Clarence S.
1. Sedimentary analcite: Am. Mineral., v. 13, p. 195-197 (1928)
2. (and Foster, M. D., and Myers, A. T.) Origin of dunities and of olivine-rich inclusions in basaltic rocks: Am. Mineral., v. 39, no. 9-10, p. 693-737, illus. (1954)

ROSS, Malcolm
Studies of some vanadium minerals of the Colorado Plateau: *in* Pt. 2 *of* Mineralogical applications of electron diffraction; Am. Mineral., v. 44, no. 3-4, p. 322-341 (1959)

ROVE, O. N. (*see* Hewett, D. F., 3; Trischka, C., 4)
1. Bisbee district, Arizona: *in* Ore deposits as related to structural features, Princeton Univ. Press, p. 211-215, maps (1942)
2. Some physical characteristics of certain favorable and unfavorable ore horizons (Bisbee); Part 1: Econ. Geol., v. 42, no. 1, p. 57-77 (1947); Part 2: v. 42, no. 2, p. 161-192 (1947)

ROY, S. K.
(and Wyant, R. K.) The Navajo meteorite: Field Museum Natural Hist., Geol. Ser., v. 7, no. 8, p. 113-127, illus. (1949)

RUBEL, A. C.
1. Tungsten: Univ. Ariz., Ariz. Bur. Mines Bull. 11, 11 p. (1916)
2. Coal in Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 17, 12 p. (1916)

RUBEY, W. W. (*see* Hewett, D. F., 6)

RUBLY, G. R. (*see also* Steele, H. J., 1)
Miami-Inspiration district: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 66-72 (1938)

RUFF, A. W.
The geology and ore deposits of the Indiana mine area, Pima County, Arizona: Univ. Ariz., MS Thesis, 64 p., maps (1952)

RUNCORN, S. K. (*see also* Opdyke, N. D., 1, 2)
1. Paleomagnetism of sediments from the Colorado Plateau: Nature, v. 176, no. 4480, p. 505-506, table (1955)
2. Paleomagnetic survey in Arizona and Utah; preliminary results: Geol. Soc. Am. Bull., v. 67, no. 3, p. 310-316 (1956)
3. Paleomagnetic comparisons between Europe and North America: Geol. Assoc. Canada Proc., v. 8, pt. 1, p. 77-85, illus. (1956)
4. Rock magnetism in the western United States: *in* Contributions to the geology of northern Arizona, Mus. N. Ariz. Bull. 40, p. 5-10 (1964)

RUSSELL, A. L.
The Midnite Test mine: Min. Jour., v. 14, no. 19, p. 24-26 (1931)

RUSSELL, H. N.
Meteor Crater: Mus. N. Ariz., Mus. Notes, v. 4, no. 3, p. 1-3 (1931)

RUTLEDGE, D. H. (*see* Gessel, C. D.)

RUTLEDGE, F. W.
Cenozoic history of Springerville area, Apache County, Arizona: Univ. Texas, MS Thesis (1956); [abst.]: Ariz. Geol. Soc. Dig., v. 3, p. 182 (1960)

SABELS, Bruno E. (*see also* Damon, P. E., 2, 3; Martin, P. S., 2)
1. Geochronology of the San Francisco Mountain volcanic field, Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, pt. 2, p. 1745 (1959)
2. Geochronology of late Cenozoic volcanism, San Francisco volcanic field, Arizona [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, pt. 2, p. 1667 (1959)
3. Late Cenozoic volcanism in the San Francisco volcanic field and adjacent areas in north-central Arizona: Univ. Ariz., PhD Thesis, 135 p. (1960)
4. Mogollon Rim volcanism and geochronology: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 100-107 (1962)

SABINS, F. F., Jr.
1. Tectonic history of part of the Dos Cabezas and Chiricahua Mountains, Arizona [abst.]: Geol. Soc. Am. Bull., v. 66, no. 12, pt. 2, p. 1610 (1955)
2. Stratigraphic relations in Chiricahua and Dos Cabezas Mountains, Arizona: AAPG Bull., v. 41, no. 3, p. 466-510, illus., map (1957)
3. Geology of the Cochise Head and western part of the Vanar quadrangles, Arizona: Geol. Soc. Am. Bull., v. 68, no. 10, p. 1315-1341, illus., map (1957)
4. (and Ross, C. A.) Late Pennsylvanian-early Permian fusulinids from southeastern Arizona: Jour. Paleo., v. 37, no. 2, p. 323-365 (1963)

SAIN, W. G.
A history of the Miami area, Arizona: Univ. Ariz. MA Thesis, 221 p. (1944)

ST. CLAIR, C. S.
1. Cenozoic rocks of south central Yavapai County: Plateau, v. 30, no. 2, p. 35-39, illus. (1957)
2. Geologic reconnaissance of the Agua Fria River area, central Arizona: Univ. Ariz., MS Thesis, 76 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 44-45 (1958)
3. Tertiary sedimentary and volcanic rocks of south-central Yavapai County, Arizona: Ariz. Geol. Soc. Dig., v. 5, p. 59-72 (1962)

SALES, R. H.
Genetic relations between granites, porphyries and associated copper deposits: Min. Engr., v. 6, p. 499-505 (1954)

SALISBURY, R. D.
The geology of the Grand Canyon region: *in* The Grand Canyon of Arizona, Passenger Dept., Atchison, Topeka and Santa Fe Railway, p. 68-82 (1902)

SAMPLE, R. D. (*see* Read, C. B., 1)

SAMPSON, E.
1. Arizona asbestos deposits: Econ. Geol., v. 19, p. 386-388 (1924)
2. Geologic mapping with airplane photographs in Arizona [absts.]: Geol. Soc. Am. Bull., v. 36, p. 135 (1925); Pan-Am. Geol., v. 43, p. 77 (1925)

SANDBERG, G. W.
(and Lyons, T. R.) Southwestern Utah-northwestern Arizona is good place to look for oil: Oil & Gas Jour., v. 60, no. 17, p. 140-145 (1962)

SANDERS, John
Hematite in veins of the Globe district: Engr. Min. Jour., v. 92, p. 1191-1192 (1911)

SANDO, W. J.
1. New species of colonial rugose corals from the Mississippian of northern Arizona: Jour. Paleo., v. 37, no. 5, p. 1083-1103 (1963)
2. Stratigraphic importance of corals in the Redwall limestone, northern Arizona: USGS Prof. Paper 501-C, p. 39-42 (1964)

SANFORD, R. S.
(and Stewart, L. A.) Artillery Peak manganese deposits, Mohave County, Arizona: USBM, RI 4275, 45 p. (1948)

SANFORD, Samuel (*see also* Schrader, F. C., 13)
(and Stone, R. W.) Useful minerals of the United States: USGS Bull. 585, p. 11-19 (1914)

SANTMYERS, R. M.
Development of the gypsum industry by States: USBM, IC 6173, 44 p. (1929)

SARLE, C. J.
Sketch of the geology of the Dos Cabezas Mountains of southeastern Arizona [abst.]: Science, new ser., v. 55, p. 544 (1922)

SATO, M.
Oxidation of sulfide ore bodies: Econ. Geol., v. 55, no. 5, p. 928-961 (1960)

SAUER, Carl
Basin and range forms in the Chiricahua area: Univ. Calif. Pub. Geog., v. 3, no. 6, p. 339-414 (1930)

SAYNER, D. B. (*see* Haskell, H. S.; Kiersch, G. A., 14)

SCHALLER, W. T. (*see also* Hewett, D. F., 6; Taber, S., 2)
1. Dumortierite: USGS Bull. 262, p. 91-120 (1905); Am. Jour. Sci., 4th ser., v. 19, p. 211-224 (1905)
2. Four new minerals: Wash. Acad. Sci. Jour., v. 5, p. 7 (1915)
3. Chemical composition of cuprotungstite: Am. Mineral., v. 17, p. 234-237 (1932)
4. (and Vlisidis, A. C.) Ajoite, a new hydrous aluminum copper silicate: Am. Mineral., v. 43, no. 11-12, p. 1107-1111, illus. (1958)

SCHELL, Bertha E.
An opal occurrence in Arizona: Rocks and Minerals, v. 22, no. 5, p. 418-428 (1947)

SCHENK, E. T. (*see also* McKee, E. D., 23; Campbell, I., 8, 10)
1. Gravigrade edentates in lower Grand Canyon, Arizona [abst.]: Geol. Soc. Am. Proc. 1936, p. 399 (1937)
2. Intra-canyon lava flow in the base of western Grand Canyon [abst.]: Geol. Soc. Am. Proc. 1937, p. 251 (1938)
3. (and Wheeler, H. E.) Cambrian sequence in western Grand Canyon, Arizona: Jour. Geol., v. 50, no. 7, p. 882-899, map (1942); [abst.]: Geol. Soc. Am. Bull., v. 52, no. 12, p. 1983-1984 (1941)

SCHLEGEL, D M. (*see also* Norton, J. J.)
Gem stones of the United States: USGS Bull. 1042-G, 49 p. (1957)

SCHLEY, R. A.
Paho Cave: Plateau, v. 36, no. 3, p. 89-90 (1964)

SCHLOCKER, J.
Magnesium-bearing minerals in the Boulder Dam area for the production of magnesium metal: USBM, IC 7216, 16 p. (1942)

SCHMECKEBIER, L. F.
Catalog and index of the publications of the Hayden, King, Powell, and Wheeler surveys: USGS Bull. 222 (1904)

SCHMITT, Harrison A.
1. Summary of the geological and metallogenetic history of Arizona and New Mexico: *in* Ore deposits of the Western States, AIME Lindgren Volume, p. 316-326 (1933)
2. Structural associations of certain metalliferous deposits in southwestern United States and northern Mexico: AIME Trans., v. 115, p. 36-58 (1935)
3. Outcrops of ore shoots (southwestern United States and Mexico): Econ. Geol., v. 34, p. 654-673 (1939)

4. The origin of the silica of the bedrock hypogene ore deposits: Econ. Geol., v. 49, no. 8, p. 877-890 (1954)
5. Copper in Arizona [abst.]: N. Mex. Geol. Soc., Guidebook 8th Field Conf., p. 258 (1957)
6. (and Clippinger, D. M., Roper, W. J., and Toombs, H.) Disseminated deposits at the Esperanza copper mine [abst.]: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 205 (1959)
7. The copper province of the Southwest: Min. Engr., v. 11, no. 6, p. 597-600 (1959)

SCHNABEL, R. W. (*see also* Butler, A. P., Jr., 1)
The uranium deposits of the United States: USGS Map MR-2 (1955)

SCHODER, Jacob
(and Allsman, P. T.) Mining and milling methods and costs at the Tennessee-Schuylkill Corporation mine, Chloride, Arizona: USBM, IC 7077, 20 p. (1939)

SCHOLZ, E. A. (*see* Anderson, C. A., 4, 9)

SCHOPF, J. M. (*see* Teichert, C.)

SCHOTT, Arthur
1. Geology of lower Colorado region: U.S. and Mex. Boundary Survey Rep. (Emory), v. 1, pt. 3, p. 92-99, Washington (1857)
2. Geological observations on the country along the boundary line lying between the one hundred and eleventh degree of longitude and the initial point of the Colorado: U.S. and Mex. Boundary Survey Rep. (Emory), v. 1, pt. 2, p. 62-77, U.S. 34th Cong., 1st sess., S. Ex. Doc. 108 and H. Ex. Doc. 135 (1857)

SCHRADER, F. C.
1. The mineral deposits of the Cerbat Range, Black Mountains, and Grand Wash Cliffs, Mohave County, Arizona: USGS Bull. 340, p. 53-83 (1908); [abst.]: Science, new ser., v. 27, p. 957-958 (1908)
2. Valuable minerals in western Arizona: Min. World, v. 29, p. 133 (1908)
3. The mineral deposits of the Cerbat Range, Black Mountains, and Grand Wash Cliffs, Mohave County, Arizona: USGS Bull. 397, 226 p., map (1909)
4. (and Hill, J. M.) Some occurrences of molybdenite in the Santa Rita and Patagonia Mountains, Arizona: USGS Bull. 430, p. 154-163 (1910); [abst.]: Min. World, v. 33, p. 185-187 (1910)
5. Alunite in Patagonia, Arizona, and Bovard, Nevada; Econ. Geol., v. 8, p. 752-767 (1913)
6. Alunite in granite porphyry near Patagonia, Arizona: USGS Bull. 540, p. 347-350 (1914)
7. Mineral deposits of the Santa Rita and Patagonia Mountains, Arizona, with contributions by James M. Hill: USGS Bull. 582, 373 p., maps (1915); [abst.]: Wash. Acad. Sci. Jour., v. 5, p. 519-521 (1915)
8. Some features of the ore deposits in the Santa Rita and Patagonia Mountains, Arizona [abst.]: Wash. Acad. Sci. Jour., v. 5, p. 252-253 (1915)
9. A sulphide-bearing monzonite from Arizona [abst. and discussion]: Wash. Acad. Sci. Jour., v. 5, p. 485 (1915)
10. The Mowry mine of Arizona: Min. Sci., p. 28-34 (Aug., 1915)
11. Geology and ore deposits of Mohave County, Arizona (with discussion by J. D. Sperr, J. B. Platts, and J. C. Anderson): AIME Bull. 119, p. 1935-1957, maps (1916); Bull. 123, p. 379-384; Bull. 124, p. 456-460 (1917); Trans., v. 56, p. 195-236, maps (1917)
12. The ore deposits of Mohave County, Arizona: Min. Sci. Press, v. 113, no. 21, p. 733-737 (1916)
13. (and Stone, R. W., and Sanford, S.) Useful minerals of the United States (revision of Bull. 585): USGS Bull. 624, p. 16-34 (1917)

14. The geologic distribution and genesis of the metals in the Santa Rita-Patagonia Mountains, Arizona: Econ. Geol., v. 12, p. 237-269 (1917)
15. Quicksilver deposits of the Phoenix Mountains, Arizona: USGS Bull. 690, p. 95-109 (1918); [abst.]: Wash. Acad. Sci. Jour., v. 8, p. 538 (1918)

SCHRECK, A. E.
(and Arundale, J. C.) Strontium; a materials survey: USBM, IC 7933 (Ariz., p. 14) (1959)

SCHROTER, G. A.
(and Campbell, I.) Geologic features of some deposits of bleaching clay: AIME Trans., v. 148, p. 178-208, illus. (1942)

SCHUCHERT, Charles
1. On the Carboniferous of the Grand Canyon of Arizona: Am. Jour. Sci., 4th ser., v. 45, p. 347-361 (1918)
2. The Cambrian of the Grand Canyon of Arizona: Am. Jour. Sci., 4th ser., v. 45, p. 362-369 (1918)
3. Correlation of the Jurassic formations of parts of Utah, Arizona, New Mexico, and Colorado (review); Am. Jour. Sci., 5th ser., v. 32, p. 398-399 (1936)

SCHUETTE, C. N.
1. Occurrence of quicksilver ore bodies: AIME Tech. Pub. 335, 88 p. (1930); [with discussion]: Trans., 1931, p. 403-488 (1931)
2. Quicksilver: USBM, Bull. 335, 168 p. (1931)

SCHULTZ, L. G.
Clay minerals in Triassic rocks of the Colorado Plateau: USGS Bull. 1147-C, p. 1-71, maps (1963)

SCHWAB, K. W.
The relation of conodonts to early vertebrates: Univ. Ariz., MS Thesis, 86 p. (1963)

SCHWALEN, H. C.
1. Rainfall and runoff in the upper Santa Cruz River drainage basin: Univ. Ariz., Coll. Agr. Tech. Bull. 95, p. 419-472 (1942)
2. (and Shaw, R. J.) Ground-water supplies of the Santa Cruz Valley of southern Arizona between Rillito Station and the International Boundary: Univ. Ariz., Agr. Exp. Sta. Bull. 288, 119 p., illus (1957)
3. Limitation in the development of ground-water reservoirs in the Southwest [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1748 (1959)
4. (Contributor to section on Water): *in* Arizona its people and resources; Univ. Ariz. Press, Tucson, Arizona (1960)
5. (and Shaw, R. J.) Progress report on study of water in the Santa Cruz Valley, Arizona: Univ. Ariz., Dept. Agr. Engr. Rep. 205, 20 p. (1961)

SCHWARTZ, D. W.
Climate change and culture history in Grand Canyon region: Am. Antiquity, v. 22, no. 4, p. 372-377, illus. (1957)

SCHWARTZ, G. M. (*see also* Mehl, M. G., 2)
1. Notes on textures and relationships in the Globe copper ores: Econ. Geol., v. 16, p. 322-329 (1921)
2. Intergrowths of bornite and chalcopyrite: Econ. Geol., v. 26, no. 2, p. 186-201, illus. (1931); [absts.]: Geol. Soc. Am. Bull., v. 42, no. 1, p. 187-188 (1931); Pan-Am. Geol., v. 55, no. 1, p 64 (1931)
3. (and Park, C. F., Jr.) A microscopic study of ores from the Campbell mine, Bisbee, Arizona: Econ. Geol., v. 27, p. 39-51 (1932)
4. Paragenesis of the oxidized ores of copper: Econ. Geol., v. 29, no. 1, p. 55-75, illus. (1934)
5. Oxidized copper ores of the United Verde Extension mine: Econ. Geol., v. 33, p. 21-33 (1936); [abst.]: v. 32, p. 1070-1071 (1937)

6. Hydrothermal alteration of igneous rocks: Geol. Soc. Am. Bull., v. 50, no. 2, p. 181-238 (1939)
7. Significance of bornite-chalcocite microtextures: Econ. Geol., v. 34, no. 4, p. 399-418 illus. (1939)
8. (and Ronbeck, A. C.) Magnetite in sulphide ores: Econ. Geol., v. 35, no. 5, p. 585-610 (1940)
9. Geology of the San Manuel area, Pinal County, Arizona: USGS Strategic Miner. Invest. Prelim. Map 3-180 (1945)
10. The host minerals of native gold: Econ. Geol., v. 39, no. 6, p. 371-411, illus. (1944)
11. Hydrothermal alteration in the San Manuel copper deposit, Arizona [absts.]: Geol. Soc. Am. Bull., v. 56, no. 12, pt. 2, p. 1195 (1945); Econ. Geol., v. 40, no. 8, p. 604 (1945)
12. Hydrothermal alteration in the "porphyry copper" deposits: Econ. Geol., v. 42, no. 4, p. 319-352 (1947)
13. Oxidation and enrichment in the San Manuel copper deposit Arizona: Econ. Geol., v. 44, p. 253-277, illus. (1949); [abst.]: no. 1, p. 81 (1949)
14. Problems in the relation of ore deposits to hydrothermal alteration (applied geology symposium): Colo. Sch. Mines Quart., v. 45, no. 1B, p. 197-208, illus. (1950)
15. Chlorite-calcite pseudomorphs after orthoclase phenocrysts, Ray, Arizona: Econ. Geol., v. 47, p. 665-672 (1952); [abst.]: Geol. Soc. Am. Bull., v. 62, no. 12, pt. 2, p. 1476-1477 (1951)
16. Geology of the San Manuel copper deposit, Arizona: USGS Prof. Paper 256, 65 p., maps (1953)
17. Argillic alteration and ore deposits: Econ. Geol., v. 51, no. 5, p. 407-414 (1956)
18. Alteration of biotite under mesothermal conditions: Econ. Geol., v. 53, no. 2, p. 164-177 (1958)
19. Hydrothermal alteration: Econ. Geol., v. 54, no. 2, p. 161-181 (1959)

SCHWARTZ, Roland J.
Detailed geological reconnaissance of the central Tortilla Mountains, Pinal County, Arizona: Univ. Ariz., MS Thesis, 82 p. (1954)

SCHWENNESEN, A. T.
1. Ground water in San Simon Valley, Arizona and New Mexico: USGS Water-Supply Paper 425, p. 1-35, maps (1917); [abst.]: Wash. Acad. Sci. Jour., v. 8, p. 128 (1918)
2. Geology and water resources of the Gila and San Carlos Valleys in the San Carlos Indian Reservation, Arizona: USGS Water-Supply Paper 450, p. 1-27, maps (1919); [abst.]: Wash. Acad. Sci. Jour., v. 11, p. 58-59 (1921)

SCIENCE
1. Fossil species of the Grand Canyon: new ser., v. 71, p. 10-11 (1930)
2. Meteor Crater: new ser., v. 72, p. 10 (1930)

SCOTLAND, P. B.
Copper mining in Metcalf district, Arizona: Engr. Min. Jour., v. 90, p. 118-123 (1910)

SCOTT, Gerald L.
Permian sedimentary framework of the Four Corners region: Univ. Wisc., PhD Thesis, 127 p. (1960)

SCOTT, H. E.
Arizona United Mining Company: Engr. Min. Jour., v. 106, p. 705 (1918)

SCOTT, R. A.
Fossil woods associated with uranium on the Colorado Plateau: USGS Prof. Paper 424-B, Art. 55, p. 130-132 (1961)

SCOTT, Robert C.
1. (and Barker, F. B.) Ground-water sources containing high concentrations of radium: USGS Prof. Paper 424-D, p. 357-359, map (1961)
2. (and Barker, F. B.) Data on uranium and radium in ground water in the United States 1954-1957: USGS Prof. Paper 426, 115 p., illus. (1962)

SCOTT, W. A.
1. Present development of the Oatman district of Arizona: Min. Engr. World, v. 44, p. 1033-1038 (1916)
2. Operations of the Magma Copper Company at Superior, Arizona: Min. Engr. World, v. 45, p. 9-10 (1916)
3. Mining operations at Johnson, Arizona: Min. Engr. World, v. 45, p. 141-143 (1916)
4. Commonwealth mine and mill at Pearce, Arizona: Min. Engr. World, v. 45, p. 187-188 (1916)

SEAGLE, E. F.
Exploration of Roaring Springs cave: Grand Canyon Nature Notes, v. 9, p. 391-394 (1935)

SEARLS, Fred, Jr.
The Emerald Isle copper deposit: Econ. Geol., v. 45, p. 175-176 (1950)

SEARS, David, 2nd
Geology of the Pantano Hill area, Pima County, Arizona: Univ. Ariz., MS Thesis, 48 p., maps (1939)

SEE, J. M.
Origin and distribution of molybdenum in the vicinity of the Glove Mine, Santa Cruz County, Arizona: Univ. Ariz., MS Thesis, 89 p. (1964)

SEFF, Philip
1. Preliminary report of the stratigraphy of the 111 Ranch beds, Graham County, Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 137-140 (1960)
2. Stratigraphic geology and depositional environments of the 111 Ranch area, Graham County, Arizona: Univ. Ariz., PhD Thesis, 171 p. (1962)

SELL, James D.
1. Diabase at the Magma mine, Superior, Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 93-97 (1960)
2. Bedding replacement deposit of the Magma mine, Superior, Arizona: Univ. Ariz., MS Thesis, 48 p. (1961)

SELLARDS, E. H.
Early man in America; index to localities and selected bibliography, 1940-1945: Geol. Soc. Am. Bull., v. 58, p. 955-978 (1947)

SELVIG, W. A. (*see* Anderson, F. G.)

SENFTLE, F. E.
(and Stieff, L. R., Cutlitta, F., and Kuroda, P. K.) Comparison of the isotopic abundance of U235 and U238 and the radium activity ratios in Colorado Plateau uranium ores: Geochimica et Cosmochimica Acta, v. 11, no. 3, p. 189-194 (1957)

SEWARD, F. A., Jr. (*see* Heinrichs, W. E., Jr., 2)

SHANLEY, W. G.
Mining and manufacturing asbestos deposits: Ariz. Min. Jour., v. 7, no. 5, p. 5-6, 24 (1923); v. 7, no. 6, p. 7-8, 41 (1923)

SHANNON, E. V. (*see also* Palache, C., 2)
(and Gonyer, F. A.) Natrojarosite from Kingman, Arizona: Wash. Acad. Sci. Jour., v. 17, p. 536-537 (1927)

SHARP, B. J.
Uranium deposits in volcanic rocks of the Basin and Range province: USGS Prof. Paper 300, p. 79-84 (1956)

SHARP, R. P.
1. A Cambrian slide breccia, Grand Canyon Arizona: Am. Jour. Sci., v. 238, no. 9, p. 668-672, illus. (1940)
2. Ep-Archean and Ep-Algonkian erosion surfaces, Grand Canyon, Arizona: Geol. Soc. Am. Bull., v. 51, no. 8, p. 1235-1369, maps (1940); [abst.]: v. 50, no. 12, pt. 2, p. 1933 (1939)
3. Ancient glaciers of the San Francisco Peaks: Plateau, v. 14, no. 2, p. 28-32 (1941)
4. Multiple Pleistocene glaciation on San Francisco Mountain, Arizona: Jour. Geol., v. 50, no. 5, p. 481-503, map (1942)
5. The Pleistocene glaciation of San Francisco Mountain, Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 150-152, illus. (1958)

SHARP, R. R., Jr.
Some magnetic properties of a part of Pikes Peak Iron deposit, Maricopa County, Arizona: Univ. Ariz., MS Thesis, 135 p. (1962)

SHAW, E. A.
United American Mining Company: Ariz. Min. Jour., v. 4, no. 3, p. 21 (1920)

SHAW, Elizabeth
Geologic mapping of Arizona: Ariz. Highways, v. 38, no. 2, p. 36-39 (1962)

SHAW, Richard J. (*see* Schwalen, H. C., 2, 5)

SHAW, S. F.
1. Operation and production of the Congress mines: Min. World, v. 30, p. 387-388 (1909)
2. Mining and milling in Tombstone district, Arizona: Min. World, v. 30, p. 589-590 (1909)
3. The Imperial Copper Company's mines, Arizona: Min. World, v. 30, p. 631-632 (1909)

SHAW, Victor
1. Superstition Mountain geology: Mineralogist, v. 15, no. 10, p. 507-510, illus. (1947); [reprint]: v. 24, no. 1, p. 8-10, 12, illus. (1956)
2. The "Lost Dutchman" — fact or fable: Earth Sci. Dig., v. 1, no. 9, p. 3-9, 23, 25-26, 32, 37, 39-40, illus. (1947)
3. Lost Portal gold: Earth Sci. Dig., v. 1, no. 11, p. 10-15, 32 (1947)
4. The lost Papuan diggings: Earth Sci. Dig., v. 2, no. 4, p. 27-32 (1947)

SHAWE, D. R.
Significance of roll ore bodies in genesis of uranium-vanadium deposits on the Colorado Plateau: USGS Prof. Paper 300, p. 239-241 (1956)

SHEFFER, B. D.
Boundary Butte area, San Juan and Apache Counties, Utah and Arizona: Intermountain Assoc. Pet. Geol., Guidebook 9th Field Conf., p. 262-267, illus. (1958)

SHERMAN, Gerald (*see also* Mosier, M.)
1. Sacramento Hill: Ariz. Min. Jour., v. 2, no. 3, p. 5-8 (1918)
2. Steam shovel operations at Sacramento Hill: Ariz. Min. Jour., v. 7, no. 13, p. 5-8, 23-24 (1923)

SHERMAN, Irving
Flocculent structure of sediment suspended in Lake Mead: Am. Geophys. Union Trans., v. 34, p. 394-406, illus. (1953)

SHERWOOD, A. M. (*see* Weeks, A. D., 2)

SHIELDS, James C., Jr.
Geology and ore deposits of the Dives and Gold Ridge groups, Dos Cabezas, Arizona: Univ. Ariz., MS Thesis, 67 p., maps (1940)

SHIELDS, W. R. (*see* Rosholt, J. N., Jr.)

SHIMER, F. H. (*see* Shimer, H. W., 1)

SHIMER, H. W.

1. (and Shimer, F. H.) The lithological section of Walnut Canyon, Arizona, with relation to the cliff dwellings of this and other regions of northwestern Arizona: Am. Anthropologist, v. 12, p. 237-249 (1910)
2. Permo-Triassic of northwestern Arizona: Geol. Soc. Am. Bull., v. 30, p. 471-497 (1919)

SHOEMAKER, Abbot H. (*see also* Bjorge, G. N.)

1. (and Somers, George) The geology of El Tiro mine, Silver Bell, Arizona: Univ. Ariz., MS Thesis, 40 p., map (1924)
2. Mining methods at the Old Dominion mine, Globe, Arizona: USBM, IC 6237, 22 p. (1930)

SHOEMAKER, Eugene M. (*see also* Luedke, R. G.; Miesch, A. T., 1; Moore, H. J.)

1. (and Luedke, R. G.) Map of the uranium region of the Colorado Plateau: USGS Trace Elements Inv. Rep. 279 (1952)
2. Collapse origin of the diatremes of the Navajo-Hopi Reservation [abst.]: Geol. Soc. Am. Bull., v. 64, p. 1514 (1953)
3. Structural features of the central Colorado Plateau and their relation to uranium deposition: USGS Prof. Paper 300, p. 155-170 (1956)
4. Occurrence of uranium in diatremes on the Navajo-Hopi Reservations, Arizona, New Mexico, and Utah: *in* Geology of uranium and thorium; United Nations International Conference on Peaceful Uses of Atomic Energy Proc. 1955, v. 6, p. 412-417, illus. (1956); [revised]: USGS Prof. Paper 300, p. 179-185, illus. (1956)
5. Structure and Quaternary stratigraphy of Meteor Crater, Arizona, in the light of shock-wave mechanics [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1748 (1959)
6. Impact mechanics at Meteor Crater, Arizona: Princeton Univ., PhD Thesis (1959)
7. Penetration mechanics of high velocity meteorites, illustrated by Meteor Crater, Arizona: 21st Int. Geol. Cong. Proc., pt. 18, sec. 18 (1960)
8. (and Gault, D. E., and Lugn, R. V.) Shatter cones formed by high-speed impact in dolomite: USGS Prof. Paper 424-D, p. 365-367, illus. (1961)
9. (and Roach, C. H., and Byers, F. M., Jr.) Diatremes and uranium deposits in the Hopi Buttes, Arizona: Geol. Soc. Am. Buddington Volume, p. 327-355 (1962)
10. (and Gault, D. E., Moore, H. J., and Lugn, R. V.) Hypervelocity impact of steel into Coconino sandstone: Am. Jour. Sci., v. 261, no. 7, p. 668-682 (1963)

SHORT, Maxwell N. (*see also* Ettlinger, I. A., 2)

1. Deep-level chalcocite at Superior, Arizona, and at Butte, Montana: Harvard Univ. PhD Thesis, 174 p. (1923)
2. (and Ettlinger, I. A.) Ore deposition and enrichment at the Magma mine, Superior, Arizona: AIME Trans., v. 74, p. 174-222, map (1926); [abst.]: Min. Met., v. 7, no. 232, p. 175-176 (1926)
3. (and Wilson, E. D.) Magma mine area, Superior: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 90-98, map (1938)
4. (and Galbraith, F. W., Harshman, E. N., Kuhn, T. H., and Wilson, E. D.) Geology and ore deposits of the Superior mining area, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 151, 159 p., illus., maps (1943)

SHRIDE, A. F. (*see also* Bromfield, C. S., 3, 4; Chidester, A. H.)

1. Localization of Arizona chrysotile asbestos deposits [abst.]: Geol. Soc. Am. Bull., v. 63, no. 12, p. 1344 (1952)

2. Younger Precambrian geology in southeastern Arizona [abst.]: Geol. Soc. Am. Bull., v. 69, no. 12, p. 1744 (1958)
3. Some aspects of younger Precambrian geology in southern Arizona: Univ. Ariz., PhD Thesis, 234 p., illus. (1961): USGS Open-file Rep., 387 p. (1961)

SHUTLER, Richard, Jr. (*see also* Martin, P. S., 1, 2)
(and Damon, P. E.) University of Arizona Radiocarbon dates II: Am. Jour. Sci. Radiocarbon Supp., v. 1, p. 59-62 (1959); Univ. Ariz. Program in Geochronology Contrib. 10 (1959)

SIBLEY, R. R.
The Copper Creek mining district, Arizona: Min. World, v. 30, p. 477-480 (1909)

SIERAKOSKI, J. (*see* Hardwick, W. R., 1)

SILL, Rush T.
The Cave Creek mining district, Arizona (discussion): Engr. Min. Jour., v. 110, p. 895 (1920)

SILLIMAN, Benjamin, Jr.
1. On some of the mining districts of Arizona, near the Rio Colorado: Am. Jour. Sci., 2nd ser., v. 41, p. 289-308 (1866)
2. Lands of the Arizona Desert: Am. Jour. Sci. and Arts, v. 6 (1873)
3. On the intimate structure of certain mineral veins [abst.]: Science, v. 1, p. 288 (1880)
4. Mineralogical notes: Am. Jour. Sci. 3rd. ser., v. 22, p. 198-205 (1881)

SILVER, Caswell
1. (and Hoover, W. B.) Geologic map of the San Juan Basin: N. Mex. Geol. Soc., Guidebook of the San Juan Basin (1951)
2. Cretaceous stratigraphy of the San Juan Basin: N. Mex. Geol. Soc., Guidebook of the San Juan Basin, p. 104-118, illus. (1951)
3. Manganese deposits of the Mogollon Rim, Coconino County, Arizona: Econ. Geol., v. 49, p. 88-91, illus. (1954)

SILVER, Leon T. (*see also* Cooper, J. R., 3)
1. Age determinations on Precambrian diabase differentiates in the Sierra Ancha, Gila County, Arizona [abst.]: Geol. Soc. Am. Bull., v. 71, no. 12, p. 1973-1974 (1960)
2. The use of cogenetic uranium-lead isotope systems in zircons in geochronology: International Atomic Energy Agency in cooperation with the Committee on Radioactivity (ICSU), Athens, Proc. (1962)

SIMMONS, Jesse
Arizota Mining Company: Min. World, v. 37, p. 152 (1912)

SIMMONS, Woodrow W. (*see also* Reed, E. F.)
1. The geology of the Cleveland mine area, Gila County, Arizona: Univ. Ariz., MS Thesis, 22 p. (1938)
2. Future mineral resources of Arizona and Nevada [abst]: AIME Min. Geol. Geophys. Div. 1955 Ann. Meeting, Absts. Tech. Papers, p. 33 (1955)

SIMON, W. W.
Superior district, Arizona: Mines Mag., v. 27, no. 11, p. 57 (1937)

SIMONS, F. S.
1. Geologic map and sections of the Klondyke quadrangle, Arizona: USGS Open-file Rep., 2 p., map, sections (1961)
2. Devitrification dikes and giant spherulites from Klondyke, Arizona: Am. Mineral., v. 47, no. 7-8, p. 871-885 (1962)
3. Composite dike of andesite and rhyolite at Klondyke, Arizona: Geol. Soc. Am. Bull., v. 74, no. 8, p. 1049-1056 (1963)
4. (and Munson, E.) Johannsenite from the Aravaipa mining district, Arizona: Am. Mineral., v. 48, no. 9, p. 1154-1157 (1963)

5. Geology of the Klondyke quadrangle, Graham and Pinal Counties, Arizona: USGS Prof Paper. 461, 173 p. (1964)

SIMPSON, J. H.
Journal of military reconnaissance from Santa Fe . . . to the Navajo Country: U.S. 31st Cong., 1st sess., S. Ex. Doc. 64 (1850)

SINGEWALD, J. T., Jr.
Titaniferous magnetites: *in* Ore deposits of the Western States, AIME Lindgren Volume, p. 511-512 (1933)

SINKANKAS, J.
"Green" amethyst from Four Peaks, Arizona: Gems and Gemology, v. 9, no. 3, p. 88-95, illus. (1957)

SIRDEVAN, W. H. (*see* Smith, H. D. W., 1)

SIRRINE, G. K.
Geology of the Springerville-St. Johns area, Apache County, Arizona: Univ. Texas, PhD Thesis (1956); [abst.]: Ariz. Geol. Soc. Dig., v. 3, p. 182 (1960)

SISLER, F. D. (*see* ZoBell, C. E.)

SITGREAVES, L.
Report of an expedition down the Zuni and Colorado Rivers: 198 p., maps, Washington (1853); [reprinted]: Rio Grande Press, Chicago, Illinois (1964)

SIVYER, L. D.
Geology of Globe, Arizona: Los Angeles Mining Review, v. 25, no. 11, p. 6-7 (1909)

SJOGREN, Hjalmar
Om Kratorn vid Canyon Diablo, Arizona, och dess samband med meteorjärns fallet pa samma plats: Konliga svenska Vetenskaps-Akademiens Handlingar: Ofversigt til Handlingar, Stockholm Arsbok 1911, p. 237-262 (1911)

SKERRETT, R. G.
Meteor Crater again a scene of activity: Compressed Air Mag., v. 34, p. 2773-2778, 2809-2813 (1929)

SKIBITZKE, H. E. (*see also* Turner, S. F., 23; Wolcott, H. N., 5)
1. (and Yost, C. B., and Pulido, A. D.) Queen Creek area, Pinal County, Arizona—records of wells, well logs, and analyses: USGS Mimeo. Rep., 73 p. (1950)
2. (and Yost, C. B., Jr.) Location of sites for irrigation wells near Chiu Chuischu, Papago Indian Reservation, Pinal County, Arizona: USGS Ground-Water Branch Open-file Rep., 6 p. (1951)
3. (and Bennett, R. R., du Costa, J. A., and Lewis, D. D.) Symposium on history of development of water supply in an arid area in southwestern United States; Salt River Valley, Arizona: *in* Ground-Water in Arid Zones; International Association of Scientific Hydrology Pub. 57, p. 706-742, Gentbrugge, Belgium (1961)

SKILLINGS, David N., Jr.
1. The new Twin Buttes copper mining district of Arizona: Skilling's Mining Review, v. 50, no. 23, p. 1 (1961)
2. Asarco's Mission open-pit Copper mine in Arizona: Skilling's Mining Review, v. 51, no. 29, p. 6-9 (1962)

SKILLINGS MINING REVIEW
1. Two years to strip Mission copper mine: v. 50, no. 49, p. 12 (1961)
2. Sacramento Hill at Bisbee: v. 51, no. 26, p. 4 (1962)

SKINNER, M. F.
The fauna of Papago Springs Cave, Arizona, and a study of *Stockeros*, with three new antilocaprines from Nebraska and Arizona: Am. Mus. Nat. Hist. Bull., v. 80, Art. 7, p. 143-220, maps (1942)

SKINNER, W. W.
The underground waters of Arizona; their character and uses: Univ. Ariz., Agr. Exp. Sta. Bull. 46, p. 273-296 (1903)

SKIPP, B. A.
Zonation of calcareous Foraminifera in the Redwall limestone (Mississippian) Arizona [abst.]: Geol. Soc. Am. Sp. Paper 73, p. 245-246 (1963)

SLOAN, R. E.
(and Adams, W. R.) History of Arizona: Record Pub. Co., Phoenix, 4 vols. (1930)

SMALL, J. B. (*see* Carder, D. S., 1)

SMILEY, T. L.
1. Research program, Geochronology Laboratories, University of Arizona (with a section on geochemistry by Damon, P. E.): Ariz. Geol. Soc. Dig., v. 1, p. 19-27, table (1958)
2. The geology and dating of Sunset Crater, Flagstaff, Arizona: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 186-190, illus. (1958)
3. Years, centuries, and millenia [millennia]: *in* Climate and man in the Southwest—a symposium; Univ. Ariz. Bull., v. 28, no. 4, p. 11-18 (1958)
4. Post-glacial physical history of the Southwest [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1749-1750 (1959)

SMITH, Anson
The Dudley interests: Ariz. Min. Jour., v. 3, no. 11, p. 18 (1920)

SMITH, Clay T.
Problems of Jurassic stratigraphy of the Colorado Plateau and adjoining regions: N. Mex. Geol. Soc., Guidebook of the San Juan Basin, p. 94-102, illus. (1951)

SMITH, D. G.
Pleistocene geology and geomorphology of the San Pedro River Valley, Cochise County, Arizona: Univ. Ariz., MS Thesis, 73 p. (1963)

SMITH, F. C.
Chloride and the Wallapai mining district: Ariz. Min. Jour., v. 3, no. 1, p. 74-75 (1919)

SMITH, George E.
The geology and ore deposits of the Mowry mine area, Santa Cruz County, Arizona: Univ. Ariz., MS Thesis, 44 p. (1956)

SMITH, George Edson P. (*see also* Bryan, K., 19)
1. Ground-water supply and irrigation in the Rillito Valley: Univ. Ariz., Agr. Exp. Sta. Bull. 64, 244 p., maps (1910)
2. Ground-water law in Arizona and neighboring states: Univ. Ariz., Coll. Agr. Tech. Bull. 65, 44 p. (1936)
3. Physiography of some Arizona valleys: Pan-Am. Geol., v. 69, p. 321-326, map (1938); [abst.]: v. 70, p. 71-72 (1938)
4. The physiography of Arizona valleys: Univ. Ariz., Coll. Agr. Tech. Bull. 77, 91 p., maps (1938)
5. (and Booher, L. J.) Forecasting ground water supply in deserts: Pan-Am. Geol., v. 74, no. 2, p. 94-98 (1940); [abst.]: v. 73, no. 5, p. 379-380 (1940)
6. The groundwater supply of the Eloy district in Pinal County, Arizona: Univ. Ariz., Coll. Agr. Tech. Bull. 87, p. 1-42 (1940)

SMITH, H. D. W.
1. (and Sirdevan, W. H.) Mining methods and costs at the United Verde mine: AIME Trans., v. 66, p. 127-181 (1922)
2. Mining methods of Verde mining district: AIME Trans., reprint no. 1309, 43 p. (1924); Ariz. Min. Jour., v. 9, no. 1, p. 9-11, 38-41; no. 2, p. 7-10, 51-53 (1925)

SMITH, Harriet B. (*see* Wallace, J. H.)

SMITH, Harry L.
Cretaceous stratigraphy of Carrizo drainage basin, Apache County, Arizona, and Catron and Valencia Counties, New Mexico: Univ. Texas, MS Thesis (1956); [abst.]: Ariz. Geol. Soc. Dig., v. 3, p. 182 (1960)

SMITH, Howard V. (*see also* Breazeale, J. F.)
1. The climate of Arizona: Univ. Ariz., Agr. Exp. Sta. Bull. 197, 112 p. (1945)
2. The chemical composition of representative Arizona waters: Univ. Ariz., Agr. Exp. Sta. Bull. 225, 76 p. (1949)
3. (and Draper, G. E., Buehrer, T. F., Fuller, W. H., and Marx, G. W.) The quality of Arizona's domestic waters: Univ. Ariz., Agr. Exp. Sta. Rep. 217, 77 p. (1963)

SMITH, Lewis A.
The geology of the Commonwealth mine: Univ. Ariz., MS Thesis, 73 p., maps (1927)

SMITH, Riley S., Jr.
A study of the Chinle-Shinarump beds in the Leupp-Holbrook area, Arizona: Univ. Ariz., PhD Thesis, 170 p., (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 44 (1958)

SMITH, Robert L.
Zones and zonal variations in welded ash flows: USGS Prof. Paper 354-F, p. 149-159 (1960)

SMITH, W. O.
(and Vetter, C. P., Cummings, G. B., and others) Comprehensive survey of sedimentation in Lake Mead, 1948-1949: USGS Prof. Paper 295, 254 p. (1960)

SNEDDEN, H. D. (see Dean, K. C.)

SNOW, F. W. (*see also* Browning, W. C.)
Mining methods and costs at the Magma mine, Superior, Arizona: USBM, IC 6168, 33 p. (1929)

SNOW, J. I.
Trilobites of the Middle Permian Kaibab formation of northern Arizona: Plateau, v. 18, no. 2, p. 17-24 (1945)

SNYDER, C. T. (*see also* Babcock, H. M., 5)
Summary of the stratigraphy from Cedar City, Utah to Las Vegas, Nevada: Utah Geol. Soc., Guidebook no. 7, p. 7-14 (1952)

SOISTER, P. E.
(and Conklin, D. R.) Bibliography of U.S. Geological Survey Reports on uranium and thorium; 1942 through May 1958: USGS Bull. 1107-A, 167 p. (1959)

SOMERS, George (*see* Shoemaker, A. H., 1)

SOPP, George P.
Geology of the Montana mine area, Empire Mountains, Arizona: Univ. Ariz., MS Thesis, 63 p., maps (1940)

SORAUF, J. E. (*see* Fisher, W. L., 2)

SOULE, J. H. (*see* Dare, W. L., 1; Johnson, G. H.)

SOURDRY, A. M. (*see* Babcock, H. M., 8)

SPARKES, G. M.
1. Yavapai County, Arizona, is a very active mining district: Min. Engr. World, v. 43, p. 977-978 (1915)
2. Yavapai, the land of opportunity: Univ. Ariz., Ariz. Bur. Mines Bull. 59, 9 p. (1917); Ariz. Min. Jour., v. 1, no. 4, p. 1-4 (1917)
3. The Money Metals mine: Min. Jour., v. 14, no. 7, p. 32 (1930)

SPAULDING, E. D. (*see* Thurmond, R. E., 1, 4)

SPEAR, W. B.
The Globe-Miami district: Mines Mag., v. 27, no. 11, p. 58-60 (1937)

SPENCER, L. J.
Meteorite craters as topographical features on the earth's surface: Geog. Jour., v. 81, p. 227-248 (1933); Smithsonian Inst. Ann. Rep. 1933, p. 307-325, maps (1935)

SPERR, J. D. (*see also* Schrader, F. L., 11)
The Tom Reed-Gold Road mining district, Arizona: Engr. Min. Jour., v. 101, p. 1-5 (1916)

SPILLMAN, Charles
Big Jim reopens: Min. Jour., v. 14, no. 20, p. 26-28 (1931)

SPILMAN, C. F.
Tom Reed Gold Mines property, Arizona: Min. Engr. World, v. 45, p. 1073-1074 (1916)

SPURR, J. E.
1. Origin and structure of the Basin ranges: Geol. Soc. Am. Bull., v. 12, p. 217-271, map (1901); [abst.]: Science, new ser., v. 13, p. 98 (1901)
2. The relation of ore deposition to faulting: Econ. Geol., v. 11, p. 601-622 (1916)
3. The ore magmas: McGraw-Hill Book Co., N.Y., 2 vols., 915 p. (1923)

STAATZ, H. M. (*see* Wilmarth, V. R.)

STABLER, H.
Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses: USGS Water-Supply Paper 274, 188 p. (1911)

STACY, F. N.
New shipping mine (Van Dyke) at Miami: Min. Jour., v. 13, no. 7, p. 9-10 (1929)

STAGER, H. K. (*see* Bush, A. L.)

STAGNER, H. R.
Geology of the fossil leaf beds of the Petrified Forest National Monument: Carnegie Inst. Wash. Pub. 526, Contrib. Paleo., p. 9-17 (1941)

STAINBROOK, M. A.
Brachiopoda of the Percha shale of New Mexico and Arizona: Jour. Paleo., v. 21, no. 4, p. 297-328, illus. (1947)

STARK, J. T.
(and Maxon, J. H.) Relict fracture cleavage in paraschists [abst.]: Geol. Soc. Am. Bull., v. 49, no. 12, pt. 2, p. 1901 (1938)

STARNES, X. B.
Work of the geological department at a porphyry copper mine: Min. Sci. Press., v. 124, p. 361-366, 396-404 (1922)

STAUFFER, C. R.
1. Devonian section in the Santa Rita Mountains of Arizona [absts.]: Geol. Soc. Am. Bull., v. 38, p. 133 (1927); Pan-Am. Geol., v. 47, p. 77 (1927)
2. The Devonian section on Pinal Creek, Arizona: Ohio Jour. Sci., v. 28, p. 152, 253-260 (1928); [abst.]: Ohio Acad. Sci. Proc., v. 8, pt. 4, p. 174 (1928)
3. Devonian of the Santa Rita Mountains, Arizona: Geol. Soc. Am. Bull., v. 39, p. 429-433 (1928)

STAUNTON, W. F.
1. The Jerome mining district: Ariz. Min. Jour., v. 1, no. 4, p. 5-9 (1917)
2. Effects of an earthquake in a mine at Tombstone, Arizona: Seismol. Soc. Am. Bull., v. 8, p. 25-27 (1918)
3. Ore possibilities at the Congress mine (Yavapai County): Engr. Min. Jour., v. 122, p. 769-771 (1926)

STEARNS, H. T. (*see* Stearns, N. D.)

STEARNS, N. D.
(and Stearns, H. T. and Waring, G. A.) Thermal springs in the United States: USGS Water-Supply Paper 679-B (Ariz., p. 91, 115-116) (1937)

STEELE, H. J.
1. (and Rubley, G. R.) San Manuel prospect: Min. Tech., v. 11, no. 5, Tech. Pub. 2255 (1947); [discussion]: Tech. Pub. 2377, p. 7 (1948)
2. San Manuel copper deposit: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 81-85, illus., map (1952)
3. Superior area: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 106-111, illus., map (1952)

STEENLAND, N. C. (*see* Vacquier, V.)

STEIN, W. T.
Mammal remains from archaeological sites in the Point of Pines region, Arizona: Am. Antiquity, v. 29, no. 2, p. 213-220 (1963)

STEPHENS, B. A.
Quijotoa mining district guide book: Tucson Citizen Pntg. & Pub. Co., 104 p. (1884)

STEPHENS, J. G. (*see* Wanek, A. A.)

STERN, T. W. (*see* Stieff, L. R., 1, 2)

STERRETT, D. B.
1. Turquoise—Mineral Park area: *in* Mineral Resources of the United States; USGS, p. 847-852 (1908)
2. Mica deposits of the United States: USGS Bull. 740 (Ariz., p. 46-47) (1923)

STERRETT, T. S. (*see* Roach, C. H.)

STEVENS, H. J.
(Editor) The copper handbook; a manual of the copper industry of the world: vols. 1-10 (1900-1910)

STEVENS, P. R. (*see also* Akers, J. P., 11; Cooley, M. E., 15)
Examination of drill cuttings and application of resulting information to solving of field problems on the Navajo Indian Reservation, New Mexico and Arizona: *in* Methods of collecting and interpreting ground-water data; USGS Water-Supply Paper 1544-H, p. 3-14 (1963)

STEWART, C. A.
1. Note on a conglomerate dike in Arizona: Science, new ser., v. 33, p. 434-435 (1911)
2. The geology and ore deposits of the Silverbell mining district, Arizona: AIME Bull. 65, p. 455-505 (1912); Trans., v. 43, p. 240-290, map (1913); [abst.]: Min. World, v. 36, p. 1104-1107, 1147-1150 (1912)
3. Magmatic differentiation at Silverbell, Arizona: Science, new ser., v. 37, p. 338-350 (1913)

STEWART, G. W.
Pegmatite deposits of the White Picacho district, Maricopa and Yavapai Counties, Arizona [review of Ariz. Bur. Mines Bull. 162 by R. H. Jahns]: Econ. Geol., v. 49, p. 335-336 (1954)

STEWART, J. H. (*see also* Fischer, R. P., 5)
1. (and Poole, F. G. and Wilson, R. F.) Stratigraphy and origin of major lithologic units of Upper Triassic series on the Colorado Plateau [abst.]: Geol. Soc. Am. Bull., v. 69, no. 12, pt. 2, p. 1746 (1958)
2. (and Williams, G. A., Albee, H. F., and Raup, O. B.) Stratigraphy of Triassic and associated formations in part of the Colorado Plateau region, with a section on "Sedimentary Petrology" by R. A. Cadigan: USGS Bull. 1046-Q, 80 p. (1959)

3. Stratgraphic relations of Hoskinnini member (Triassic?) of Moenkopi formation on Colorado Plateau: AAPG Bull., v. 43, no. 8, p. 1852-1868, illus. (1959)
4. Stratigraphy and origin of Chinle formation (Upper Triassic) on the Colorado Plateau: Stanford Univ., PhD Thesis (1960)
5. (and Wilson, R. F.) Triassic strata of the Salt Anticline region, Utah and Colorado: Four Corners Geol. Soc., Guidebook 3rd Field Conf., p. 98-106, illus. (1960)
6. Origin of cross-strata in fluvial sandstone layers in the Chinle formation (Upper Triassic) on the Colorado Plateau: USGS Prof. Paper 424-B, Art. 54, p. 127-129 (1961)

STEWART, Lincoln A. (*see also* Dale, V. B., 2; Farnham, L. L., 3; Sanford, R. S.)
1. A study of the Ajo copper ore minerals: Univ. Ariz., MS Thesis, 24 p., maps (1933)
2. (and Hedges, J. H.) Asbestos deposits in Arizona: Min. Jour., v. 28, no. 12, p. 7-8 (1944)
3. Apache iron deposit, Navajo County, Arizona: USBM, RI 4093, 87 p. (1947)
4. (and Haury, P. S.) Arizona asbestos deposits, Gila County, Arizona: USBM, RI 4100, 28 p. (1947)
5. Chrysotile-asbestos deposits of Arizona: USBM, IC 7706, 124 p., illus., map (1955); [supp.]: IC 7745, 41 p., illus., map (1956)
6. (and Pfister, A. J.) Barite deposits of Arizona: USBM, RI 5651, 89 p., maps (1960)
7. Mining methods and costs, Regal Asbestos mine, Jaquays Mining Corporation, Gila County, Arizona: USBM, IC 7986, 53 p., illus., maps (1961)

STEWART, S. O.
The Old Hat mining district, Pinal County, Arizona: Min. Engr. World, v. 36, p. 952 (1912)

STEWART, S. W. (*see* Diment, W. H.)

STEWART, W. O.
An ice cave in Arizona: Rocks and Minerals, v. 16, no. 9, p. 329 (1941)

STIEFF, L. R. (*see also* Senftle, F. E.)
1. (and Stern, T. W., and Milkey, R. G.) A preliminary determination of the age of some uranium ores of the Colorado Plateaus by the lead-uranium method: USGS Circ. 271, 19 p., illus. (1953)
2. (and Stern, T. W.) Isotopic study of some Colorado Plateau ores (discussion): Econ. Geol., v. 54, no. 4, p. 752 (1959)

STILL, A. R.
Uranium at Copper Cities and other porphyry copper deposits, Miami district, Arizona: Harvard Univ., PhD Thesis (1962)

STIPP, T. F.
(and Beikman, H. M.) Map of Arizona showing oil, gas and exploratory wells, pipelines, and areas of igneous and metamorphic rocks: USGS Map OM-201 (1959)

STIRTON, R. A.
1. A new genus of the family Vespertilionidae from the San Pedro Pliocene of Arizona: Univ. Calif., Dept. Geol. Sci. Bull., v. 20, p. 27-30 (1931)
2. A new beaver from the Pliocene of Arizona, with notes on the species of *Dipoides*: Jour. Mammalogy, v. 17, p. 279-281 (1936)

STOCKING, H. E.
(and Page, L. R.) Natural occurrence of uranium in the United States — a summary: USGS Prof. Paper 300, p. 5-12 (1956)

STODDARD, A. C.
1. Mining practice and methods at Inspiration Consolidated Copper Company, Inspiration, Arizona: USBM, IC 6169, 23 p. (1929)

2. History and development of block caving at the mines of the Inspiration Consolidated Copper Company: AIME Trans., v. 163, p. 96-120, illus. (1945)

STOKES, William L.

1. Morrison formation and related deposits in and adjacent to the Colorado Plateau: Geol. Soc. Am. Bull., v. 55, no. 8, p. 951-992, illus. (1944)
2. Primary lineation in fluvial sandstones, a criterion of current direction: Jour. Geol., v. 55, no. 1, p. 52-54, illus. (1947)
3. Carnotite deposits in the Carrizo Mountains area, Navajo Indian Reservation, Apache County, Arizona, and San Juan County, New Mexico: USGS Circ. 111, 5 p., map (1951)
4. Primary sedimentary trend indicators as applied to ore finding in the Carrizo Mountains, Arizona and New Mexico: USAEC, RME-3043, pt. 1, 48 p., illus., map (1953)
5. Some stratigraphic, sedimentary and structural relations of uranium deposition in the Salt Wash sandstone: USAEC, RME-3102, 40 p. (1954)
6. Pterodactyl tracks from the Morrison formation: Jour. Paleo., v. 31, no. 5, p. 952-954, illus. (1957); [abst.]: Geol. Soc. Am. Bull., v. 65, no. 12, p. 1309 (1954)
7. Pediment concept applied to Shinarump and similar conglomerates: Geol. Soc. Am. Bull., v. 61, p. 91-98 (1960)
8. Fluvial and eolian sandstone bodies in the Colorado Plateau: *in* Geometry of sandstone bodies; AAPG, p. 151-179 (1961)
9. (and Heylmun, E. B.) Tectonic history of southwestern Utah: Intermountain Assoc. Pet. Geol., Guidebook 12th Field Conf., p. 19-25 (1963)
10. Triassic and Jurassic formations of southwestern Utah: Intermountain Assoc. Pet. Geol., Guidebook 12th Field Conf., p. 60-64 (1963)
11. Incised, wind-aligned stream patterns of the Colorado Plateau: Am. Jour. Sci., v. 262, no. 6, p. 808-816 (1964)
12. Eolian varving in the Colorado Plateau: Jour. Sed. Pet., v. 34, no. 2, p. 432 (1964)

STONE, G. H.

1. Note on the minerals associated with copper in parts of Arizona and New Mexico [abst.]: Science, new ser., v. 14, p. 796-797 (1901)
2. Note on the extinct glaciers of New Mexico and Arizona [abst.]: Science, new ser., v. 14, p. 798 (1901)

STONE, J. F.

Canyon country, the romance of a drop of water and a grain of sand: G. P. Putnam's Sons, N.Y., 442 p., illus (1932)

STONE, R. W. (*see also* Sanford, S.; Schrader, F. C., 13)

1. Gypsum products; their preparation and uses: USBM Tech. Paper 155, 67 p. (1917)
2. Gypsum deposits of the United States: USGS Bull. 697 (Ariz., p. 49-56) (1920)

STONEHAM, W. J.

Arizona: Min. World, v. 32, p. 163-169 (1910)

STORMS, W. H.

[The Hillside mine, Yavapai County, Arizona]: Engr. Min. Jour., v. 50, p. 162-163 (1890)

STORMS, W. R. (*see also* Needham, A. B., Thurmond, R. E., 3)

(and Bowman, A. B.) Mining methods and practices at the Mineral Hill Copper mine, Banner Mining Co., Pima County, Arizona: USBM, IC 7786, 25 p., illus. (1957)

STOSE, George W. (*see also* Willis, B., 1)

1. Geologic map of the United States (scale 1:2,500,000): USGS (1932)
2. Geologic map of North America (scale 1:5,000,000): Geol. Soc. Am. (1946)

STOVER, M. M. (*see* Hardwick, W. R., 6)

STOYANOW, A. A.

1. Oil prospects of the Willcox region: Ariz. Min. Jour., v. 9, no. 7, p. 11-12, 26-29 (1925)
2. Notes on recent stratigraphic work in Arizona: Am. Jour. Sci., 5th ser., v. 12, p. 311-324 (1926)
3. Cambric formations of southeastern Arizona and their trilobitic faunas [abst.]: Pan-Am. Geol., v. 53, p. 315 (1930)
4. Certain aspects of Devonic in Arizona [abst.]: Pan-Am. Geol., v. 53, p. 316-317 (1930)
5. Observations on Mississippian corals of Arizona [abst.]: Pan-Am. Geol., v. 53, p. 317 (1930)
6. Occurrence of the Malone and Torcer faunas at the base of the Arizona Comanchean: Science, new ser., v. 83, p. 328 (1936)
7. Correlation of Arizona Paleozoic formations: Geol. Soc. Am. Bull., v. 47, p. 459-540 (1936); [discussion]; p. 1994-1998 (1937)
8. Jurassic and early Cretacic faunas from Arizona [abst.]: Pan-Am. Geol., v. 65, p. 375-376 (1936)
9. Fossiliferous zones in the Cretaceous and Tertiary deposits of southeastern Arizona [abst.]: Geol. Soc. Am. Proc. 1936, p. 296-297 (1937)
10. Lower Cretaceous stratigraphy in southeastern Arizona [abst.]: Geol. Soc. Am. Proc. 1937, p. 117 (1938)
11. Paleontological stratigraphy of Arizona; its relation to adjacent areas [abst.]: Geol. Soc. Am. Bull., v. 50, no. 12, pt. 2, p. 1960 (1939)
12. Arizona Paleozoic paleontology [absts.]: Pan-Am. Geol., v. 73, no. 5, p. 376 (1940); Geol. Soc. Am. Bull., v. 51, no. 12, p. 1950 (1940)
13. Paleozoic paleogeography of Arizona: Geol. Soc. Am. Bull., v. 53, no. 9, p. 1255-1282, paleogeog. maps (1942)
14. Molluscan faunule from Devonian Island Mesa beds, Arizona: Jour. Paleo., v. 22, no. 6, p. 783-791, illus. (1948); [abst.]: Geol. Soc. Am. Bull., v. 57, no. 12, pt. 2, p. 1234 (1946)
15. Stratigraphic evaluation of some upper Paleozoic index fossils of Arizona [abst.]: Geol. Soc. Am. Bull., v. 59, no. 12, pt. 2, p. 1383 (1948)
16. Some problems of Mississippian stratigraphy in southwestern United States: Jour. Geol., v. 56, no. 4 (1948); [abst.]: Geol. Soc. Am. Bull., v. 58, no. 12, pt. 2, p. 1278-1279 (1947)
17. Lower Cretaceous stratigraphy in southeastern Arizona: Geol. Soc. Am. Mem. 38, 169 p., illus., maps (1949)
18. Sequence of Cambrian trilobite faunas in southeastern Arizona [abst.]: Geol. Soc. Am. Bull., v. 60, p. 1922 (1949)
19. Occurrence of Texas Permian ammonoids in Arizona [abst.]: Geol. Soc. Am. Bull., v. 60, p. 1946 (1949)

STRAHLER, Arthur N. (*see also* Babenroth, D. L.)

1. Landslides of the Vermilion and Echo cliffs, northern Arizona: Jour. Geomorph., v. 3, no. 4, p. 285-300, maps (1940)
2. A guide to the East Kaibab monocline in the Grand Canyon region: Plateau, v. 17, no. 1, p. 1-13, maps, block diagrams (1944)
3. Geomorphic significance of valleys and parks of the Kaibab and Coconino plateaus, Arizona: Science, v. 100, no. 2593, p. 219-220 (1944)
4. Valleys and parks of the Kaibab and Coconino plateaus, Arizona: Jour. Geol., v. 52, p. 361-387, illus. (1944)
5. Landscape features of the Kaibab and Coconino Plateaus: Plateau, v. 18, no. 1, p. 1-6, illus. (1945)
6. A geologic guide to the western part of the Kaibab Plateau: Plateau, v. 19, no. 4, p. 53-60, illus. (1947)

7. Geomorphology and structure of the West Kaibab fault zone and Kaibab Plateau, Arizona: Geol. Soc. Am. Bull., v. 59, no. 6, p. 513-540, illus., maps (1948); [abst.]: v. 58, no. 12, pt. 2, p. 1230 (1947)

STRAHORN, A. T.
Geology at site of proposed diversion works (at Headgate Rock, near Parker, Arizona): *in* Proposed irrigation project, Colorado River Indian Reservation Rep. (C. A. Engle), p. 15-17, U.S. 67th Cong., 2nd sess., hearings on H. R. 11449 (1922)

STREITZ, Robert
Subsurface stratigraphy and hydrology of the Rillito Creek-Tanque Verde Wash area, Tucson, Arizona: Univ. Ariz., MS Thesis, 60 p. (1962)

STRINGHAM, Bronson
1. Relationship of ore to porphyry in the Basin and Range Province, U.S.A.: Econ. Geol., v. 53, p. 806-822 (1958)
2. Differences between barren and productive intrusive porphyry: Econ. Geol., v. 55, p. 1622-1630 (1960)

STROBELL, J. D., Jr. (*see also* Anderson, C. A., 4, 9)
1. Stratigraphic relations in the Carrizo Mountains area, northeastern Arizona and northwestern New Mexico [abst.]: Geol. Soc. Am. Bull., v. 65, no. 12, p. 1310-1311 (1954)
2. Geology of the Carrizo Mountains area in northeastern Arizona and northwestern New Mexico: USGS Map OM-160, 2 sheets, text (1956)
3. Salient stratigraphic and structural features of the Carrizo Mountains area, Arizona-New Mexico: Intermountain Assoc. Pet. Geol., Guidebook 9th Field Conf., p. 66-73, illus. (1958)

STRONG, Mary Frances
Pink marble in Arizona: Gems and Minerals, no. 296, p. 26-27 (1962)

STUART, W. T. (*see* Morrison, R. B., 4)

STUDEBAKER, Irving G.
Structure and stratigraphy of the Helmet Peak area, Pima County, Arizona: Univ. Ariz., MS Thesis, 26 p. (1960)

STUGARD, Frederick, Jr.
(and Wyant, D. G., and Gude, A. J.) Secondary uranium deposits in the United States: USGS Circ. 220, p. 19-25 (1952)

STULER, J. E.
(compiler) Uranium map of Arizona showing active and probable areas: Stuler Map Co., Phoenix, Ariz., map 100-U (1956)

STULIK, R. S. (*see also* Hardt, W. F., 2, 3; White, N. D., 3, 4)
(and Twenter, F. R.) Geology and ground water of the Luke area, Maricopa County, Arizona: USGS Water-Supply Paper 1779-P, 30 p. (1964)

STUMM, E. C.
Upper Devonian compound tetracorals from the Martin limestone: Jour. Paleo., v. 22, no. 1, p. 40-47, illus. (1948)

STURDEVANT, G. E. (*see* Gilmore, C. W., 7)

STURGES, E. L.
Mining sodium sulphate at Camp Verde: Min. Jour., v. 14, no. 4, p. 50-51 (1930)

STURGIS, E. B. (*see* Rand, L. R.)

STUTZER, Otto
1. Meteor Crater and Nördlinger Ries: Deutsche geologische Gesellschaft Zeitschrift, Band 88, Heft 8, p. 510-523, illus., Berlin (1936)
2. Der Meteor-Krater in Arizona: Natur un dVolk, Band 66, Heft 9, p. 442-453, illus. (1936)

SULIK, John F.
Stratigraphy and structure of the Montosa Canyon area, Santa Cruz County, Arizona: Univ. Ariz., MS Thesis, 64 p., (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 45 (1958)

SULLIVAN, Mark
Detroit Copper Company at Morenci: Overland, new series, 82 p. May, (1905)

SULLWOLD, H. H., Jr. (*see* Read, C. B., 1)

SWANSON, R. W. (*see* Peterson, N. P., 5, 17)

SWAPP, C. W.
1. Boom or bust: World Oil, v. 143, no. 1, p. 80-92, illus. (1956)
2. The geology and oil and gas possibilities of northwestern Arizona: *in* Oil, gas, and helium in Arizona; Arizona Development Board *for* Arizona Oil and Gas Conservation Commission, p. 35 (1961)

SWIFT, T. T.
Date of channel trenching in the Southwest: Science, new ser., v. 63, p. 70-71 (1926)

SYKES, Glenton G. (*see also* Cooperrider, C. K., 1)
Vegetation and the mining industry: Min. Jour., v. 20, no. 23, p. 5 (1937)

SYKES, Godfrey G.
1. The delta and estuary of the Colorado River: Geog. Rev., v. 16, p. 232-255, map (1926)
2. Study of the delta of the Colorado River: Carnegie Int. Wash. Yearbook 29, p. 411-413 (1930)
3. Completion of the study of delta of Colorado River: Carnegie Inst. Wash. Yearbook 30, p. 458-460 (1931); Yearbook 31, p. 342-345 (1932)
4. (Study of the delta of the Colorado River): Carnegie Inst. Wash. Yearbook 32, p. 351-353 (1933)
5. Continuation of study of the Colorado delta and the lower Colorado River: Carnegie Inst. Wash. Yearbook 34, p. 351-353 (1935); Yearbook 35, p. 356-358 (1936)
6. Delta, estuary, and lower portion of the channel of the Colorado River 1933 to 1935: Carnegie Inst. Wash. Pub. 480, 70 p., map (1937)
7. The Colorado delta: Carnegie Inst. Wash. Pub. 460, 193 p., map (1937); Am. Geog. Soc. Sp. Pub. 19, 192 p., map (1937)
8. End of a great delta: Pan-Am. Geol., v. 69, p. 241-248 (1938)
9. Regolith of the desert: Pan-Am. Geol., v. 71, p. 347-358 (1939)
10. Rio Santa Cruz of Arizona, a paradigm desert streamway: Pan-Am. Geol., v. 72, no. 2, p. 81-92 (1939)

TABER, Stephen
1. The genesis of asbestos and asbestiform minerals (with discussion): AIME Bull. 119, p. 1973-1998 (1916); Bull. 123, p. 397-405; Bull. 125, p. 825-827 (1917); Trans., v. 57, p. 62-98 (1918)
2. (and Schaller, W. T.) Psittacinite from the Higgins mine, Bisbee, Arizona: Am. Mineral., v. 15, p. 575-579 (1930)

TAFT, H. H.
Notes on the tungsten ores of the Southwest: Min. World, v. 44, p. 1047-1048 (1916)

TAGG, K. M. (*see* Gazdik, G. C.)

TAINTER, S. L.
1. Amargosa (Esperanza) molybdenum-copper property, Pima County, Arizona: USBM, RI 4016, 15 p. (1947)
2. Apex copper property, Coconino County, Arizona: USBM, RI 4013, 23 p. (1947)

3. Johnny Bull-Silver Knight lead-zinc property, Cerbat Mountains, Mohave County, Arizona: USBM, RI 3998, 14 p. (1947)
4. Christmas copper deposit, Gila County, Arizona: USBM, RI 4293 (1948)

TALLMON, M. C. (*see* Morgan, W. C., 1, 2)

TALLY, R. E.
1. United Verde ready now for double the former capacity: Ariz. Min. Jour., v. 6, no. 5, p. 18-20, 22-24, 54-55 (1922)
2. Arizona mining industry, past, present, and future: Ariz. Min. Jour., v. 6, no. 15, p. 11, 35 (1923)
3. The mining industry in Arizona: Ariz. Min. Jour., v. 8, no. 12, p. 7, 20 (1924)

TALMAGE, J. E.
On certain peculiar markings on sandstones from the vicinity of Glen Canyon, Arizona [abst.]: Science, new ser., v. 11, p. 220 (1900)

TANNER, W. F.
Geological interpretation of grain-size distribution measurements of Colorado Plateau sedimentary rocks; a discussion: Jour. Geol., v. 70, no. 3, p. 375-376 (1962)

TARR, W. A.
1. Rhythmic banding of manganese dioxide in rhyolite tuff: Jour. Geol., v. 26, p. 610-617 (1918)
2. Introductory economic geology: McGraw-Hill Book Co., N.Y., 664 p. (1930)

TASSIN, W. (*see* Merrill, G. P., 3)

TAVELLI, J. A.
Review of airborne radioactivity survey techniques in the Colorado Plateau: USAEC, RMO-679, 12 p. (1951)

TAYLOR, D. W.
Pliocene fresh-water mollusks from Navajo County, Arizona: Jour. Paleo. v. 31, no. 3, p. 654-661, illus. (1957)

TAYLOR, F.
Jasper in Limestone Gulch: Desert Mag., v. 17, no. 7, p. 18-21, illus. (1954)

TAYLOR, Omer J. (*see also* Damon, P. E., 2)
Correlation of volcanic rocks in Santa Cruz County, Arizona: Univ. Ariz., MS Thesis, 59 p. (1960); Ariz. Geol. Soc. Dig., v. 3, p. 87-91 (1960)

TAYLOR, Walter W.
An analysis of some salt samples from the Southwest: Plateau, v. 27, no. 2, p. 1-7 (1954)

TEICHERT, C.
(and Schopf, J. M.) A Middle or Lower Devonian psilophyte flora from central Arizona and its paleogeographic significance: Jour. Geol., v. 66, no. 2, p. 208-217, illus. (1958)

TENNEY, J. B. (*see also* Bonillas, Y. S.; Butler, G. M., 26; Wilson, E. D., 14)
1. Bisbee porphyry deposits: Engr. Min. Jour., v. 97, p. 467-468 (1914)
2. The Bisbee mining district, fifty years young: Engr. Min. Jour., v. 123, p. 837-841 (1927)
3. The zinc resources of Arizona: Min. Jour., v. 12, no. 1, p. 7-8, 17 (1928)
4. The mineral industries of Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 125, 135 p. (1928); 2nd Rep.: Bull. 129, 108 p. (1930)
5. History of mining in Arizona: Univ. Ariz., Ariz. Bur. Mines Open-file Rep., 514 p. (1929)
6. Arizona copper prospects: Engr. Min. Jour., v. 127, p. 752-754 (1929)
7. Relation of the ore deposits of the southern Rocky Mountain region to the Colorado Plateau (discussion): Colo. Sci. Soc. Proc., v. 12, p. 269-277 (1930)

8. The Bisbee mining district: *in* Ore deposits of the Southwest; 16th Int. Geol. Cong., Guidebook 14, p. 40-67, maps (1932)
9. Economic geological reconnaissance of Casa Grande mining district, Pinal County, Arizona: Casa Grande Chamber of Commerce, 24 p. (1934)
10. The copper deposits of Arizona: *in* Copper resources of the world; 16th Int. Geol. Cong., p. 167-206, 213-228, 233-235, maps (1935)
11. Geology and ore deposits of the Tombstone District, Arizona [review of paper by Butler, B. S., Wilson, E. D., and Rasor, C. A.]: Econ. Geol., v. 33, p. 675-678 (1938)

TERMIER, Pierre
Une visite au Grand Cañon du Colorado: Revue Univ. Paris, v. 19, no. 17, p. 553-569 (1924)

THACKER, E.
Squaw Peak mine: Rocks and Minerals, v. 24, no. 7-8, p. 376-377, illus. (1949)

THACPAW, S. C.
Geology of the Ruby Star Ranch area, Twin Buttes mining district, Pima County, Arizona: Univ. Ariz., MS Thesis, 59 p. (1960)

THADEN, R. E. (*see* Witkind, I. J., 20)

THEOBALD, P. K., Jr.
(and Thompson, C. E.) Zinc in magnetite from alluvium and igneous rocks associated with ore deposits: USGS Prof. Paper 450-C, p. 72-73 (1962)

THOENEN, J. R.
Alunite resources of the United States: USBM, RI 3561, 48 p. (1941)

THOMAS, B. E.
1. Ore deposits of the Wallapai district, Arizona: Econ. Geol., v. 44, p. 663-705, illus., maps (1949)
2. Geology of the Wallapai district, Arizona [abst.]: Geol. Soc. Am. Bull., v. 61, no. 12, pt. 2, p. 1509-1510 (1950)
3. The Emerald Isle copper deposit (discussion): Econ. Geol., v. 46, p. 231-233 (1951)
4. Geology of the Chloride quadrangle, Arizona: Geol. Soc. Am. Bull., v. 64, p. 391-420, illus., map (1953)

THOMAS, George C.
1. The framework of Mississippian sedimentation in Arizona: Univ. Ariz., MS Thesis (1958)
2. The Mississippian system in Southern Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 31-33 (1959)
3. (and Pye, W. D.) Mississippian sedimentation and stratigraphy of south-eastern Arizona [abst.]: Geol. Soc. Am. Bull., v. 71, no. 12, p. 1991-1992 (1960)

THOMAS, H. E. (*see also* Brown, R. H.; Gatewood, J. S., 2)
1. First fourteen years of Lake Mead: USGS Circ. 346, 27 p., illus. (1954)
2. Drainage basin tributary to Lake Mead: Chap. D. *in* Pt. 1 *of* Comprehensive survey of sedimentation in Lake Mead, 1948-1949; USGS Prof. Paper 295, p. 21-30 (1960)
3. Water and the Southwest — what is the future? USGS Circ. 469, 15 p. (1962)
4. Effects of drought in the Colorado River Basin: USGS Prof. Paper 372-F, p. 1-51 (1963)
5. Effects of drought in basins of interior drainage: USGS Prof. Paper 372-E, 51 p. (1963)

THOMAS, Kirby
1. The Globe mining district, Arizona: Min. Met., v. 24, p. 231-232 (1901)
2. Engineer recommends large plant for Central: Ariz. Min. Jour., v. 7, no. 13, p. 19-20, 23 (1923)
3. In the direction of the sun: Ariz. Min. Jour., v. 7, no. 18, p. 9, 28 (1924)

4. Exploring in Arizona for a super meteorite: Ariz. Min. Jour., v. 8, no. 4, p. 16 (1924)

THOMAS, N. O.
(and Harbeck, G. E.) Reservoirs in the United States: USGS Water-Supply Paper 1360-A, 99 p., illus. (1956)

THOMAS, R. W.
Mining practice at Ray mines, Nevada Consolidated Copper Company, Ray, Arizona: USBM, IC 6167, 28 p. (1929)

THOMAS, Walter L.
Geology and ore deposits of the Rosemont area, Pima County, Arizona: Univ. Ariz., MS Thesis, 54 p., maps (1931)

THOMPSON, A. J. (*see* Wartman, F. S.)

THOMPSON, A. P.
1. Some of the factors that affect the future of Jerome: Ariz. Min. Jour., v. 6, no. 5, p. 13, 56 (1922)
2. A geological picture of northern Arizona: Ariz. Min. Jour., v. 7, no. 9, p. 7-8, 41-44 (1923)
3. The silver mining district in Yuma County: Ariz. Min. Jour., v. 8, no. 16, p. 3-4 (1925)
4. The Castle Dome lead district of Yuma County: Ariz. Min. Jour., v. 9, p. 5-6, 48-49 (1925)
5. The King of Arizona region, Yuma County; Ariz. Min. Jour., v. 9, no. 7, p. 9-10, 60-62 (1925)
6. The price of copper in relation to prospecting: Ariz. Min. Jour., v. 9, no. 9, p. 9-10, 38 (1925)
7. Mining possibilities of the White Hills district: Ariz. Min. Jour., v. 9, no. 12, p. 7-8, 45-47 (1925)
8. Prospecting invisible Arizona: Ariz. Min. Jour., v. 9, no. 10, p. 5-6, 61-64 (1926)
9. Finding the lost Vulture lode: Min. Jour., v. 14, no. 13, p. 9-11, 28-30 (1930)

THOMPSON, C. E. (*see* Theobald, P. K., Jr.)

THOMPSON, L. K. (*see* Davis, G. E.)

THOMPSON, M. E. (*see also* Weeks, A. D., 1, 2)
(and Roach, C. H., and Meyrowitz, R.) Simplotite, a new quadrivalent vanadium mineral from the Colorado Plateau: Am. Mineral., v. 43, no. 1-2, p. 16-25 (1958)

THOMSON, Elihu
The fall of a meteorite: Am. Acad. Arts. Proc., v. 47, p. 721-733 (1912)

THOMSSEN, R. W. (*see also* Pabst, A., 2)
1. (and Barber, G. A.) A partial section of Escabrosa limestone in the Galiuro Mountains, Pinal County, Arizona: Ariz. Geol. Soc. Dig., v. 1, p. 12-14 (1958)
2. (and Williams, S. A., and Bideaux, R. A.) Minerals from the Table Mountain mine, Pinal County, Arizona: Mineral Explorer (1958)

THORDARSON, W. (*see* Johnson, H. S., Jr., 1)

THORP, E. M.
(and Brown, C. B.) Sedimentation in San Carlos Reservoir, Gila River, Arizona: U.S. Soil Cons. Serv. Tech. Pub. 91, 26 p. (1951)

THURMOND, F. L.
1. Arizona's oldest copper mine: Min. Sci. Press, v. 120, p. 647 (1920)
2. A prospecting trip through the San Carlos Indian Reservation: Ariz. Min. Jour., v. 5, no. 3, p. 11-12 (1921)
3. Is there a Canyon Diablo meteorite: Engr. Min. Jour., v. 122, p. 817-818 (1926)

THURMOND, R. E. (*see also* Heinrichs, W. E., Jr., 1)
1. (and Heinrichs, W. E., Jr., and Spaulding, E. D.) Geophysical discovery and development of the Pima mine, Pima County, Arizona — a successful exploration project: Min. Engr., v. 6, no. 2, p. 197-202 (1954); AIME Trans., v. 199 (1954)
2. A description of the Pima ore body: Min. Cong. Jour., v. 41, no. 1, p. 27-30, illus. (1955)
3. (and Storms, W. R.) Discovery and development of the Pima copper deposit, Pima Mining Co., Pima County, Arizona: USBM, IC 7822, 19 p., illus., map (1958)
4. (and Olk, J. F., Komadina, G. A., Journeay, J. A., Spaulding, E. D., and Hernlund, R. W.) Pima, a three-part story, geology, open-pit, milling: Min. Engr., v. 10, no. 4, p. 453-462, illus. (1958)

TILDEN, Paul M.
Nature in rock and mineral: Nat. Hist., v. 69, no. 3, p. 64 (1960)

TILGHMAN, B. C. (*see also* Barringer, D. M., 2)
Coon Butte, Arizona: Acad. Nat. Sci. Phila. Proc., v. 57, p. 887-914 (1906)

TILLOTSON, C. C.
The biggest mill and classifier (Colorado River): Min. Jour., v. 15, no. 1, p. 3-4 (1931)

TILTON, G. R. (*see also* Aldrich, L. T., 2)
(and Davis, G. L., Weatherill, G. W., and Aldrich, L. T.) Isotopic ages of zircon from granites and pegmatites: Am. Geophys. Union Trans., v. 38, p. 360-371 (1957)

TIPTON, R. J. (*see* Guyton, W. F.)

TITLEY, Spencer, R. (*see also* Lacy, W. C., 3)
1. Igneous rocks of the Basin and Range Province in Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 85-88 (1959)
2. Geology along the Diamond Rim and adjoining areas, Gila and Navajo Counties, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 123-129, illus. (1962)

TOEPELMANN, W. C. (*see* Mehl, M. G., 2)

TOLL, R. H.
Mining operations in Mohave County, Arizona: Min. Engr. World, v. 35, p. 243-244 (1911)

TOLMAN, C. F., Jr. (*see also* Moore, B. N., 3)
1. The geology of the vicinity of the Tumamoc Hills, Arizona: Carnegie Inst. Wash. Pub. 113, p. 67-82, maps (1909)
2. Erosion and deposition in the southern Arizona bolson region: Jour. Geol., v. 17, p. 136-163 (1909)
3. The southern Arizona copper fields: Min. Sci. Press, v. 99, p. 356-360, 390-393 (1909)
4. Disseminated chalcocite deposits at Ray, Arizona: Min. Sci. Press, v. 99, p. 622-624 (1909)
5. The Miami-Inspiration ore zone: Min. Sci. Press, v. 99, p. 646-658 (1909)
6. Copper deposits of Silverbell, Arizona: Min. Sci. Press, v. 99, p. 710-712 (1909)
7. Copper in Arizona in 1909: Min. Sci. Press, v. 100, p. 71-72 (1910)
8. Geology at Globe, Arizona: Min. Sci. Press, v. 100, p. 327-328 (1910)
9. Engineering and economic aspects of low-grade copper deposits: Engr. Mag., v. 38, p. 893-904 (1910)
10. An Arizona earthquake (Aug. 18, 1912): Seismol. Soc. Am. Bull., v. 2, p. 209-210 (1912)

11. Geological sketch of the Papagueria: New trails in Mexico (Lumholtz), p. 398-399, Charles Scribner and Sons, New York (1912)
12. Bajadas of the Santa Catalina Mountains, Arizona [abst. and discussion]: Geol. Soc. Am. Bull., v. 26, p. 391 (1915)
13. Observations on certain types of chalcocite and their characteristic etch patterns: AIME Bull. 110, p. 401-433 (1916); (with discussion): Trans., v. 54, p. 402-441 (1917)

TONGE, Thomas
The mineral resources of Arizona: Engr. Mag., v. 13, p. 758-781 (1897)

TOOMBS, H. (*see* Schmitt, H. A., 6)

TORRE, Mandrazo, R. de la
Geomorfologia del Cañon del Colorado: Boletín de Historia Natural, v. 1, no. 2, p. 61-65, Havana (1950)

TOULA, Franz
Geologische Forschungsergebnisse aus dem Flussgebiet des Colorado: Ein Vortrag gehalten im Vereine zur Verbreitung naturwissenschaftlicker Kenntnisse in Wien, 1887, 79 p., Wien (1887)

TOVOTE, W. L.
1. Gold Road, die bedeutendste Goldgrube Arizonas: Oesterreichische Zeitschrift für Berg- und Hüttenwesen, v. 54, p. 549-550, Wien (1906)
2. Mohave County, Arizona: Uesterreichische Zeitschrift für Berg- und Hüttenwesen, v. 55, p. 9-10 (1907)
3. The Clifton-Morenci district of Arizona: Min. Sci. Press, v. 101, p. 770-773 (1910)
4. Bisbee, Arizona; a geological sketch: Min. Sci. Press, v. 102, p. 203-208 (1911)
5. Magmatic origin of ore-forming solutions: Min. Sci. Press, v. 104, p. 601-602 (1912)
6. Types of porphyry copper deposits: Min. Sci. Press, v. 104, p. 686-687 (1912)
7. Metallic minerals as precipitants of silver and gold (discussion): Econ. Geol., v. 8, p. 720 (1913)
8. The Globe mining district, Arizona: Min. Sci. Press, v. 108, no. 11, p. 442-449, 487-492 (1914)
9. Detrital copper deposits: Min. Sci. Press, v. 115, p. 281-282 (1917)
10. Notes on certain ore deposits of the Southwest [with discussion]: AIME Bull. 142, p. 1599-1612 (1918); Trans., v. 61, p. 42-59 (1920)
11. Cunningham Pass district, Arizona: Min. Sci. Press, v. 117, p. 19-20 (1918)
12. The copper industry of the Southwest: Min. Mag., v. 20, p. 267-275, 339-350 (1919)

TRAINER, J. N.
Eight recent garnet finds: Rocks and Minerals, v. 22, no. 9, p. 811-818, illus. (1947)

TREOLAR, Thomas
Chalcedony near Aguila, Arizona: Rocks and Minerals, v. 21, no. 3, p. 143 (1946)

TRIPPEL, Alex
Arizona (mine production by counties and districts, 1887): Rep. Director of Mint, 1887, p. 120-142 (1888)

TRISCHKA, Carl
1. Asbestos and the Arizona industry: Engr. Min. Jour., v. 124, p. 337-340 (1927)
2. The silica outcrops of the Warren mining district, Arizona: Engr. Min. Jour., v. 125, p. 1045-1050 (1928)
3. Diatomite in Arizona: Engr. Min. Jour., v. 127, p. 13-14 (1929)
4. (and Rove, O. N., and Barringer, D. M., Jr.) Boxwork siderite: Econ. Geol., v. 24, p. 677-686 (1929)

5. Bisbee ore bodies reviewed: Engr. Min. Jour., v. 131, p. 500-505 (1931)
6. Subsidence following extraction of ore from limestone replacement deposits, Warren mining district, Bisbee, Arizona: AIME Trans., v. 109, p. 173-180, map, illus. (1934)
7. Bisbee district: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 32-41, maps (1928)
8. The sixteen Southwest porphyry coppers now in period of greatest activity: Min. World, v. 15, no. 13, p. 43-47 (1953)

TRUESDELL, W. H.
Ray copper district, Arizona: Min. Sci. Press, v. 98, p. 794-797 (1909)

TSCHIRWINSKY, P.
Ueber die Psudometeor-Krater in Arizona und auf der Insel Oesel: Soc. russe mineralogie Mem., 2nd ser., v. 60, livr. 1, p. 135-144 (1931)

TUAN, Yi-Fu
1. Types of pediments in the San Pedro Valley region, Arizona: Assoc. Pacific Coast Geog. Yearbook, v. 16, p. 17-24, illus. (1954)
2. Pediments in southeastern Arizona: Univ. Calif. Pub. Geog., v. 13, 163 p. (1959)
3. Structure, climate and basin land forms in Arizona and New Mexico: Assoc. Am. Geog. Annals, v. 52, p. 51-68 (1962)

TUCK, Frank J.
1. Mining's part in Arizona's economy: Ariz. Dept. Miner. Res., 16 p. (1952)
2. (compiler) History of mining in Arizona: Ariz. Dept. Miner. Res., 40 p. (1955)
3. Stories of Arizona copper mines: Ariz. Dept. Miner. Res., 77 p. (1957)
4. Fifty years of mining in the State of Arizona, 1912-1962: Ariz. Dept. Miner. Res., 11 p., (1962)

TUCSON DAILY CITIZEN
1. Old Cerro Colorado mines resume old time activity: Ariz. Min. Jour., v. 14, no. 12, sec. 2, p. 5, 26-27 (1921)
2. Water problem and you: 15 part series carried in April (1963)

TURNBOW, D. R.
Permian and Pennsylvanian rocks of the Four Corners area: Four Corners Geol. Soc., Guidebook, p. 66-69 (1955)

TURNER, D. S.
1. Devonian system of the Black Mesa Basin: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 71-73 (1958)
2. Catalogue of stratigraphic names of the Black Mesa Basin and adjacent areas: N. Mex. Geol. Soc., Guidebook 9th Field Conf., p. 130-135 (1958)

TURNER, G. L.
The Deming axis, southeastern Arizona, New Mexico, and Trans-Pecos Texas: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 59-72, illus. (1962)

TURNER, S. F. (*see also* Bowen, E. R.; Halpenny, L. C., 8; Hazen, G. E.)
1. Ground-water investigations by the U.S. Geological Survey in cooperation with the State of Arizona: Ariz. State Water Commissioner, 11 Bienn. Rep., p. 66-71 (1941)
2. (and Halpenny, L. C.) Ground-water investigations in the upper Gila River valley, New Mexico and Arizona: Am. Geophys. Union Trans. 22nd Ann. Mtg., Pt. 3, p. 738-744 (1941)
3. (and Halpenny, L. C., McDonald, H. R., and Bratton, D. H.) Ground-water levels and pumpage in Arizona in 1939-1940 (Duncan and Virden Valleys, by Babcock, H. M.): Ariz. State Water Commission, 85 p. (1941)
4. (and others) Water resources of Safford and Duncan-Virden Valleys, Arizona and New Mexico (with analyses by Hem, J. D.): Ariz. State Water Commission, 58 p., maps (1941)

5. A review of the State's cooperation and need for further cooperation in ground-water observation and investigation: Assoc. Western State Engr. Proc. 14th Ann. Conf., p. 78-86 (1941)
6. (and others) Pumpage and ground-water levels in Arizona in 1940: USGS Water-Supply Paper 911, p. 7-103 (1941)
7. Pumpage and ground-water levels in Arizona in 1941: USGS Water-Supply Paper 941, p. 7-85 (1943)
8. (and others) Ground-water resources of the Santa Cruz Basin, Arizona: USGS Mimeo. Rep., 84 p., map (1943)
9. Report on cooperative ground-water investigations: Ariz. State Water Commission, 12th Bienn. Rep., 64-66 (1943)
10. (and others) Pumpage and ground-water levels in Arizona in 1942: USGS Water-Supply Paper 949, p. 7-59 (1944)
11. (and others) Pumpage and ground-water levels in Arizona in 1943: USGS Water-Supply Paper 991, p. 6-71 (1945)
12. (and others) Ground-water resources and problems of the Safford Basin, Arizona: USGS Mimeo. Rep., 28 p., map (1946)
13. (and McDonald, H. R., and Cushman, R. L.) Safe yield of the ground-water reservoirs in the drainage basins of the Gila and Salt Rivers, near Phoenix, Arizona: USGS Mimeo. Rep., 15 p. (1946)
14. Ground water in the Tucson quadrangle, Arizona: USGS Ground-Water Branch Open-file Rep., 15 p., maps (1946)
15. (and others) Pumpage and ground-water levels in Arizona in 1944: USGS Water-Supply Paper 1021, p. 5-66 (1947)
16. (and others) Further investigations of the ground-water resources of the Santa Cruz Basin, Arizona: USGS Mimeo. Rep., 45 p., map (1947)
17. (and Halpenny, L. C., and others) Pumpage and ground-water levels in Arizona in 1946 (by counties): USGS Mimeo. Rep. (1948)
18. (and others) Pumpage and ground-water levels in Arizona in 1945: USGS Water-Supply Paper 1028, p. 5-62 (1949)
19. (and others) Pumpage and ground-water levels in Arizona in 1946: USGS Water-Supply Paper 1076, p. 5-93 (1949)
20. (and Cushman, R. L.) Pumpage and ground-water levels in Arizona in 1947: USGS Water-Supply Paper 1101, p. 5-72 (1951)
21. (and others) Pumpage and ground-water levels in Arizona in 1948: USGS Water-Supply Paper 1131, p. 5-62 (1951)
22. (and Halpenny, L. C.) Ground-water in the Queen Creek area, Arizona: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 17-20, illus., map (1952); [abst.]: Geol. Soc. Am. Bull., v. 63, no. 12, pt. 2, p. 1347 (1952)
23. (and Skibitzke, H. E.) Use of water by phreatophytes in a 2,000-foot channel between Granite Reef and Gillespie Dams, Maricopa County, Arizona: Am. Geophys. Union Trans., v. 33, no. 1, p. 66-72 (1952)
24. (and others) Pumpage and ground-water levels in Arizona in 1949: USGS Water-Supply Paper 1161, p. 5-63 (1952)
25. (and Cushman, R. L.) Pumpage and ground-water levels in Arizona in 1950: USGS Water-Supply Paper 1170, p. 3-43 (1953)
26. (and Poland, J. F.) Letter regarding an investigation to determine the possibilities of an additional water supply for the Army Air Force Flexible Gunnery School near Kingman, Arizona: USGS Ground-Water Branch Open-file Rep., 10 p., map (1959)
27. Letter regarding a further investigation to determine the possibilities of an additional water supply for the Army Air Force Flexible Gunnery School near Kingman, Arizona: USGS Ground-Water Branch Open-file Rep., 5 p., maps (1959)

TWENHOFEL, W. S. (*see also* Butler, A. P., Jr., 2)
(and Buck, K. L.) Geology of uranium deposits in the United States: USGS Prof. Paper 300, p. 375-380 (1956)

TWENTER, F. R. (*see also* Stulik, R. S.)
1. Geology and promising areas for ground-water development in the Hualapai Indian Reservation, Arizona: USGS Ground-Water Branch Mimeo. Rep., 95 p. illus. (1959); Water-Supply Paper 1576-A, 38 p. (1962)
2. Miocene and Pliocene history of Central Arizona: USGS Prof. Paper 424-C, p. 153-156 (1961)
3. The significance of the volcanic rocks in the Fossil Creek area, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 107-109 (1962)
4. New fossil localities in the Verde formation, Verde Valley, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 109-115 (1962)
5. Rocks and water in Verde Valley, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 135-140 (1962)
6. (and Metzger, D. G.) Geology and ground water in Verde Valley — the Mogollon Rim region, Arizona: USGS Bull. 1177, 132 p. (1963)

TWETO, O. L. (*see* Lemmon, D. M.)

TYLER, P. M.
1. Public services for the identification of mineral specimens: USBM, IC 6597, 12 p. (1932)
2. (and Petar, A. V.) Arsenic: USBM Econ. Paper 17, 35 p. (1934)
3. Sodium sulphate: USBM, IC 6833, 39 p. (1935)

TYRELL, W. W., Jr.
Geology of the Whetstone Mountains area, Cochise and Pima Counties, Arizona: Yale Univ., PhD Thesis (1957)

ULRICH, E. O.
(and Bassler, R. S.) Cambrian bivalved Crustacea of the order Conchostraca: U.S. Natl. Mus. Proc., v. 78, Art. 4, 130 p. (1931)

UMBACH, P. H.
1. (and Barnes, F. C.) Developments in Arizona, western New Mexico, and northern New Mexico in 1951: AAPG Bull, v. 36, no. 6, p. 1266-1273, maps (1952)
2. (and Barnes, F. C.) Developments in Arizona, western New Mexico, and northern New Mexico in 1952: AAPG Bull., v. 37, no. 6, p. 1147-1156, maps (1953)
3. (and Barnes, F. C.) Developments in Arizona, western New Mexico, and northern New Mexico in 1953: AAPG Bull., v. 38, no. 6 (1954)

UNDERWOOD, J. R.
Geology of Carrizo Valley, southern Apache County, Arizona: Univ. Texas, MS Thesis (1956): [abst.]: Ariz. Geol. Soc. Dig., v. 3, p. 182-183 (1960)

UNITED STATES ATOMIC ENERGY COMMISSION
Geologic investigations of radioactive deposits; semi-annual progress report, Dec. 1, 1956 to May 31, 1957: TEI-690, 571 p., illus., maps (1957)

UNITED STATES BUREAU OF MINES
1. Analyses of Arizona, California, Idaho, and Oregon coals: Tech. Paper 696, 83 p. (1947)
2. Mineral facts and problems: Bull. 556 (Ariz., p. 230) (1956); Bull. 585, 1016 p. (1960)

UNITED STATES BUREAU OF MINES — UNITED STATES GEOLOGICAL SURVEY (cooperative project)
1. Antimony: Materials Survey MS-1, 289 p., illus. (1951)

2. Lead: Materials Survey MS-9, 587 p., illus. (1951)
3. Zinc: Materials Survey MS-12, 613 p. (1951)
4. Cobalt: Materials Survey MS-5, 221 p. (1952)
5. Copper: Materials Survey MS-6, 694 p., illus. (1952)
6. Manganese: Materials Survey, MS-10, 538 p. (1952)

UNITED STATES BUREAU OF RECLAMATION
1. Mineral resources and possible industrial development in the region surrounding Boulder Dam (Boulder Dam project, Arizona-Nevada-California): 44 p. (1934)
2. Geological investigations: Boulder Canyon Project, Final Rep., pt. 3, Bull. 1, 231 p., illus., maps (1950)
3. Davis Dam and power plant: (geology p. 9-28), illus., map (1955)

UNITED STATES COAST AND GEODETIC SURVEY
Magnetograms and hourly values, Tucson, Arizona, 1958: U.S. Coast and Geodetic Survey, Magnetic Observatory, Tucson, Arizona, MHV-Tu58, 144 p. (1961)

UNITED STATES GEOLOGICAL SURVEY
1. Analyses of samples from ground-water sources, Graham and Greenlee counties, Arizona: Ground-Water Branch Mimeo. Rep., 10 p. (1942)
2. Letter from acting director, U.S. Geological Survey, to administrator, Reconstruction Finance Corp., giving available data on groundwater in the vicinity of the San Manuel copper mine, Pinal County, Arizona: Ground-Water Branch Mimeo. Rep., 6 p. (1952)

UNITED STATES MINT
Annual reports of the Director, 1881-1938; Reports of the Director of the Mint upon the statistics of production of the precious metals in the United States, 1881-1938

UNIVERSITY OF ARIZONA
1. Arizona and its heritage: Univ. Ariz. Bull., v. 7, no. 3, 291 p. (1936)
2. Capturing additional water in the Tucson area: Univ. Ariz.-USGS Rillito Creek Hydrologic Research Comm. Rep., 59 p. (1959)
3. Arizona its people and resources: Univ. Ariz. Press, Tucson, Arizona, 385 p., illus., maps (1960)

UPHAM, W. E.
Specular hematite deposits, Planet, Arizona: Min. Sci. Press, v. 102, p. 521-523 (1911)

VACHER, Antoine
Les environs de Phoenix, Arizona, et le barrage Roosevelt: Ann. de Geog., ann. 22, p. 197-208, Paris (1913); Am. Geog. Soc. Memorial Volume, Transcontinental Excursion, 1912, p. 349-356 (1915)

VACHER, H. C. (*see* Davis, C. W.)

VACQUIER, V.
(and Steenland, N. C., Henderson, R. G., and Zietz, I.) Interpretation of aeromagnetic maps: Geol. Soc. Am. Mem. 47, 151 p., illus. (1951)

VALGEAN, A.
Review of mining and smelting operations for 1917: Ariz. Min. Jour., v. 1, no. 7, p. 5-7 (1918)

VAN CLEAVE, P. F.
Petrified Forest National Park, plant fossils: Ariz. Highways, v. 39, no. 4, p. 31-33 (1963)

VANDERBURG, W. O.
Tungsten: USBM, IC 6821, 31 p. (1935)

VANDER HOFF, V. L. (*see also* Camp, C. L., 5)
The Chinle formation: Mus. N. Ariz., Mus. Notes, v. 6, no. 7, p. 35-38 (1934)

VAN GUNDY, C. E.
1. Some observations of the Unkar group of the Grand Canyon Algonkian: Grand Canyon Nature Notes, v. 9, p. 338-349 (1934)
2. Nankoweap group of the Grand Canyon Algonkian [abst.]: Geol. Soc. Am. Proc. 1936, p. 304 (1937)
3. Jellyfish from Grand Canyon Algonkian: Science, new ser., v. 85, no. 2204, p. 314 (1937)
4. Faulting in the east part of Grand Canyon of Arizona: AAPG Bull., v. 30, no. 11, p. 1899-1909, maps (1946)
5. Nankoweap group of the Grand Canyon Algonkian of Arizona: Geol. Soc. Am. Bull., v. 62, no. 8, p. 953-959, illus., maps (1951)

VAN HISE, C. R.
1. Correlation papers; Archean and Algonkian: USGS Bull. 86, (Ariz., p. 326-332) (1892)
2. (and Leith, C. K.) Pre-Cambrian geology of North America: USGS Bull. 360 (Ariz., p. 45, 771-779) (1909)

VAN DE GRAAFF, F. R.
Upper Cretaceous stratigraphy of southwestern Utah: Intermountain Assoc. Pet. Geol., Guidebook 12th Field Conf., p. 60-64 (1963)

VAN HORN, W. L.
1. Late Cenozoic beds in the upper Safford Valley, Graham County, Arizona: Univ. Ariz., MS Thesis, 108 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 45 (1958)
2. Late Cenozoic alluvial deposits of the upper Safford Valley, Graham County, Arizona: Ariz. Geol. Soc. Dig., v. 5, p. 89-96 (1962)

VAN LOPIK, J. R.
(and Kolb, C. R.) Handbook, a technique for preparing desert terrain analogs: U.S. Army Corps Engr., Waterways Exp. Sta. Tech. Rep. 3-506 (1959)

VAN SICKLE, D. M. (*see* Hains, C. F.)

VASSAR, H. E. (*see* Larsen, E. S., 3rd; Palache, C., 4.)

VAUGHAN, R. H.
North Toh-Atin gas field, Apache County, Arizona: Intermountain Assoc. Pet. Geol., Guidebook 9th Field Conf., p. 280-281, illus. (1958)

VAUGHN, P. P.
1. A downslope trackway in the DeChelly sandstone, Permian of Monument Valley: Plateau, v. 36, no. 1, p. 25-28 (1963)
2. Vertebrates from the Organ Rock shale of the Cutler group, Permian of Monument Valley and vicinity, Utah and Arizona: Jour. Paleo., v. 38, no. 3, p. 567-583 (1964)

VAUX, G. (*see* Overholt, J. L.)

VEATCH, A. C.
Coal deposits near Pinedale, Navajo County, Arizona: USGS Bull. 431, p. 239-242, map (1911)

VELASCO, J. R. (*see* Mulchay, R. B.)

VENABLE, B. W.
Mining at the Palo Verde mine: Min. Cong. Jour., v. 49, no. 1, p. 14-18 (1963)

VERITY, Victor H.
Laws and regulations governing mineral rights in Arizona, 4th ed., revised: Ariz. Dept. Miner. Res. (1957); 5th ed., revised: 80 p. (1959); appendix added (1962)

VER WIEBE, W. A.
1. Present distribution and thickness of Paleozoic systems: Geol. Soc. Am. Bull., v. 43, no. 2, p. 495-540, illus. (1932); [absts.]: Geol. Soc. Am. Bull., v. 43, no. 1, p. 138-139 (1932); Pan-Am. Geol., v. 57, no. 1, p. 67 (1932)
2. Present distribution and thickness of Mesozoic systems: Geol. Soc. Am. Bull., v. 44, no. 4, p. 827-864 (1933); [abst.] Geol. Soc. Am. Bull., v. 44, no. 1, p. 106 (1933)

VETTER, C. P. (*see also* Smith, W. O.)
Sediment problems in Lake Mead and downstream on the Colorado River: Am. Geophys. Union Trans., v. 34, no. 2, p. 249-256, illus. (1953)

VINCENT, J. D. (*see* Weiss, N. L.)

VINE, J. D.
Uranium-bearing coal in the United States: USGS Prof. Paper 300, p. 405-411 (1956)

VISHER, S. S.
The history of the bajadas of the Tucson bolson of Arizona [abst.]: Science, new ser., v. 37, p. 459 (1913)

VLISIDIS, A. C. (*see* Hutton, C. O., 4; Schaller, W. T., 4)

VOELGER, Klaus
Cenozoic deposits in the southern foothills of the Santa Catalina Mountains near Tucson, Arizona: Univ. Ariz., MS Thesis, 101 p. (1953)

VOKES, H. E.
The story of a tree (Petrified Forest): Nat. Hist., v. 49, no. 2, p. 104-107, maps (1942)

VON BERNEWITZ, M. W.
Occurrence and treatment of mercury ore at small mines: USBM, IC 6966, 40 p. (1937)

WAGNER, O. E., Jr.
The paleontology and stratigraphy of the Kaibab limestone, an abstract of a thesis: Univ. Ill., Urbana, Ill., 9 p. (1932)

WAIBEL, Leo
Die Inselberglandschaft von Arizona und Sonora: Gesellschaft für Erdkunde zu Berlin, Zeitsch., Sonderband zur Hundertjahrferer, p. 68-91 (1928)

WALCOTT, C. D.
1. The Permian and other Paleozoic groups of the Kanab Valley, Arizona: Am. Jour. Sci., 3rd ser., v. 20, p. 221-225 (1880)
2. Pre-Carboniferous strata in Grand Canyon of the Colorado, Arizona: Am. Jour. Sci., 3rd ser., v. 26, p. 437-442, 484 (1883)
3. Deer Creek coal field, White Mountains Indian Reservation, Arizona: U.S. 48th Cong., 2nd sess., Sen. Ex. Doc. 20, p. 2-7 (1885); [abst.]: Am. Jour. Sci., 3rd ser., v. 29, p. 338-339 (1885)
4. On the Cambrian faunas of North America: USGS Bull. 10, p. 283-354 (1885); Bull. 30, 369 p. (1886)
5. Classification of the Cambrian system of North America: Am. Jour., Sci., 3rd ser., v. 32, p. 138-157 (1886); [abst.]: Am. Nat., v. 20, p. 800-802 (1886)
6. The fauna of the Lower Cambrian or Olenellus zone: USGS 10th Ann. Rep., pt. 1, p. 509-760 (1890); [absts.]: Am. Jour. Sci., 3rd ser., v. 42, p. 345-346; Am. Geol., v. 8, p. 82-86 (1891)
7. Study of line of displacement in the Grand Canyon of the Colorado in northern Arizona: Geol. Soc. Am. Bull., v. 1, p. 49-64 (1890)
8. Correlation papers; Cambrian: USGS Bull. 81, 447 p., maps (1891)
9. La succession stratigraphique des faunes Cambriennes dans l'Amerique du Nord: 4th Int. Geol. Cong., Compte Rendu, p. 223-225 (1891)

10. Pre-Cambrian igneous rocks of the Unkar terrane, Grand Canyon of the Colorado, Arizona: USGS 14th Ann. Rep., pt. 2, p. 497-519, map (1894)
11. Algonkian rocks of the Grand Canyon of the Colorado: Jour. Geol., v. 3, p. 312-330, maps (1895)
12. The Cambrian and its problems in the Cordilleran region: *in* Problems of American geology; p. 162-233 New Haven (1915)

WALKER, A. L.
Recollections of early day mining in Arizona: Arizona Historical Review, v. 6, no. 2, p. 14-43 (1935)

WALKER, G. W. (*see also* Finch, W. I., 2)
1. (and Osterwald, F. W.) Introduction to the geology of uranium-bearing veins in the conterminous United States: USGS Prof. Paper 455-A, p. 1-28 (1963)
2. Age of uranium-bearing veins in the conterminous United States: USGS Prof. Paper 455-B, p. 29-35 (1963)
3. Host rocks and their alterations as related to uranium-bearing veins in the conterminous United States: USGS Prof. Paper 455-C, p. 37-53 (1963)
4. (and Adams, J. W.) Mineralogy, internal structure and textural characteristics and paragenesis of uranium-bearing veins in the conterminous United States: USGS Prof. Paper 455-D, p. 55-90 (1963)
5. Supergene alteration of uranium-bearing veins in the conterminous United States: USGS Prof. Paper 455-E, p. 91-120 (1963)

WALKER, L. W.
The geodes of Kofa: Nature Mag., v. 50, no. 5, p. 266-267, illus. (1957)

WALKER, M. V.
Evidence of Triassic insects in the Petrified Forest National Monument Arizona: U.S. Natl. Mus. Proc., v. 85, Pub. 3033, p. 138-141 (1938)

WALLACE, J. H.
(and Smith, H. B.) Bibliography of U.S. Geological Survey trace elements and related reports to June 1, 1954: USGS Bull. 1019-B, 78 p. (1955)

WALLACE, Robert M.
1. Stratigraphy and structure of a part of the Canada del Oro district, Santa Catalina Mountains, Pinal County, Arizona: Univ. Ariz., MS Thesis, 55 p., maps (1951)
2. Structure of the northern end of the Santa Catalina Mountains, Arizona: Univ. Ariz., PhD Thesis, 45 p., map (1955)

WALLER, Harold E., Jr.
The geology of the Paymaster and Olivette mining areas, Pima County, Arizona: Univ. Ariz., MS Thesis, 48 p. (1960)

WALTON, M. S., Jr.
Geology of the Painted Desert and Petrified Forest: Ariz. Highways, v. 34, no. 7, p. 6-13, illus. (1958)

WANEK, A. A. (*see also* Read, C. B., 3, 5, 6)
(and Stephens, J. G.) Reconnaissance geologic map of the Kaibito and Moenkopi Plateaus and parts of the Painted Desert, Coconino County, Arizona: USGS Map OM-145, 2 sheets with sections and text (1953)

WANLESS, H. R.
1. Evidence of eustatic shifts in sea level in the Pennsylvanian of the southwestern United States: Tulsa Geol. Soc. Dig., v. 20, p. 65-69 (1952)
2. Pennsylvanian rocks of Arizona and bordering areas [abst.]: Geol. Soc. Am. Bull., v. 66, no. 12, p. 1631 (1955)

WANTLAND, Dart
1. Geophysical investigations for United States Atomic Energy Commission in the Colorado Plateau area: U.S. Bur. Reclamation Geol. Rep. G-119, 151 p. (1952)

2. Field tests for the United States Atomic Energy Commission on the use of seismic geophysical method for tracing "buried channels" in the Monument Valley area, Arizona: U.S. Bur. Reclamation Geol. Rep. G-123, 26 p. (1952)
3. Examples of geophysical exploration for uranium, Colorado Plateau area: Mines Mag., v. 44, no. 8, p. 18-24, illus. (1954), no. 9, p. 26-33, illus. (1954); summary with title, How seismic refraction locates uranium: Oil and Gas Jour., v. 53, no. 48, p. 149-150, 153, 155-156, illus. (1955)

WARD, L. F.
1. Some analogies in the Lower Cretaceous of Europe and America: USGS 16th Ann. Rep., pt. 1, p. 463-542 (1896)
2. The petrified forests of Arizona: U.S. Dept. Int., 23 p., Washington (1900); Smithsonian Inst. Ann. Rep. 1899, p. 289-307 (1901); Glimpses of the Cosmos, v. 6, p. 76-98 (1918)
3. The fossil forests of Arizona [absts.]: Science, new ser., v. 11, p. 30-31 (1900); Glimpses of the Cosmos, v. 6, p. 71-72 (1918)
4. The older Mesozoic: USGS 20th Ann. Rep., pt. 2, p. 222-429 (1900)
5. Geology of the Little Colorado Valley: Am. Jour. Sci., 4th ser., v. 12, p. 401-413 (1901)
6. Status of the Mesozoic floras of the United States (second paper): USGS Mon., v. 48, pt. 1, 616 p.; pt. 2, 119 pls. (1905)

WARD, R. A.
Desert Pavement (Kofa Mountains): Compass, v. 38, no. 1, p. 3-8 (1961)

WARD, T. W.
Fossil egg filled with colemanite: Mineralogist, v. 3, no. 6, p. 12-13 (1935)

WARDWELL, Henry R.
Geology of the Potts Canyon mining area near Superior, Arizona: Univ. Ariz., MS Thesis, 104 p., maps (1941)

WARGO, J. G.
1. Geology of a portion of the Coyote-Quinlan complex, Pima County, Arizona: Univ. Ariz., MS Thesis, 67 p. (1954)
2. Drainage patterns in the Alambre Valley, Arizona: Ohio Jour. Sci., v. 55, no. 5, p. 263-266, illus., map (1955)
3. (and Kurtz, W. L.) Geologic and tectonic features of the Coyote Mountains, Arizona: Ohio Jour. Sci., v. 56, no. 1, p. 10-16, illus., map (1956)
4. Volcanic stratigraphy of southwestern New Mexico and southeastern Arizona: N. Mex. Geol. Soc., Guidebook 10th Field Conf., p. 158 (1959)

WARING, G. A. (*see* Bryan, K., 19; Stearns, N. D.)

WARNER, L. A.
(and Holser, W. T., Wilmarth, V. R., and Cameron, E. N.) Occurrence of non-pegmatitic beryllium in the United States: USGS Prof. Paper 318, 198 p. (1959)

WARREN, C. H.
Mineralogical notes; native arsenic from Arizona: Am. Jour. Sci. 4th ser., v. 16, p. 337-344 (1903)

WARREN, H. V.
1. (and Loofbourow, R. W.) The occurrence and distribution of the precious metals in the Montana and Idaho mines, Ruby, Arizona: Econ. Geol., v. 27, p. 578-585 (1932)
2. (and Delavault, R. E., and Irish, R. I.) Further biogeochemical data from the San Manuel copper deposit, Pinal County, Arizona: Geol. Soc. Am. Bull., v. 62, p. 919-929 (1951); [abst.]: Geol. Soc. Am. Bull., v. 62, p. 1520 (1951)

WARTMAN, F. S.
(and Thompson, A. J.) The use and limitation of the spectrograph in examining prospector's samples: Univ. Ariz., Ariz. Bur. Mines Circ. 8, 5 p. (1941)

WASHINGTON, H. S.
Chemical analyses of igneous rocks published from 1884 to 1913 inclusive, with a critical discussion of the character and use of analyses: USGS Prof. Paper 99, 1201 p. (1917)

WATKINS, R. A.
1. Review of mining conditions in the State: Ariz. Min. Jour., v. 3, no. 1, p. 57-61 (1919)
2. Operations in Richmond Basin, Gila County: Ariz. Min. Jour., v. 3, no. 6, p. 15 (1919)
3. The Van Dyke Copper Company: Ariz. Min. Jour., v. 3, no. 6, p. 34 (1919)
4. Old Dominion — the pioneer: Ariz. Min. Jour., v. 3, no. 6, p. 36-37 (1919)
5. Arizona Commercial Copper Company: Ariz. Min. Jour., v. 3, no. 6, p. 41 (1919)
6. Iron Cap Copper Company: Ariz. Min. Jour., v. 3, no. 6, p. 42 (1919)
7. Porphyry Consolidated Copper Company: Ariz. Min. Jour., v. 3, no. 6, p. 43 (1919)
8. Arizona-Globe Copper Company: Ariz. Min. Jour., v. 3, no. 6, p. 44-45, maps (1919)
9. Gibson Consolidated Copper Company: Ariz. Min. Jour., v. 3, no. 6, p. 46 (1919)
10. Dripping Springs Copper Company of Arizona: Ariz. Min. Jour., v. 3, no. 6, p. 47-48 (1919)

WATSON, B. N.
Structure and petrology of the eastern portion of the Silver Bell Mountains, Pima County, Arizona: Univ. Ariz., PhD Thesis, 168 p. (1964)

WATSON, Fletcher, Jr.
Meteor Crater: Pop. Astron., v. 44, no. 1, p. 2-17 (1936)

WATSON, H. B.
1. Mineral district of Wickenburg: Ariz. Min. Jour., v. 2, no. 7, p. 6-8 (1918)
2. Rich Hill observations: Ariz. Min. Jour., v. 2, no. 7, p. 8-10 (1918)

WATSON, K. D.
Eclogite inclusions in serpentine pipes at Garnet Ridge, northeastern Arizona [abst.]: Geol. Soc. Am. Bull., v. 71, no. 12, p. 2082-2083 (1960)

WATT, Roberta
History of Morenci, Arizona: Univ. Ariz., MA Thesis, 157 p. (1956)

WEATHERILL, G. W. (*see* Aldrich, L. T., 1, 2; Tilton, G. R.)

WEATHERS, G.
Uranium occurrence at the King No. 1 claim, Gila County, Arizona: USAEC, RME-2016, pt. 1 (1954)

WEBB, B. P.
(and Coryell, K. C.) Preliminary regional mapping in the Ruby quadrangle, Arizona: USAEC, RME-2009 (1954)

WEBB, R. W. (*see* Brady, L. F., 18, 19)

WEBBER, Benjamin N. (*see also* Lasky, S. G., 1, 2, 3)
1. The Upper Carboniferous stratigraphy of the Galiuro Mountains: Univ. Ariz., MS Thesis, 32 p., maps (1925)
2. Marcasite in the contact metamorphic ore deposits of the Twin Buttes district. Pima County, Arizona: Econ. Geol., v. 24, p. 304-310 (1929)
3. Mineral resources survey of Arizona with reference to electrical power demand: Ariz. Colorado River Commission Rep., p. 31-42 (1933)
4. Mining in Arizona with cheap and abundant power: Min. Jour., v. 17, no. 19, p. 3-4 (1934)
5. Bajada placers of the arid Southwest [with discussion]: AIME Trans., v. 115, p. 378-392 (1935)

WEBER, Robert H.
The geology of the east-central portion of the Huachuca Mountains, Arizona: Univ. Ariz., PhD Thesis, 191 p., maps (1950); [abst.]: Geol. Soc. Am. Bull., v. 59, no. 12, pt. 2, p. 1384-1385 (1948)

WEBSTER, R. N. (*see also* Hammer, D. F., 2)
Exploration extends Magma's future: Min. Engr., v. 10, no. 10, p. 1062-1065, illus. (1958)

WEED, W. H. (*see also* Austin, W. L.)
1. The copper production of the United States: USGS Bull. 260, p. 211-216 (1905)
2. The copper mines of the United States in 1905: USGS Bull. 285, p. 93-124 (1906)
3. Copper mines of the world: Hill Pub. Co., N.Y., 375 p. (1907)
4. The Kingman mining district of Arizona: Min. World, v. 32, p. 1113-1114 (1910)
5. The Ray copper mining district, Arizona: Min. World, v. 34, p. 53-56 (1911)
6. Notes on the Miami copper district, Arizona: Min. World, v. 36, p. 1043-1044 (1912)
7. Is geology a success as a guide to ore deposits: Min. World, v. 36, p. 1138; v. 37, p. 245-246 (1912)
8. "Chimney" or "pipe" deposits in the porphyries: Min. Engr. World, v. 38, p. 375-378 (1913)
9. (Editor) The copper handbook; a manual of the copper mining industry of the world, 1913-1914: v. 11, 1413 p. (1914)
10. (Editor) The mines handbook: v. 12-16 (1916-25)
11. Kay Copper no longer a prospect: Ariz. Min. Jour., v. 9, no. 6, p. 7-8, 39-40 (1925)

WEEKS, A. D. (*see also* Botinelly, T., 1, 2)
1. (and Thompson, M. E.) Identification and occurrence of uranium and vanadium minerals on the Colorado Plateau: USGS Bull. 1009-B, 50 p. (1954)
2. (and Thompson, M. E., and Sherwood, A. M.) Navajoite, a new vanadium oxide from Arizona: Science, v. 119, no. 3088, p. 326 (1954); Am. Mineral., v. 40, no. 3-4, p. 207-212, tables (1955)
3. Mineralogy and oxidation of Colorado Plateau uranium ores: USGS Prof. Paper 300, p. 187-194 (1956)

WEIDNER, M. I.
The geology of the Beacon Hill-Colossal Cave area, Pima County, Arizona: Univ. Ariz., MS Thesis, 34 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 46 (1958)

WEIGHT, H. O.
1. Geodes and the palms in the Kofa country: Desert Mag., v. 12, no. 6, p. 17-22, illus. (1949)
2. Magic rocks of the Saucedas: Desert Mag., v. 12, no. 7, p. 14-19, illus. (1949)
3. Lost mines of old Arizona: Calico Press, Twenty-nine Palms, California, 76 p. (1959)

WEIR, Doris B.
Geologic guides to prospecting for carnotite deposits on Colorado Plateau: USGS Bull. 988-B, 27 p., map (1952)

WEIR, G. W. (*see* McKee, E. D., 47)

WEISSENBORN, H. F. (*see* Avery, R. B.)

WEITZ, J. H.
High-grade dolomite deposits in the United States: USBM, IC 7226, (Ariz., p. 74-75) 86 p. (1942)

WELLES, S. P. (*see also* Camp, C. L., 7, 8, 9)
1. Vertebrates from the upper Moenkopi formation of northern Arizona: Univ. Calif., Dept. Geol. Sci. Bull., v. 27, no. 7, p. 241-294, illus. (1947) [abst.]: Geol. Soc. Am. Bull, v. 57, no. 12, pt. 2, p. 1262 (1946)
2. How do you know where to look for them?: Plateau, v. 20, no. 3, p. 41-50, illus. (1948)
3. New Jurassic dinosaur from the Kayenta formation of Arizona: Geol. Soc. Am. Bull., v. 65, no. 6, p. 591-598, illus. (1954)
4. Age of the Keyenta [Kayenta] formation [abst.]: Geol. Soc. Am. Bull., v. 65, no. 12, p. 1332 (1954)
5. New name for a brachyopid labyrinthodont: Jour. Paleo., v. 31, no. 5, p. 982 (1957)

WELLS, H. L.
(and Penfield, S. L.) Gerhardite and artificial basic cupric nitrates: Am. Jour. Sci., 3rd ser., v. 30, p. 50-57 (1885); Yale Bicent. Pub., Contrib. Mineral., p. 134-137 (1901)

WELLS, J. D. (*see also* Petersen, R. G., 6)
1. Preliminary geologic map of the House Rock Spring NE quadrangle, Coconino County, Arizona: USGS Map MF-188, with section and text (1958)
2. Preliminary geologic map of the House Rock Spring SE quadrangle, Arizona: USGS Map MF-189 (1959)
3. Stratigraphy and structure of the House Rock Valley area, Coconino County, Arizona: USGS Bull. 1081-D, 40 p. (1960)

WELLS, R. C.
1. A new occurrence of cuprodescloizite: Am. Jour. Sci., 4th ser., v. 36, p. 636-638 (1913)
2. Sodium sulphate; its sources and uses: USGS Bull. 717, p. 18-19 (1923)
3. Analyses of rocks and minerals from the laboratory of the United States Geological Survey, 1914-1936: USGS Bull. 878, 134 p. (1937)

WELLS, R. L. (*see also* Mead, W. E.)
(and Rambosek, A. J.) Uranium occurrences in Wilson Creek area, Gila County, Arizona: USAEC, RME-2005, 17 p. (1953)

WENDT, A. F.
The copper ores of the Southwest: AIME Trans., v. 15, p. 25-77, map (1887); Engr. Min. Jour., v. 43, p. 94-96, 112-114, 133-134, 150-152, 183-185 (1887)

WENGERD, S. A.
1. (and Matheny, M. L.) Pennsylvanian system of the Four Corners region: AAPG Bull., v. 42, no. 9, p. 2048-2106 (1958)
2. Pennsylvanian oil possibilities of San Juan Basin, Four Corners region: AAPG Bull., v. 43, no. 9, p. 2214-2227, illus. (1959)
3. Regional structural-stratigraphic cross section, east-central Arizona to west-central New Mexico: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 58 (1962)

WENZEL, L. K. (*see* Meinzer, O. E., 5)

WERTZ, Jacques B.
Mechanism of erosion and deposition along channelways: Univ. Ariz., PhD Thesis, 500 p. (1962); Ariz. Acad. Sci. Jour., v. 2, no. 4, p. 146-163 (1963)

WETMORE, Alexander
1. Fossil birds from southeastern Arizona: U.S. Natl. Mus. Proc., v. 64, Art. 5, p. 1-18 (1924)
2. Remains of a swan from the Miocene of Arizona: Condor, v. 45, no. 3, p. 120 (1943)
3. A fossil rail from the Pliocene of Arizona: Condor, v. 59, no. 4, p. 267-268, illus. (1957)

WHEAT, J. B.
Prehistoric water sources of the Point of Pines area, Arizona: Am. Antiquity, v. 17, p. 185-196, illus. (1952)

WHEELER, G. M.
1. Preliminary report of explorations in Nevada and Arizona: U.S. 42nd Cong., 2nd sess., Sen. Ex. Doc. 65, 94 p., map (1872)
2. Preliminary report concerning explorations and surveys principally in Nevada and Arizona, 1871: 96 p., map, Washington (1872)
3. Report of explorations and surveys in Nevada, Utah, and Arizona: U.S. War Dept. Chief Engr. Ann. Rep. 1872 (U.S., 42nd Cong., 3rd sess., H. Ex. Doc. 1, pt. 2, v. 2), App DD. p. 1124-1176 (1872)
4. Annual report upon the geographical and geological surveys and explorations west of the 100th meridian: 11 p., map, Washington (1873); U.S. War Dept., Chief Engr. Ann. Rep. 1873 (U.S. 43rd Cong., 1st sess., H. Ex. Doc. 1, pt. 2, v. 2), App. EE, p. 1211-1218 (1873)
5. Progress report upon geographical and geological explorations and surveys west of the 100th meridian in 1872: 56 p., Washington (1874)
6. Geographical and geological explorations and surveys west of the 100th meridian: Am. Jour. Sci., 3rd ser., v. 7, p. 388-391 (1874)
7. Geological atlas projected to illustrate geographical explorations and surveys west of the 100th meridian: Washington (1876)
8. Itinerary of Colorado Grand Canyon and River trip of 1871: U.S. Geog. Survey W. 100th Meridian, Final Report, p. 147-171, map, illus. (1889)

WHEELER, H. E. (*see also* Schenk, E. T., 3)
1. Lower and Middle Cambrian correlations in Nevada and Arizona [abst.]: Geol. Soc. Am. Bull., v. 52, p. 1959-1960 (1941)
2. (and Beesley, E. M.) Critique of the time-stratigraphic concept: Geol. Soc. Am. Bull., v. 59, p. 75-86 (1948); [abst.]: Geol. Soc. Am. Bull., v. 58, no. 12, pt. 2, p. 1258 (1947)

WHEELER, R. B.
(and Kerr, A. R.) Preliminary report on the Tonto group of the Grand Canyon, Arizona: Grand Canyon Nat. Hist. Assoc. Bull. 5, p. 1-16, maps (1936)

WHERRY, E. T.
Notes on wolframite, beraunite, and axinite: U.S. Natl. Mus. Proc., v. 47, p. 501-511 (1914)

WHITACRE, H. E.
The geology of the Madera-Agua Caliente Canyons area, southern Arizona: Univ. Ariz., MS Thesis, 41 p. (1964)

WHITCOMB, H. A. (*see also* Brown, S. C., 4)
1. Geology of the Morgan mine area, Twin Buttes, Arizona: Univ. Ariz., MS Thesis, 82 p., maps (1948)
2. (and Halpenny, L. C., and Hem, J. D.) Water-supply investigation of the Buell Park-Sawmill area, Navajo Indian Reservation, Apache County, Arizona: USGS Ground-Water Branch Open-file Rep., 20 p. (1950)

WHITE, Charles A. (*see also* Hayden, F. V.)
1. Preliminary report upon invertebrate fossils collected by expeditions of 1871, 1872, and 1873, with descriptions of new species: U.S. Geog. Geol. Surveys W. of 100th Mer. (Wheeler), 27 p., Washington (1874)
2. Report upon the invertebrate fossils collected in portions of New Mexico and Arizona by parties of the expeditions of 1871, 1872, 1873, and 1874: U.S. Geog. Geol. Surveys W. of the 100th Mer. (Wheeler), v. 4, pt. 1, 219 p. (1877)
3. Remarks upon certain Carboniferous fossils from Colorado, Arizona, Idaho, Utah, and Wyoming, and certain Cretaceous corals from Colorado, together with descriptions of new forms: U.S. Geog. Geol. Survey of the Territories (Hayden) Bull., v. 5, p. 209-221 (1879)

WHITE, Charles D.
1. The flora of the Hermit shale in the Grand Canyon, Arizona: Natl. Acad. Sci. Proc., v. 13, p. 574-575 (1927)
2. Study of the fossil floras in the Grand Canyon, Arizona: Carnegie Inst. Wash. Yearbook 26, p. 366-369 (1927); Yearbook 27, p. 389-390 (1928)
3. Algal deposits of Unkar Proterozoic age in the Grand Canyon, Arizona: Natl. Acad. Sci. Proc., v. 14, p. 597-600 (1928)
4. Study of the fossil floras in the Grand Canyon, Arizona: Carnegie Inst. Wash. Yearbook 28, p. 392-393 (1929); Yearbook 29, p. 400-403 (1930); Yearbook 30, p. 451 (1931)
5. Interpreting the Grand Canyon: Science, new ser., v. 69, p. 671-672 (1929)
6. Flora of the Hermit shale, Grand Canyon, Arizona: Carnegie Inst. Wash. Pub. 405, 221 p. (1929)
7. Deposition and age of the Hermit shale [abst.]: Pan-Am. Geol., v. 53, p. 72-73 (1930); Geol. Soc. Am. Bull., v. 41, p. 47 (1930)
8. The seeds of *Supaia,* a Permian pteridosperm [abst.]: Science, new ser., v. 29, p. 462 (1934)

WHITE, Charles H.
Cuneiform fragments diagnostic of fault breccia: Econ. Geol., v. 35, p. 92-97 (1940)

WHITE, D. E.
Antimony in the United States: USGS Map MR-20 (1962)

WHITE, J. F.
Granite xenoliths in diabase and associated high and low temperature feldspars [abst.]: Geol. Soc. Am. Bull., v. 66, no. 12, pt. 2, p. 1669 (1955)

WHITE, Natalie D. (*see also* Dennis, P. E.; Feth, J. H., 11; Johnson, P. W., 5, 6)
1. Analysis and evaluation of available hydrologic data for the San Simon basin, Cochise and Graham Counties, Arizona: USGS Ground-Water Branch Open-file Rep., 63 p., illus. (1961); Water-Supply Paper 1619-DD, 33 p. (1963)
2. Ground-water conditions in the Rainbow Valley and Waterman Wash areas, Maricopa and Pinal Counties, Arizona: USGS Open-file Rep., 113 p. (1961); Water-Supply Paper 1669-F, p. 1-50, maps (1963)
3. (and Stulik, R. S., and Morse, E. K.) Annual report on ground water in Arizona — Spring 1960 to Spring 1961: Ariz. State Land Dept. Water Res. Rep. 10 (1962)
4. (and Stulik, R. S., and Morse, E. K.) Annual report on ground water in Arizona — Spring 1961 to Spring 1962: Ariz. State Land Dept. Water Res. Rep. 11 (1962)

WHITFIELD, E.
Analysis of coal from Deer Creek Valley, Arizona: USGS Bull. 27, p. 74 (1886)

WHITFIELD, J. E. (*see* Diller, J. S., 1, 2)

WHITMAN, A. R.
Reconnaissance on Eparchaean plain in Arizona [absts.]: Pan-Am. Geol., v. 63, p. 309-310 (1935); Geol. Soc. Am. Proc. 1935, p. 332-333 (1936)

WHITNEY, J. D.
1. The metallic wealth of the United States: Philadelphia, 510 p. (1854)
2. On meteoric iron from Arizona: Calif. Acad. Sci. Proc., v. 3, p. 48-50 (1863)

WHITNEY, Richard L.
Stratigraphy and structure of the northeastern part of the Tucson Mountains: Univ. Ariz., MS Thesis, 61 p. (1957); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 46-47 (1958)

WICKES, L. W.
Molybdenum in the Hualpai Mountains: Min. Sci. Press, v. 114, p. 699-700 (1917)

WIDEMAN, F. L.
A reconnaissance of sulfur resources in Wyoming, Colorado, Utah, New Mexico, and Arizona: USBM, IC 7770, 61 p., illus., map (1957)

WIESE, J. H. (*see also* McKelvey, V. E., 1)
Study of the Abrigo limestone, Arizona [abst.]: Geol. Soc. Am. Bull., v. 51, p. 1964 (1940)

WIIK, H. B. (*see* Mason, B.)

WILDERMUTH, R. (*see* Poulson, E. N., 2)

WILLDEN, C. R.
1. Sedimentary iron-formation in the Devonian Martin formation, Christmas quadrangle, Arizona: USGS Prof. Paper 400-B, p. 21-23 (1960)
2. Composition of the iron-formation of Devonian Age in the Christmas quadrangle, Arizona: USGS Prof. Paper 424-D, p. 304-306 (1961)

WILLIAMS, F.
Fusulinid fauna of the Naco limestone near Bisbee, Arizona: Univ. Ill., Thesis (1941)

WILLIAMS, Floyd J.
Structural control of uranium deposits, Sierra Ancha region, Gila County, Arizona: USAEC, RME-3152, 117 p. (1957)

WILLIAMS, Frank E.
The petrified forests of Arizona: Jour. Geog., v. 11, p. 329-332 (1913)

WILLIAMS, G. A. (*see also* Poole, F. G., 1; Stewart, J. H., 2)
The coal deposits and Cretaceous stratigraphy of the western part of Black Mesa, Arizona: Univ. Ariz., PhD Thesis, 307 p., maps (1951); [abst.]: Geol. Soc. Am. Bull., v. 62, p. 1514-1515 (1951)

WILLIAMS, Henry S.
1. Correlation papers; Devonian and Carboniferous: USGS Bull. 80, 279 p. (1891)
2. Note on the Devonian fossils (of the Bisbee quadrangle): USGS Prof. Paper 21, p. 35-42 (1904)

WILLIAMS, Howel
1. Denuded volcanoes of Navajo-Hopi country [absts.]: Pan-Am. Geol., v. 64, p. 67-68 (1935); Geol. Soc. Am. Proc. 1935, p. 344 (1936)
2. Pliocene volcanoes of the Navajo-Hopi country: Geol. Soc. Am. Bull., v. 47, p. 111-172, maps (1936)

WILLIAMS, J. S. (*see* Baker, A. A., 6; Gilluly, J., 7, 8)

WILLIAMS, K. (*see* Hendricks, E. L., 1)

WILLIAMS, Sidney A. (*see also* Bideaux, R. A., 2; Thomssen, R. W., 2)
1. Chrome diopside from Buell Park, Arizona: Mineral Explorer, Jan.-Mar. (1959)
2. A new occurrence of allanite in the Quijotoa Mountains, Pima County, Arizona: Ariz. Geol. Soc. Dig., v. 3, p. 47-51 (1960)
3. The mineralogy of the Mildren and Steppe mining districts, Pima County, Arizona: Univ. Ariz., PhD Thesis, 95 p. (1962)
4. Gerhardtite from the Daisy shaft, Mineral Hill mine, Pima County, Arizona: Ariz. Geol. Soc. Dig., v. 4, p. 123-125 (1961)
5. Oxidation of sulfide ores in the Mildren and Steppe mining districts, Pima County, Arizona: Econ. Geol., v. 58, no. 7, p. 1117-1125 (1963)

WILLIS, Bailey
1. Index to the stratigraphy of North America: USGS Prof. Paper 71, 894 p., accompanied by a geologic map of North America compiled by the United States Geological Survey in co-operation with the Geological Survey of Canada and the Instituto Geologico de Mexico, under the supervision of Bailey Willis and G. W. Stose (1912)

2. Geology of the Colorado River Basin with reference to engineering problems: Science, new ser., v. 56, p. 177-182 (1922)
3. Normal fault structures and others: AAPG Bull., v. 30, no. 11, p. 1875-1887 (1946)

WILLIS, C. F.
1. Directory of Arizona minerals: Univ. Ariz., Ariz. Bur. Mines Bull. 3, 16 p. (1915)
2. Arizona (mineral resources, etc.): Univ. Ariz., Ariz. Bur. Mines Bull. 6, 16 p. (1916)
3. Mineralogy of useful minerals in Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 41, 70 p. (1916)
4. Tungsten mining in Arizona: Min. Sci. Press, v. 112, p. 824-825 (1916)
5. Ore strike at Dripping Springs: Ariz. Min. Jour., v. 3, no. 10, p. 20-21 (1920)
6. Kay Copper Company: Ariz. Min. Jour., v. 3, no. 11, p. 16-17 (1920)
7. The Ranier mines: Ariz. Min. Jour., v. 3, no. 11, p. 19 (1920)
8. Mining around Winkelman: Ariz. Min. Jour., v. 3, no. 11, p. 26-33 (1920)
9. Prince of Arizona: Ariz. Min. Jour., v. 3, no. 11, p. 38-39 (1920)
10. Pioneer Payson: Ariz. Min. Jour., v. 3, no. 12, p. 15-18, 55-60 (1920)
11. The Bishop Knoll Mining Company: Ariz. Min. Jour., v. 3, no. 12, p. 19, 60 (1920)
12. Gray Metals Company: Ariz. Min. Jour., v. 3, no. 12, p. 21 (1920)
13. What is the matter with the Chloride mining district: Ariz. Min. Jour., v. 4, no. 3, p. 13-14 (1920)
14. The Stargo Mines Company, Inc.: Ariz. Min. Jour., v. 4, no. 3, p. 34-35, 51-52 (1920)
15. The Howard Copper Company: Ariz. Min. Jour., v. 4, no. 6, p. 15, 53 (1920)
16. Dripping Springs Mines Corporation: Ariz. Min. Jour., v. 4, no. 6, p. 19-20 (1920)
17. The Central Copper Company: Ariz. Min. Jour., v. 4, no. 10, sec. 2, p. 3-5 (1921)
18. Golden Bell Mining Company: Ariz. Min. Jour., v. 4, no. 10, sec. 2, p. 9-10 (1921)
19. Continental Commission Company: Ariz. Min. Jour., v. 4, no. 12, p. 15-16 (1921)
20. Jerome-Grande Copper Company: Ariz. Min. Jour., v. 4, no. 12, p. 19, 35 (1921)
21. The Union Pass boom centers around Catherine property: Ariz. Min. Jour., v. 4, no. 12, p. 50 (1921)
22. Dardenelles strike gives Chloride more assurance: Ariz. Min. Jour., v. 4, no. 12, p. 51, 66 (1921)
23. C. O. D. solves problem of Cerbat Range ores: Ariz. Min. Jour., v. 4, no. 12, p. 55, 68 (1921)
24. Great Republic was once one of lost mines: Ariz. Min. Jour., v. 4, no. 12, p. 55, 68 (1921)
25. Kingman Consolidated mines working long tunnel project: Ariz. Min. Jour., v. 4, no. 12, p. 56, 68 (1921)
26. Famous White Hills mines soon to be under way: Ariz. Min. Jour., v. 4, no. 12, p. 57-59 (1921)
27. The Silver Trails (Diamond Joe) mine: Ariz. Min. Jour., v. 4, no. 12, p. 60-61 (1921)
28. Activity in Oatman at Highland Chief mines: Ariz. Min. Jour., v. 4, no. 12, p. 64, 68 (1921)
29. Satisfactory progress made by Central Copper Company: Ariz. Min. Jour., v. 5, no. 6-7, p. 19-20 (1921)
30. Inspiration Consolidated: Ariz. Min. Jour., v. 5, no. 23, p. 13-15, 77-78 (1922)

31. Miami Copper Company: Ariz. Min. Jour., v. 5, no. 23, p. 16-17, 78-80 (1922)
32. Old Dominion copper mine: Ariz. Min. Jour., v. 5, no. 23, p. 18-19 (1922)
33. Payson mining district: Ariz. Min. Jour., v. 5, no. 23, p. 19 (1922)
34. Arizona Commercial Company: Ariz. Min. Jour., v. 5, no. 23, p. 22-23 (1922)
35. Iron Cap Copper Company: Ariz. Min. Jour., v. 5, no. 23, p. 24-25 (1922)
36. The Superior and Boston: Ariz. Min. Jour., v. 5, no. 23, p. 26-27 (1922)
37. El Capitan mine: Ariz. Min. Jour., v. 5, no. 23, p. 28-30 (1922)
38. Dripping Springs favored by geological conditions: Ariz. Min. Jour., v. 5, no. 23, p. 31-32 (1922)
39. New Dominion Copper Company: Ariz. Min. Jour., v. 5, no. 23, p. 38 (1922)
40. Castle Dome Development Company promising porphyry property: Ariz. Min. Jour., v. 5, no. 23, p. 47 (1922)
41. Louis d'Or property looks like next big porphyry mine: Ariz. Min. Jour., v. 5, no. 23, p. 55-56 (1922)
42. The Northwest Inspiration has a strategic location: Ariz. Min. Jour., v. 5, no. 23, p. 58 (1922)
43. The Inspiration Needles has large undeveloped schists: Ariz. Min. Jour., v. 5, no. 23, p. 60-61 (1922)
44. New strike made at Central Copper Company: Ariz. Min. Jour., v. 6, no. 2, p. 6-8, map (1922)
45. Ray Consolidated history shows large scale necessary: Ariz. Min. Jour., v. 6, no. 2, p. 24-27, 34 (1922)
46. Arizona Hercules (Ray Hercules) prepares to resume production soon: Ariz. Min. Jour., v. 6, no. 2, p. 28, 37 (1922)
47. Seventy-nine mining company ships fifty tons ore daily: Ariz. Min. Jour., v. 6, no. 2, p. 29, 40 (1922)
48. White Metals Company ready for silver production: Ariz. Min. Jour., v. 6, no. 2, p. 30-31, 36-37 (1922)
49. Magma Copper Company launches big program of construction: Ariz. Min. Jour., v. 6, no. 3, p. 32-35 (1922)
50. Magmatic Copper Company has advantageous mine location: Ariz. Min. Jour., v. 6, no. 3, p. 36, 44 (1922)
51. Silver King mine was one of Arizona's most famous producers: Ariz. Min. Jour., v. 6, no. 3, p. 37-38 (1922)
52. United Verde Extension has wonderful orebody: Ariz. Min. Jour., v. 6, no. 5, p. 26-28 (1922)
53. Recent strike at Copper Chief may make that "third mine": Ariz. Min. Jour., v. 6, no. 5, p. 30-31 (1922)
54. Interest in Jerome district centered upon Verde Central: Ariz. Min. Jour., v. 6, no. 5, p. 32, 46-47 (1922)
55. Calumet and Jerome has property near city limits: Ariz. Min. Jour., v. 6, no. 5, p. 34-35 (1922)
56. Shea Copper Company has long and persistent vein: Ariz. Min. Jour., v. 6, no. 5, p. 36, 47 (1922)
57. Verde Jerome Copper is backed by strong people: Ariz. Min. Jour., v. 6, no. 5, p. 38, 50 (1922)
58. Jerome Bisbee Copper has deep shaft work started: Ariz. Min. Jour., v. 6, no. 5, p. 39, 48 (1922)
59. Verde Cobre has opportunity for deep tunnel development: Ariz. Min. Jour., v. 6, no. 5, p. 40, 52 (1922)
60. Ewing and Hooker group has enormous jasper outcrops: Ariz. Min. Jour., v. 6, no. 5, p. 44, 52 (1922)
61. Verde Chief property in south section of district: Ariz. Min. Jour., v. 6, no. 5, p. 45 (1922)

62. Jerome Grande Copper between Verde Central and United Verde: Ariz. Min. Jour., v. 6, no. 5, p. 46 (1922)
63. Mining opportunities around Tucson hold great promise: Ariz. Min. Jour., v. 6, no. 10, p. 26-28, 30-31, 33 (1922)
64. In prospect and retrospect; 1922 doings — 1923 promises: Ariz. Min. Jour., v. 6, no. 15, p. 5-8, 41-47 (1923)
65. Recent gold operations cause comment in Jerome: Ariz. Min. Jour., v. 6, no. 24, p. 9, 40 (1923)
66. Pacific Slope Mines start development program; Ariz. Min. Jour., v. 7, no. 1, p. 13, 19 (1923)
67. Romances of some of Arizona's mines (Calumet and Arizona, Copper Queen, Inspiration, Magma, Silver King, Miami, United Eastern, New Cornelia, Shattuck-Arizona, Old Dominion, Iron Cap, Ray Consolidated, Arizona Copper, United Verde, Tom Reed, United Verde Extension): Ariz. Min. Jour., v. 7, no. 11, supplement, p. 1-16 (1923)
68. Consistency marks development (Maricopa Copper Company): Ariz. Min. Jour., v. 7, no. 12, p. 14-16 (1923)
69. Reviewing the year 1923: Ariz. Min. Jour., v. 7, no. 15, p. 5-6, 24, 26 (1924)
70. Ploma King starts extensive program: Ariz. Min. Jour., v. 8, no. 1, p. 15-18 (1924)
71. Kay hits original ore at 1,200 feet depth: Ariz. Min. Jour., v. 8, no. 14, p. 5-7 (1924)
72. Reviewing the year of 1924: Ariz. Min. Jour., v. 8, no. 15, p. 9-11, 54-56 (1925)
73. Kay Copper finds ore extension on 1,500: Ariz. Min. Jour., v. 9, no. 19, p. 9-10, 34 (1926)

WILMARTH, M. G.
1. Correlation chart of Arizona (tentative correlation of the named geologic units): USGS chart (1932)
2. Lexicon of geologic names of the United States: USGS Bull. 896, 2 vols., 2396 p. (1938)

WILMARTH, V. R. (*see also* Warner, L. A.)
(and Bauer, H. L., Jr., Staatz, M. H., and Wyant, D. G.) Uranium in fluorite deposits: USGS Circ. 220, p. 13-18 (1952)

WILSON, A. (*see* Gatewood, J. S., 2)

WILSON, Clyde A.
Ore controls of the San Xavier mine, Pima County, Arizona: Univ. Ariz., MS Thesis, 58 p. (1960)

WILSON, C. H. (*see also* Jakosky, J. J., 1)
Drilling proves existence of meteoric mass: Min. Jour., v. 15, no. 23, p. 7 (1932)

WILSON, D.
(and Keroher, G. C., and Hansen, B. E.) Index to geologic names of North America: USGS Bull. 1056-B, p. 407-621 (1959)

WILSON, Edwin
Interest in silver properties revives with slump in copper: Ariz. Min. Jour., v. 4, no. 11, sec. 2, p. 10, 30 (1921)

WILSON, Eldred D. (*see also* Anthony, J. W., 3; Butler, B. S., 8, 9, 10, 11, 12, 13, 16; Darton, N.H., 13; Hogue, W. G., 2; Jenkins, O. P., 1, 2; King, P. B., 2; Lausen, C., 2; Moore, R. T. 4; Short M. N., 3, 4; Stoyanow, A. A., 7; Tenney, J. B., 11)
1. Index to accompany the map of the State of Arizona prepared by the United States Geological Survey in cooperation with the Arizona Bureau of Mines: Univ. Ariz., Ariz. Bur. Mines, 24 p. (1920)

2. The Mazatzal quartzite, a new pre-Cambrian formation of central Arizona: Univ. Ariz., MS Thesis, 45 p., maps (1922)
3. Proterozoic Mazatzal quartzite of central Arizona: Pan-Am. Geol., v. 38, p. 299-312, maps (1922)
4. Geology and ore deposits of the Courtland-Gleeson region, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 123, 79 p., map (1927)
5. Nature as an engineer: Prof. Engr., v. 12, no. 3, p. 7-8 (1927)
6. Nature's feats of engineering: Lit. Digest, v. 93, no. 6, p. 25 (1927)
7. Arizona gold placers, 2nd rev. ed.: Univ. Ariz., Ariz. Bur. Mines Bull. 124, 60 p., maps (1927)
8. Asbestos deposits of Arizona (with an introduction on asbestos minerals by G. M. Butler): Univ. Ariz., Ariz. Bur. Mines Bull. 126, 100 p., maps (1928)
9. An occurrence of dumortierite near Quartzsite, Arizona: Am. Mineral., v. 14, p. 373-381 (1929)
10. (and Butler, G. M.) Manganese ore deposits in Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 127, 107 p. (1930)
11. Some relations of ore deposits to folded rocks (discussion): AIME Trans., gen. vol., p. 246-247 (1931)
12. New mountains in the Yuma Desert, Arizona: Geog. Rev., v. 21, p. 221-228, map (1931)
13. Marine Tertiary in Arizona: Science, new ser., v. 74, p. 567-568 (1931)
14. Arizona gold placers (with recent information by J. B. Tenney): Univ. Ariz., Ariz. Bur. Mines Bull. 132, Pt. 1, p. 9-71, maps (1932)
15. Geology and mineral deposits of southern Yuma County, Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 134, 236 p., maps (1933); [abst.]: Min. Jour., v. 17, no. 9, p. 3-4 (1933)
16. Arizona gold placers, 4th ed., revised.: Univ. Ariz., Ariz. Bur. Mines Bull. 135, 90 p., maps (1933); Bull. 142, 90 p., maps (1937)
17. Arizona lode gold mines: Univ. Ariz., Ariz. Bur. Mines Bull. 137, Pt. 1, 194 p., maps (1934)
18. Arizona gold mining: Explosives Engr., v. 13, p. 52-53 (1935)
19. Physiography (Arizona and its heritage): Univ. Ariz. Bull., v. 7, no. 3, p. 19-26 (1936)
20. Pre-Cambrian Mazatzal Revolution in central Arizona: Harvard Univ., PhD Thesis, 300 p., maps (1937); Geol. Soc. Am. Bull., v. 50, p. 1113-1164, maps (1939); [abst.]: Geol. Soc. Am. Proc. 1936, p. 112-113 (1937)
21. Correlation of Arizona Paleozoic formations (discussion): Geol. Soc. Am. Bull., v. 47, p. 1998-2000 (1937)
22. Octave mine: Univ. Ariz., Ariz. Bur. Mines Bull. 145, p. 130-132 (1938)
23. Bibliography of the geology and mineral resources of Arizona (to June 30, 1939): Univ. Ariz., Ariz. Bur. Mines Bull. 146, 164 p. (1939)
24. Pre-Cambrian of Arizona basin ranges: 6th Pacific Sci. Cong. Proc., v. 1, p. 321-330 (1940)
25. Diatomaceous earth: Univ. Ariz., Ariz. Bur. Mines Circ. 1, 6 p. (1940)
26. Mica: Univ. Ariz., Ariz. Bur. Mines Circ. 3, 4 p. (1940)
27. Vermiculite: Univ. Ariz., Ariz. Bur. Mines Circ. 4, 3 p. (1940)
28. Manganese: Univ. Ariz., Ariz. Bur. Mines Circ. 6, 3 p. (1941)
29. Quicksilver(Mercury): Univ. Ariz., Ariz. Bur. Mines Circ. 9, 13 p. (1941)
30. Tungsten: Univ. Ariz., Ariz. Bur. Mines Circ. 10, 11 p. (1941)
31. Mineral map of Arizona (scale: 17 miles to the inch): Univ. Ariz., Ariz. Bur. Mines (1941)
32. Tungsten deposits of Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 148, 54 p., map (1941)
33. Magnesium: Univ. Ariz., Ariz. Bur. Mines Circ. 11, 9 p. (1941)
34. Arizona lode gold deposits: *in* Ore deposits as related to structural features, p. 242-243, maps, Princeton Univ. Press (1942)

35. History of mining in Pima County, Arizona: Tucson Chamber of Commerce (1942); 2nd ed: (1944); 3rd ed.: (1946); 4th ed.: (1947); 5th ed.: (1949); 6th ed.: (1951)
36. Developments in Arizona metal deposits: Min. Jour., v. 28, no. 8, p. 7-9 (1944); [abst.]: Econ. Geol., v. 39, p. 106 (1944)
37. Tectonic map of Basin Range Province in Arizona and New Mexico: Tectonic Map of the United States (scale: 1:2,500,000) (1944)
38. Arizona nonmetallics: Univ. Ariz., Ariz. Bur. Mines Bull. 152, 58 p. (1944)
39. (and Roseveare, G. H.) Arizona perlite: Univ. Ariz., Ariz. Bur. Mines Circ. 12, 10 p. (1945)
40. Early mining in Arizona: Kiva, Ariz. State Mus., Univ. Ariz. (1946)
41. Metallic mineral map of Arizona, 2nd ed., revised: Univ. Ariz., Ariz. Bur. Mines (1946)
42. Nonmetallic mineral map of Arizona, 2nd ed., revised: Univ. Ariz., Ariz. Bur. Mines (1946)
43. Map of Arizona mining districts, 2nd ed., revised: Univ. Ariz., Ariz. Bur. Mines (1946); 3rd ed., revised: (1952)
44. Geology of the Copper Butte mine, Mineral Creek district, Pinal County, Arizona: USBM, RI 3914, p. 4-5, figs. 6-7, map (1946)
45. Geology of the Mohawk zinc prospect, Pima County, Arizona: USBM, RI 3950, p. 5-6, figs. 1-2, map (1946)
46. (and Butler, A. P., Jr.) Geology of New Planet iron deposit, Yuma County, Arizona: USBM, RI 3982, p. 3-4, figs. 2-4, map (1946)
47. Seismology in Arizona [abst.]: Geol. Soc. Am. Bull., v. 58, no. 12, p. 1270 (1947)
48. Geology of Aravaipa lead-zinc deposits, Graham County, Arizona: USBM, RI 4007, p. 4-5 (1947)
49. Geology of Sullivan copper mine, Cochise County, Arizona: USBM, RI 4015, p. 3, fig. 2 (1947)
50. San Manuel prospect (discussion): AIME Tech. Pub. 2377, p. 6-7 (1948)
51. Geology of Antler copper-zinc deposit, Mohave County, Arizona: USBM, RI 4214, p. 4-5, figs. 2-5, map (1948)
52. (and Roseveare, G. H.) Arizona nonmetallics, 2nd ed., revised: Univ. Ariz., Ariz. Bur. Mines Bull. 155, 60 p. (1949)
53. Geologic maps of Hagerman and O. K. shaft areas and underground workings, Johnson Camp, Cochise County, Arizona: USBM, RI 4504, figs. 3-5, 7 (1949)
54. (and Roseveare, G. H.) Arizona minerals for chemical industries: Chem. Engr. News, v. 27, p. 3002-3003 (1949)
55. New orebodies help raise Arizona's lead-zinc output: Engr. Min. Jour., v. 150, no. 7, p. 116-118 (1949)
56. Structure in Arizona [abst.]: Geol. Soc. Am. Bull., v. 60, p. 1929 (1949)
57. Geologic maps of Copper Glance, Copper Queen, Minnie, Copper Bullion, and Copper Butte mine areas, Twin Buttes area, Pima County: USBM, RI 4732, figs. 3a-3c (1950)
58. Arizona zinc and lead deposits; general features: Univ. Ariz., Ariz. Bur. Mines Bull. 156, p. 7-17, illus. (1950)
59. Arizona zinc and lead deposits; Pima district: Univ. Ariz., Ariz. Bur. Mines Bull 156, p. 39-51 (1950)
60. Arizona zinc and lead deposits; Aravaipa district: Univ. Ariz., Ariz. Bur. Mines Bull. 156, p. 51-63 (1950)
61. Arizona zinc and lead deposits; Superior area: Univ. Ariz., Ariz. Bur. Mines Bull. 156, p. 84-98, map (1950)
62. Review (Manganese resources of the Artillery Mountains region, Mohave County, Arizona, by S. G. Lasky and B. N. Webber, USGS Bull. 961, 1950): Econ. Geol., v. 45, p. 710-712 (1950)

63. Fluorspar in Arizona: Univ. Ariz., Ariz. Bur. Mines Circ. 15, 14 p. (1951)
64. Arizona zinc and lead deposits; production summary: Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 7-10, index map (1951)
65. Arizona zinc and lead deposits; Dragoon Mountains: Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 10-29, maps (1951)
66. Arizona zinc and lead deposits; Huachuca Mountains: Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 36-40 (1951)
67. Arizona zinc and lead deposits; Empire district: Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 49-56 (1951)
68. Arizona zinc and lead deposits; Curtin or Humphrey mine (Banner district): Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 82-83 (1951)
69. Arizona zinc and lead deposits; Silver and Eureka districts: Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 83-97, map (1951)
70. Arizona zinc and lead deposits; Castle Dome district (Yuma County): Univ. Ariz., Ariz. Bur. Mines Bull. 158, p. 98-115, map (1951)
71. Igneous rocks between Tucson and Holbrook, Arizona: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 7-8, Table 3 (1952)
72. General geology between Ray and Superior, Arizona: Ariz. Geol. Soc.-Geol. Soc. Am., Guidebook Southern Ariz., p. 96-105, map (1952)
73. Arizona gold placers, 5th ed., revised: Univ. Ariz., Ariz. Bur. Mines Bull. 160, pt. 1, p. 11-86, pls. I-XII, figs. 1-5 (1952)
74. (and Roseveare, G. H., and Moore, R. T.) Metallic mineral map of Arizona, 3rd ed., revised: Univ. Ariz., Ariz. Bur. Mines (1953)
75. (and Moore, R. T., and Roseveare, G. H.) Nonmetallic mineral map of Arizona, 4th ed., revised: Univ. Ariz., Ariz. Bur. Mines (1953)
76. Geologic factors related to block caving at San Manuel copper mine, Pinal County, Arizona: USBM, RI 5336, 78 p., illus. (1957)
77. (and Moore, R. T., and Peirce, H. W.) Geologic map of Maricopa County, Arizona (scale, 1:375,000): Univ. Ariz., Ariz. Bur. Mines (1957)
78. (and Moore, R. T.) Geologic map of Graham and Greenlee Counties, Arizona (scale, 1:375,000): Univ. Ariz., Ariz. Bur. Mines (1958)
79. (and Moore, R. T.) Geologic map of Pinal County, Arizona (scale, 1:375,000): Univ. Ariz., Ariz. Bur. Mines (1959)
80. (and Moore, R. T., and Peirce, H. W.) Geologic map of Gila County, Arizona (scale 1:375,000): Univ. Ariz., Ariz. Bur. Mines (1959)
81. (and Moore, R. T.) Geologic map of Mohave County, Arizona (scale, 1:375,000): Univ. Ariz., Ariz. Bur. Mines (1959)
82. (and Moore, R. T.) Structure of Basin and Range Province in Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 89-106 (1959); [abst.]: Geol. Soc. Am. Bull., v. 70, no. 12, p. 1755 (1959)
83. Geologic map of Yuma County, Arizona (scale 1:375,000): Univ. Ariz., Ariz. Bur. Mines (1960)
84. (and Moore, R. T., and O'Haire, R. T.) Geologic map of Pima-Santa Cruz Counties, Arizona (scale 1:375,000): Univ. Ariz., Ariz. Bur. Mines (1960)
85. (and Moore, R. T., and O'Haire, R. T.) Geologic map of Navajo-Apache Counties, Arizona (scale 1:375,000): Univ. Ariz., Ariz. Bur. Mines (1960)
86. Geologic factors related to block caving at San Manuel copper mine, Pinal County, Arizona, 2nd Progress Report, April 1956-March 1958: USBM, RI 5561, 43 p., illus. (1960)
87. (Contributor to sections on geology and physical environment): *in* Arizona its people and resources; Univ. Ariz. Press, Tucson, Ariz. (1960)
88. (and O'Haire, R. T., and McCrory, F. J., compilers) Map and index of Arizona mining districts: Univ. Ariz., Ariz. Bur. Mines (1961)
89. Gold placers and placering in Arizona, 6th ed., revised: Univ. Ariz., Ariz. Bur. Mines Bull. 168, 124 p., illus. (1961)

90. A Résumé of the geology of Arizona: Univ. Ariz., Ariz. Bur. Mines Bull. 171, 140 p., illus., maps (1962)
91. Geologic cross-sections; sections 2, 3, 5, 6, and 8: Univ. Ariz., Ariz. Bur. Mines, Geologic cross-sections of Arizona, 3 sheets, index map (1962)
92. (and Moore, R. T.) Cretaceous and Tertiary ore deposition in Arizona: Ariz. Geol. Soc. Dig., v. 6, p. 1-6 (1963)
93. Mineral deposits of the Gila River Indian Reservation, Arizona: Univ. Ariz., Ariz. Bur. Mines Open-file Rep., 35 p., maps (1963)

WILSON, Hewitt
Iron oxide mineral pigments of the United States: USBM Bull. 370, 198 p. (1933)

WILSON, L. K.
San Manuel prospect [discussion]: AIME Tech. Pub. 2377, p. 5-6 (1948)

WILSON, P. D. (*see also* Tovote, W. L., 10)
1. A cavern in the Shattuck mine: Engr. Min. Jour., v. 97, p. 743-744 (1914); Progressive Ariz., v. 2, no. 3, p. 13 (1926)
2. Notes on certain ore deposits of the Southwest [discussion]: AIME Bull. 146, p. 445-447 (1919)
3. Deposition of copper carbonate from mine water: AIME Trans., v. 68, p. 552-555 (1923); [abst.]: Min. Met., no. 188, p. 37 (1922)

WILSON, R. A.
Thrust faulting in the Empire Mountains of southeastern Arizona: Jour. Geol., v. 42, p. 422-429 (1934)

WILSON, R. F. (*see also* Lewis, G. E., 2; Stewart, J. H., 1, 5)
1. Sedimentary facies of the Moenkopi formation of Triassic age on the Colorado Plateau [abst.]: Geol. Soc. Am. Bull., v. 69, no. 12, pt. 2, p. 1749 (1958)
2. The stratigraphy and sedimentology of the Kayenta and Moenave formations, Vermilion Cliffs region, Utah and Arizona: Stanford Univ., PhD Thesis, 401 p. (1959)

WILSON, R. L. (*see also* Kiersch, G. A., 8)
1. (and Keller, W. D.) Reports on bentonitic clay: *in* Mineral Resources Navajo-Hopi Indian Reservations, Arizona-Utah, v. 2, p. 22-41, map, illus., Univ. Ariz. Press, Tucson (1955)
2. Stratigraphy and economic geology of the Chinle formation, northeastern Arizona: Univ. Ariz., PhD Thesis, 255 p. (1956)

WILSON, R. W.
Preliminary study of fauna of Rampart Cave, Arizona [abst.]: Geol. Soc. Am. Bull., v. 52, p. 1985 (1941)

WINDES, S. L.
Physical properties of mine rock, Part 1: USBM, RI 4459, 79 p. (1949)

WINTERS, S. S.
1. Permian stratigraphy in eastern Arizona: Plateau, v. 24, p. 10-16 (1951)
2. New Permian gastropod genera from eastern Arizona: Wash. Acad. Sci. Jour., v. 46, no. 2, p. 44-45 (1956)
3. Lithology and stratigraphy of the Supai Formation, Fort Apache Indian Reservation, Arizona: N. Mex. Geol. Soc., Guidebook 13th Field Conf., p. 87-89, illus. (1962)
4. Supai formation (Permian) of eastern Arizona: Geol. Soc. Am. Mem. 89, 99 p. (1963)

WISE, Francis
Notes on Mammoth (mineral locality), Arizona: Rocks and Minerals, v. 18, no. 9, p. 267 (1943)

WISEMAN, Philip
United Eastern report gives future plans: Ariz. Min. Jour., v. 8, no. 6, p. 9, 23-24 (1924)

WISHAW, Q. G.
Prospecting for porphyry type copper deposits in Arizona: Canadian Mining Journal, v. 84, no. 4, p. 67-69 (1963)

WISSER, Edward H. (*see also* Billingsley, P., 4)
1. Oxidation subsidence at Bisbee, Arizona: Econ. Geol., v. 22, p. 761-790 (1927)
2. Cordilleran ore districts in relation to regional structure: Canadian Min. Met. Bull., v. 52, no. 561, p. 4-12, maps (1959); Univ. Calif., Berkeley, I. E. R. Reprint no. 33-59 (1959)

WITHINGTON, C. F.
1. (and Jaster, M. C.) Selected annotated bibliography of gypsum and anhydrite in the United States and Puerto Rico: USGS Bull. 1105, 119 p. (1960)
2. Origin of mottled structure in bedded calcium sulfate: USGS Prof. Paper 424-D, p. 342-344 (1961)
3. Gypsum and anhydrite in the United States: USGS Map MR-33 (1962)

WITKIND, I. J.
1. Localization of uranium minerals in channel sediments at the base of the Shinarump conglomerate, Monument Valley, Arizona [absts.]: Econ. Geol., v. 49, no. 7, p. 804-805 (1954); Geol. Soc. Am. Bull., v. 65, no. 12, p. 1327 (1954)
2. Geology and ore deposits of the Monument Valley area, Apache and Navajo Counties, Arizona: Univ. Colo., PhD Thesis (1956)
3. Channels and related swales at the base of the Shinarump conglomerate, Monument Valley, Arizona: *in* Geology of uranium and thorium; United Nations International Conference Peaceful Uses Atomic Energy Proc., v. 6, p. 368-370, illus. (1956); [revised]: *in* Contributions to the geology of uranium and thorium . . . ; USGS Prof. Paper 300, p. 233-237, illus. (1956)
4. (and others) Preliminary geologic map of the Dinnehotso NW quadrangle, Arizona-Utah: USGS Map MF-92 (1956)
5. and others) Preliminary geologic map of the Dinnehotso NE quadrangle, Arizona-Utah: USGS Map MF-93 (1956)
6. (and others) Preliminary geologic map of the Dinnehotso SE quadrangle, Arizona: USGS Map MF-94 (1956)
7. (and others) Preliminary geologic map of the Dinnehotso SW quadrangle, Arizona: USGS Map MF-95 (1956)
8. Uranium deposits at base of the Shinarump conglomerate, Monument Valley, Arizona: USGS Bull. 1030-C, p. 99-130 (1956)
9. (and others) Preliminary geologic map of the Boot Mesa NW quadrangle, Arizona-Utah: USGS Map MF-84 (1957)
10. (and others) Preliminary geologic map of the Boot Mesa NE quadrangle, Arizona-Utah: USGS Map MF-85 (1957)
11. (and others) Preliminary geologic map of the Boot Mesa SE quadrangle, Arizona: USGS Map MF-86 (1957)
12. (and others) Preliminary geologic map of the Boot Mesa SW quadrangle, Arizona: USGS Map MF-87 (1957)
13. (and others) Preliminary geologic map of the Agathla Peak NW quadrangle, Arizona-Utah: USGS Map MF-88 (1957)
14. (and others) Preliminary geologic map of the Agathla Peak NE quadrangle, Arizona-Utah: USGS Map MF-89 (1957)
15. (and others) Preliminary geologic map of the Agathla Peak SE quadrangle, Arizona: USGS Map MF-90 (1957)
16. (and others) Preliminary geologic map of the Agathla Peak SW quadrangle, Arizona: USGS Map MF-91 (1957)
17. Geology and ore deposits of the Monument Valley area, Apache and Navajo Counties, Arizona: USGS Open-file Rep. (1957)

18. (and Hemphill, W. R., Pillmore, C. L., and Morris, R. H.) Isopach mapping by photogeologic methods as an aid in location of swales and channels in the Monument Valley area, Arizona: USGS Bull. 1043-D, 28 p. (1960)
19. The uranium-vanadium ore deposit at the Monument No. 1-Mitten No. 2 mine, Monument Valley, Navajo County, Arizona: USGS Bull. 1107-C, p. 219-242 (1961)
20. (and Thaden, R. E.) Geology and uranium-vanadium deposits of the Monument Valley area, Apache and Navajo Counties, Arizona; with sections on serpentine at Garnet Ridge by Malde, H. E., and Thaden, R. E., and Mineralogy and paragenesis of the ore deposit at the Monument No. 2 and Cato Sells Mine by Johnson, D. H.: USGS Bull. 1103, 171 p. (1963)

WOLCOTT, H. N. (*see also* Bluhm, F. I.; Cahill, J. M., 1; Feth, J. H., 8; Johnson, P. W., 6; McDonald, H. R., 3, 4, 5)
1. Quicksilver activities in Arizona: Min. Jour., v. 23, no. 22, p. 3-5 (1940)
2. Salt River Valley area (ground water), Maricopa and Pinal Counties: USGS Open-file Rep., p. 137-146 (1952)
3. Rainbow Valley-Waterman Wash area: USGS Open-file Rep., p. 151-158 (1952)
4. Memorandum on ground-water resources and geology of Rainbow Valley-Waterman Wash area, Maricopa County, Arizona: USGS Mimeo Rep., 13 p., illus., map (1953)
5. (and Skibitzke, H. E., and Halpenny, L. C.) Water resources of Bill Williams River Valley, near Alamo, Arizona: USGS Water-Supply Paper 1360-D, 28 p. (1956)

WOLF, F., Jr.
Stanley Butte district: Min. Sci. Press, v. 101, p. 13 (1910)

WOLLE, Muriel S.
Oatman; Arizona's 20th century gold camp: Min. World, v. 18, no. 7, p. 68 (1959)

WOLLMAN, Constance (*see* Kiersch, G. A., 14; Krumlauf, H. E.)

WOOD, B. D.
Stream gaging stations and publications relating to water resources, 1885-1913; Part 9, Colorado River Basin: USGS Water-Supply Paper 340, p. 105-116 (1916)

WOOD, H. B. (*see also* Isachsen, Y. W., 1)
1. (and Grundy, W. D.) Techniques and guides in exploration for uranium in Shinarump channels on the Colorado Plateau: USGS Prof. Paper 300, p. 651-658 (1956)
2. Relations of the origin of host rocks to uranium deposits and ore production in western United States: USGS Prof. Paper 300, p. 533-542 (1956)

WOOD, H. R. (*see also* Maddock, T.)
History of mining in Yavapai County, Arizona: Min. Jour., v. 13, no. 8, p. 9, 35-36 (1929)

WOOD, M. M.
Metamorphic effects of the Leatherwood quartz diorite, Santa Catalina Mountains, Pima County, Arizona: Univ. Ariz., MS Thesis, 68 p. (1963)

WOOD, P. A. (*see also* Lance, J. F., 6)
1. A Miocene camel from Wellton, Yuma County, Arizona: Univ. Ariz., MS Thesis, 37 p. (1956); [abst.]: Ariz. Geol. Soc. Dig., v. 1, p. 54-55 (1958)
2. Tertiary deposits in southern Arizona: Ariz. Geol. Soc., Guidebook II Southern Ariz., p. 58-61 (1959)
3. Paleontological investigations in 111 Ranch area: Ariz. Geol. Soc. Dig., v. 3, p. 141-143 (1960)

WOOD, William H.
1. The Cambrian and Devonian carbonate rocks at Yampai Cliffs, Mohave County, Arizona: Univ. Ariz., PhD Thesis, 228 p. (1956)
2. The Muav limestone and the supra-Muav sequence at Yampai Cliffs, Arizona: Plateau, v. 29, no. 2, p. 25-29, illus. (1956)

WOODBRIDGE, D. E.
1. Arizona and Sonora: Engr. Min. Jour., v. 81, p. 896-897, 990-992, 1134-1135, 1180-1182, 1229-1232 (1906)
2. An addition to domestic manganese reserves: Engr. Min. Jour., v. 135, p. 459-460 (1934)

WOODDELL, Charles E.
The Mississippian fauna of the Redwall limestone near Jerome, Arizona: Univ. Ariz., MS Thesis, 117 p. (1927)

WOODRUFF, E. G.
Geology of the San Juan oil field, Utah: USGS Bull. 471 (Ariz., p. 104) (1912)

WOODWARD, G. E.
1. (and Luff, P.) Metal production figures for 1944, Arizona: Min. Jour., v. 28, p. 6-7 (1945)
2. (and Luff, P.) Annual report to Director of the Mint, fiscal year 1945-1946: (Ariz. p., 20-21) (1946)

WOODYARD, K. E.
Clays of St. John's vicinity, Arizona and New Mexico: Univ. Texas, MS Thesis (1956); [abst.]: Ariz. Geol. Soc. Dig., v. 3, p. 183 (1960)

WORCESTER, A. W.
Allison mine of El Oro Mining Company: Min. Jour., v. 15, no. 3, p. 5-6 (1931)

WORLD OIL
Exploration outlook: v. 154, no. 3, p. 89-110 (1962)

WRIGHT, B. A. (*see* Hibbard, C. W.)

WRIGHT, H. E., Jr. (*see also* Appledorn, C. R.)
1. Opal cement in thick Tertiary eolian sandstone, Chuska Mountains, Arizona-New Mexico [abst.]: Geol. Soc. Am. Bull., v. 62, p. 1492 (1951)
2. (and Becker, R. M.) Correlation of Jurassic formations along Defiance Monocline, Arizona-New Mexico: AAPG Bull., v. 35, no. 3, p. 607-623, map (1951)
3. Problem of Tohatchi formation, Chuska Mountains, Arizona-New Mexico: AAPG Bull., v. 38, no. 8, p. 1827-1836 (1954)
4. Origin of the Chuska sandstone, Arizona-New Mexico — a structural and petrographic study of a Tertiary eolian sediment: Geol. Soc. Am. Bull., v. 67, no. 4, p. 413-434, illus., maps (1956)

WRIGHT, J. C.
(and Dickey, D. D.) Relations of the Navajo and Carmel formations in southwestern Utah and adjoining Arizona: USGS Prof. Paper 450-E, Art. 197, p. 63-66 (1962)

WRIGHT, M. S., Jr.
Photogeology giving rapid coverage in Four Corners: World Oil, v. 150, no. 2, p. 104-107 (1960)

WRIGHT, R. J.
1. Reconnaissance of certain uranium deposits in Arizona: USAEC, RMO-679, 21 p., maps (1950)
2. Annie Laurie prospect, Santa Cruz County, Arizona: USAEC, RMO-677, 7 p., map (1951)
3. Ore controls in sandstone uranium development of the Colorado Plateau: Econ. Geol., v. 50, no. 2, p. 135-155 (1955)

WRUCKE, C. T.
Paleozoic and Cenozoic rocks in the Alpine-Nutrioso area, Apache County, Arizona: USGS Bull. 1121-H, 26 p. (1961)

WYANT, D. G. (*see also* Klepper, M. R.; Stugard, F. Jr.; Wilmarth, V. R.)
(and Beroni, E. P., and Granger, H. C.) Some uranium deposits in sandstone: USGS Circ. 220, p. 26-30, maps (1952); [abst.]: Geol. Soc. Am. Bull., v. 62, p. 1544 (1951)

WYANT, R. K. (*see* Roy, S. K.)

WYCKOFF, R. W. G. (*see* Bowen, N. L.)

WYLIE, C. C.
1. Meteor craters, meteors, and bullets: Pop. Astron., v. 42, p. 469-471 (1934)
2. Calculations on the probable mass of the object which formed Meteor Crater: Pop. Astron., v. 51, no. 2, p. 97-99 (1943); no. 3, p. 158-161 (1943)

YEN, T. C.
Some Triassic fresh-water gastropods from northern Arizona: Am. Jour. Sci., v. 249, p. 671-675 (1951)

YILDIZ, Mehmet
Structure and petrography of Black Rock, Apache County, Arizona: Univ. Ariz., MS Thesis, 41 p. (1961)

YOCHELSON, E. L.
Gastropods from the Redwall limestone (Mississippian) in Arizona: Jour. Paleo., v. 36, no. 1, p. 74-80 (1962)

YOST, C. B., Jr. (*see also* Armstrong, C. A.; Feth, J. H., 10; Skibitzke, H. E., 1, 2)
Geophysical and geological reconnaissance to determine ground-water resources of Chiu Chuischu area, Papago Indian Reservation, Arizona: USGS Mimeo. Rep., 19 p., illus., map (1953)

YOST, H. W.
Production plans of Bagdad Copper Corporation: Min. Jour., v. 13, no. 6, p. 5-7 (1929)

YOUNG, G. J.
Prehistoric mining for rock salt at Camp Verde: Engr. Min. Jour., v. 124, p. 18 (1927)

YOUNG, H. V.
Historical sketch of the United Verde Copper Company: Min. Cong. Jour., v. 16, p. 303-305 (1930)

YOUNG, K. P.
Cretaceous ammonites from eastern Apache County, Arizona: Jour. Paleo., v. 31, no. 6, p. 1167-1174, illus. (1957)

YOUNG, R. G.
1. Dakota group of Colorado Plateau: AAPG Bull., v. 44, no. 2, p. 156-194, illus. (1960)
2. Distribution of uranium deposits in the White Canyon-Monument Valley district Utah-Arizona: Econ. Geol., v. 59, no. 5, p. 850-873 (1964)

YOUNG, W. H.
1. (and Anderson, R. L.) Thickness of bituminous coal and lignite seams mined in the United States in 1945: USBM, IC 7442, 17 p. (1947)
2. (and Anderson, R. L.) Thickness of bituminous coal and lignite seams at all mines and thickness of overburden of strip mines in the United States in 1950: USBM, IC 7642, 18 p., illus. (1952)

YOUNGS, F. O. (*see* Poulson, E. N., 1)

ZASLOW, B.
(and Kellogg, C. M.) An analysis of metallic spheroids from Meteor Crater, Arizona: Geochimica et Cosmochimica Acta, v. 24, no. 4, p. 315-317 (1961)

ZELLER, R. A., Jr.
Geologic controls in oil and gas exploration in southwestern New Mexico and southeastern Arizona: AAPG, Rocky Mountain Sec. Geol. Record, p. 143-144 (Feb. 1959); Oil and Gas Jour., v. 57, no. 12, p. 213 (1959); AAPG Bull., v. 43, no. 5, p. 1109 (1959)

ZIESMER, H. M.
1. (and Mieyr, George) Steam-shovel operation at Bisbee, Arizona: AIME Trans., v. 68, p. 251-269 (1923)
2. Sampling and estimating ore at Sacramento Hill: Ariz. Min. Jour., v. 10, no. 9, p. 7-11, 19-21 (1926)

ZIETZ, Isidore (*see* Keller, G. V., 2; Vacquier, V.)

ZIMMERMAN, J.
(Editor) Mines Register [successor to the Mines Handbook]: v. 19, 1314 p. (1937)

ZIRKLE, R. G.
Fusulinid fauna from the Naco Group in the Chiricahua Mountains near Portal, Cochise County, Arizona: Univ. Ill., MA Thesis (1952)

ZoBELL, C. E.
(and Sisler, F. D., and Oppenheimer, C. H.) Evidence of biochemical heating in Lake Mead mud: Jour. Sed. Pet., v. 23, no. 1, p. 13-17, illus. (1953); American Petroleum Institute Report of Progress, 1952-1953, p. 200-204, illus. (1955)

INDEX

AERIAL PHOTOGRAPHS
Arizona, Viking rocket: Mitcham, T. W., 3
Esperanza mine: Buchella, F. H., Jr.
Geologic mapping: Loel, W.; Sampson, E., 2

AEROMAGNETIC MAPS *See* MAPS, *Aeromagnetic*

ALTERATION *See also* ECONOMIC GEOLOGY; METALLIFEROUS MINERAL DEPOSITS
Ajo dist., Pima Co.: Gilluly, J., 1, 4, 5, 6, 11, 13
Argillic: Schwartz, G. M., 17
Bagdad area, Yavapai Co.: Anderson, C. A., 6, 9
Big Bug dist., Yavapai Co.: Anderson, C. A., 10
Biotite under mesothermal conditions: Schwartz, G. M., 18
Dispersion patterns: Chaffee, M. A.
Guide to ore deposits: Chaffee, M. A., Kerr, P. F., 3
Hydrothermal: Schwartz, G. M., 14, 19
———, Castle Dome copper deposit: Peterson, N. P., 6
———, igneous rocks: Schwartz, G. M., 6
———,porphyry copper deposits: Schwartz, G. M., 12
———, San Manuel copper deposits: Schwartz, G. M., 11
Jerome area, Yavapai Co.: Anderson, C. A., 10
Leached outcrops: Blanchard, R.
———, as copper ore indicators: Locke, A., 1
Porphyry copper deposits, phase relations: Creasey, S. C., 8
San Manuel mine: Schwartz, G. M., 11, 13, 16
Santa Catalina Mts., Leatherwood quartz diorite: Wood, M. M.
Schist and porphyry by fire: Leonard, R. J., 4
Silver Bell: Kerr, P. F., 2
Tuba dike, Cameron area: Barrington, J., 2
Uranium deposits, Colorado Plateau: Abdel-Gawad, A., 1, 2; Johnson, H. S., Jr., 2; Kerr, P. F., 3, 7
———, host rocks: Walker, G. W., 3
———, supergene: Walker, G. W., 5

AREAS DESCRIBED *See also* MINES AND MINING DISTRICTS
Agua Caliente Canyon, Santa Rita Mts.: Whitacre, H. E.
Agua Fria River: St. Clair, C. S., 2
Agua Verde Hills, Pima Co.: Kerns, J. R.
Ajo Basin, Pima Co.: Lakes, A., 1
Ajo dist.: Dehlinger, M. E.; Gilluly, J., 1, 2, 3, 4, 5, 11, 13
Alambre Valley: Wargo, J. G., 2
Amole dist., Tucson Mts., Pima Co.: Kinnison, J. E., 1
Andrus Canyon, Mohave Co.: Fisher, W. L., 1
Apache Co., central: Akers, J. P., 8, 12
Apache Trail: Rickard, T. A., 4
Aquarius Range, Mohave Co.: Hobbs, S. W.
Aravaipa and Stanley dists., Graham Co.: Ross, C. P., 4

AREAS DESCRIBED *(Continued)*

Arizona: Barnes, W. C., 2; Blake, W. P., 35, 39; Darton, N. H., 4, 14, 16; Emmons, S. F., 1; Gilbert, G. K., 1, 2, 4, 5; Johnson, D. W., 1; Lance, J. F., 11; Loew, O., 1, 2, 3; Mowry, S., 1, 2; Parry, C. C., 1, 2; Rath, G., 1; University of Arizona, 1, 3; Wheeler, G. M., 1, 2, 3, 4, 5, 6; Wilson, E. D., 87, 90; Woodbridge, D. E., 1
———, central: Ransome, F. L., 1; Wilson, E. D., 2, 3, 20
———, northeastern: Davis, W. M., 5; Moore, R. C., 1; Peirce, H. W., 5; Read, C. B., 3, 6; Simpson, J. H.; Wilson, R. L., 2
———, northern: Darton, N. H., 2, 3, 7; Emory, W. H., 1; Gilbert, G. K., 7; Gregory, H. E., 11, 12; Howell, E. E., McKee, E. D., 48; Peale, A. C.; Thompson, A. P., 2
———, northwestern: Bissell, H. J., 1, 3; Gregory, H. E., 15; Longwell, C. R., 3
———, southeastern: Dumble, E. T., 1; Shride, A. F., 2, 3
———, southern: Arizona Geological Society, 1, 2; Bailey, G. E.; Cox. E. T.; Darton, N. H., 21; Emory, W. H., 2, 3; Lutton, R. J., 1; McKee, E. D., 42; Pumpelly, R., 1, 2, 4; Tolman, C. F., Jr., 2, 3
———, southwestern: Lumholtz, K. S.
———, western: Lee, W. T., 5; Michler, N.
Arizona Desert: Lakes, A., 3
Arizona Plateau: Griswold, L. S.
Artillery Mts., Mohave Co.: Lasky, S. G., 1, 2, 3
Aubrey Cliffs, Coconino Co.: Belden, W. A.
Aubrey Valley: Blissenbach, E., 3
Avra-Altar Valley, Pima Co.: Andrews, D. A., 1
Baboquivari Mts., Fresnal Park, Pima Co.: Donald, P. G.
Bagdad, Yavapai Co.: Anderson, C. A., 9; Vacquier, V.
Basin and Range Province: Davis, W. M., 6; Nolan, T. B., 2; Wilson, E. D., 82
Beacon Hill-Colossal Cave, Pima Co.: Weidner, M. I.
Bear Creek Canyon, Ariz.-N. Mex.: Maise, C. R.
Belmont-Queen Creek dist., Superior: Harshman, E. N.
Benson, Cochise Co.: Carpenter, E. J.
Bill Williams River valley: Wolcott, H. N., 5
Bisbee, Cochise Co.: Hogue, W. G., 2; Ransome, F. L., 3, 4, 5, 7, 8, 9, 17, 26; Rove, O. N., 1, 2; Tenney, J. B., 1, 2, 8; Tovote, W. L., 4
Black Mesa, Navajo-Hopi Indian Reservations: Akers, J. P., 1, 2; Elston, W. E.; Harshbarger, J .W., 1; Page, H. G., 1; Reagan, A. B., 18; Williams, G. A.
Black Mesa Basin: Cooley, M. E., 3; Kelley, V. C., 5
Black Mountain-Yale Point, Black Mesa: Clinton, N. J., 1
Black Mountains, Mohave Co.: Schrader, F. C., 1, 3, 11, 12
Black Rock, Apache Co.: Yildiz, M.
Bonita Creek, lower: Heindl, L. A., 17, 22
Boulder Canyon: U.S. Bureau of Reclamation, 2
Boulder (Hoover) Dam: U.S. Bureau of Reclamation, 1
Boulder Reservoir floor: Longwell, C. R., 6
Boundary Butte, Apache Co.: Sheffer, B. D.
Bradshaw Mountains: Jaggar, T. A., Jr.; Lindgren, W., 16
———, Black Canyon schist belt: Jerome, S. E., 1
Bright Angel quad., Coconino Co.: Maxson, J. H., 8, 11
Buckskin Mountains, western, Yuma Co.: Blanchard, R. C.
Buell Park-Sawmill area, Apache Co.: Whitcomb, H. A., 2
Bunker Hill dist., Copper Creek area: Kuhn, T. H., 2, 4
Cameron, Coconino Co.: Akers, J. P., 11; Chenoweth, W. L., 4; Hinckley, D. N., 1
Cameron and Leupp quads. Coconino Co.: Akers, J. P., 6
Cameron-St. Johns area: Gregg, C. C.
Campo Bonito area, Oracle: Ludden, R. W.

AREAS DESCRIBED *(Continued)*

Cañada del Oro, Santa Catalina Mts.: Wallace, R. M., 1
Canyon Country: Stone, J. F.
Carrizo drainage basin, Apache Co.: Smith, H. L.
Carrizo Mtn.: Emery, W. B.; Strobell, J. D., Jr., 2, 3
Carrizo Valley, Apache Co.: Underwood, J. R.
Casa Grande dist., Pinal Co.: Tenney, J. B., 9
Castle Dome dist., Yuma Co.: Wilson, E. D., 70
Cataract Canyon, Coconino Co.: Ferris, H. A.
Cerbat Mts., Mohave Co.: Hernon, R. M., 3; Schrader, F. C., 1, 3, 11, 12
———, Mineral Park area: Sterrett, D. B., 1
Cerro Colorado dist., Pima Co.: Jones, R. D.
Cherry Creek dist., Yavapai Co.: Lindgren, W., 10; Reid, J. A., 1, 2
Chetoh Country, Apache Co.: Howell, P. W., 2
Chiricahua Mts., Cochise Co.: Badger, S. S.; Enlows, H. E., 3, 4
———, northeastern: Raydon, G. T.
Chiricahua and Dos Cabezas Mts., Cochise Co.: Sabins, F. F., Jr., 1, 2
Chuska Mts., Navajo Indian Reservation: Appledorn, C. R.; Harshbarger, J. W., 6; Wright, H. E., Jr., 3
Cienega Amarilla area, Apache Co.: O'Brien, B. R.
Cienega Gap, Pima Co.: Brennan, D. J., 2, 3
Cienega Valley, Pima Co.: Brennan, D. J., 1
Clarkdale quad., Yavapai Co.: Lehner, R. E., 1
Clifton-Morenci, Greenlee Co.: Lindgren, W., 1, 2, 3, 7, 8; Loel, W.; Ransome, F. L., 10; Tovote, W. L., 3
Coal Mine Canyon, Coconino Co.: Brady, L. F., 20
Cochise Co., central: Gilluly, J., 7
Cochise Head and Vanar quads., Cochise Co.: Sabins, F. F., Jr., 3
Coconino Plateau: Strahler, A. N., 3, 4, 5
Colorado Basin: Gregory, H. E., 14; Harker, A.; Maddock, T.; Pack, F. J.; Willis, B., 2
Colorado Desert: Barrows, D. P.
Colorado Plateau: Gilbert, G. K., 6; Gregory, H. E., 13; Hinds, N. E. A., 10; Hunt, C. B., 3; Longwell, C. R., 2; Margerie, E., 1; Moore, R. C., 2, 5, 6; Payne, A. L.
Colorado River Delta: Fox, C. K.
Colorado River region: Blackwelder, E., 1, 4, 5; Ives, J. C.; Newberry, J. S.; Powell, J. W., 1, 3, 4, 5, 8, 9; Schott, A., 1; Sitgreaves, L.; Tillotson, C. C.; Toula, F.
Colorado River valley, lower: Lee, W. T., 3; Metzger, D. G., 7, 8
Colossal Cave, Pima Co.: Acker, C. J.
Comb Ridge-Navajo Mtn.: Hodgson, R. A.
Comobabi Mts., southern, Pima Co.: Bryner, L., 1, 2
Copper Hill area, Winkelman: Evenson, J.
Courtland-Gleeson, Cochise Co.: Gilluly, J., 7; Wilson, E. D., 4
Coyote Mts., Pima Co.: Kurtz, W. L.; Wargo, J. G., 1, 3
Cunningham Pass, Yuma Co.; Tovote, W. L., 11
Davis Dam area: U.S. Bureau of Reclamation, 3
Deer Creek coal field, Pinal Co.: Walcott, C. D., 3
Deluge Wash area, Mohave Co.: Berger, H. W., 2
Dendora Valley, Maricopa Co.: Armstrong, C. A.
Desert lands: Silliman, B., Jr., 2
Diamond Butte quad., Gila Co.: Gastil, R. G., 4
Diamond Rim area, Gila and Navajo Cos.: Titley, S. R., 2
Dos Cabezas Mts., Cochise Co.: Sarle, C. J.
———, Dives and Gold Ridge groups: Shields, J. C., Jr.

Dragoon Mts., Cochise Co.: Bagg, R. M.; Gilluly, J., 7; Wilson, E. D., 65
———, central: Cederstrom, D. J., 1, 2
Dragoon quad., Cochise Co.: Cooper, J. R., 6
Dripping Spring Mts., Gila and Pinal Cos.: Kiersch, G. A., 5
Dry Mtn., Graham Co.: Clay, D. W.
East Kaibab monocline, Coconino Co.: Strahler, A. N., 2
Echo Cliffs region, Coconino Co.: Callahan, J. T., 1
Elden Mtn., Coconino Co.: Brady, L. F., 7
Eloy dist., Pinal Co.: Smith, G. E. P., 6
Empire dist., Pima Co.: Wilson, E. D., 67
Empire Mts., Pima Co.: Galbraith, F. W., 11, Wilson, R. A.
———, northern: Alberding, H.
Empire Peak, Pima Co.: Mayuga, M. N., 1
Escudilla Mtn., Apache Co.: Wrucke, C. T.
Flagstaff area, Coconino Co.: Akers, J. P., 9
Ft. Apache Indian Reservation: Winters, S. S., 3
Ft. Apache region: Reagan, A. B., 2, 8, 14
Ft. Defiance quad., Apache Co.: Allen, J. E.
Fossil Creek area: Twenter, F. R., 3
Four Corners region: Scott, G. L.
Fresnal Park, Baboquivari Mts., Pima Co.: Donald, P. G.
Galiuro Mts.: Blake, W. P., 32; Davis, W. M., 14
Ganado: Reagan, A. B., 16, 17
Gila Basin: Lakes, A., 1
Gila Bend Basin, Maricopa Co.: Babcock, H. M., 6
Gila Bend Indian Reservation: Heindl, L. A., 21, 31; Wilson, E. D., 93
Gila River area: Lippincott, J. B.; Ross, C. P., 1, 2, 3
Gila Valley: Knechtel, M. M., 3; Lee, W. T., 1; Schwennesen, A. T., 2
Glen-San Juan Canyon area: Cooley, M. E., 4
Globe area, Gila Co.: Peterson, N. P., 15, 19, 20; Ransome, F. L., 2, 6, 14, 15, 17; Sivyer, L. D.; Tolman, C. F., Jr., 8; Tovote, W. L., 8
Globe-Miami dist., Gila Co.: Peterson, N. P., 9, 10, 11, 16, 19
Grand Canyon: Darton, N. H., 6, 7, 9, 10, 12; Davis, W. M., 1, 2, 3, 4, 7, 8, 9, 10, 11; Gilbert, G. K., 7; Hinds, N. E. A., 1; Johnson, D. W., 3, 4, 6, 11, 12; McKee, E. D., 1; Matthes F. E., 1, 2, 3, 4; Mir Amoros, J.; Moore, R. C., 3, 4, 7; Morris, T. G.; Noble, L. F., 1, 2, 3, 4, 5; Ohern, D. W.; Reilly, P. T.; Richter, R. 1; Robinson, H. H., 2, 3; Salisbury, R. D.; Sharp, R. P., 1, 2; Termier, P.; Walcott, C. D., 2, 7, 10, 11; Wheeler, G. M., 8; White, C. D., 5
———, boat voyage: Birdseye, C. H.
———, country north of: Powell, J. W., 2, 6
———, south rim: Metzger, D. G., 5, 6
———, western: Schenk, E. T., 2, 3
Grand Wash Cliffs, Mohave Co.: Longwell, C. R., 1, 4; Schrader, F. C., 1, 3, 11, 12
Great Basin: Axelrod, D. I.; Bissell, H. J., 2
Harquahala Plains, Maricopa and Yuma Cos.: Metzger, D. G., 3
Harshaw dist., Santa Cruz Co.: Kartchner, W. E.
Haunted Canyon quad.: Peterson, D. W., 1
Headgate Rock, Parker area: Strahorn, A. T.
Helmet Peak area, Pima Co.: Mayuga, M. N., 2; Studebaker, I. G.
Helvetia dist., Pima Co.: Creasey, S. C., 1; Johnson, V. H., 1, 2
Hiltano camp, Empire Mts., Pima Co.: Feiss, J. W.
Hilton Ranch, Pima Co.: Marvin, T. C.
Hindu Canyon, Mohave Co.: Gray, R. S., 1, 2
Holbrook region: Babcock, H. M., 5; Harrell, M. A.

AREAS DESCRIBED *(Continued)*

Hopi Buttes: Hack, J. T., 3; Laidley, R. A.
House Rock Spring NE quad., Coconino Co.: Wells, J. D., 1
House Rock Valley, Coconino Co.: Wells, J. D., 3
Huachuca Mts., Cochise Co.: Wilson, E. D., 66
———, east-central: Weber, R. H.
———, northern: Alexis, C. O., 2
Hualapai dist., Mohave Co.: Wheeler, G. M., 2
Hualapai Indian Reservation, Mohave Co.: Twenter, F. R., 1
———, eastern: Koons, E. D., 3
Hunt's Mesa, Monument Valley: Chester, J. W.
Hurricane Fault zone: Lovejoy, E. M. P., 2
Indian Hot Springs, Graham Co.: Knechtel, M. M., 1
Jackrabbit area, Pinal Co.: Hammer, D. F.,1
Jerome, Yavapai Co.: Anderson, C. A., 10; Lehner, R. E., 2; Lindgren, W., 16; Provot, F. A.; Reber, L. E., Jr., 2, 3; Staunton, W. F., 1
Jerome to Phoenix: Bower, F. W., 1
Johnson Camp, Cochise Co.: Cooper, J. R., 1, 2
Johnson dist., Cochise Co.: Heineman, R. E. S., 1
Kaibab Plateau: Lunt, H. F.; Strahler, A. N., 3, 4, 5, 6, 7
Kaibito Plateau, Coconino Co.: Wanek, A. A.
Kanab Valley: Walcott, C. D., 1
Kirkland Creek dam site: Eckel, E. B., 3
Klondyke quad., Graham and Pinal Cos.: Simons, F. S., 5
Ko Vaya Hills, Pima Co.: Bryner, L., 1, 2
Kofa Mts., Yuma Co.: Weight, H. O., 1
Lake Mead: Longwell, C. R., 15, 16; Thomas, H. E., 2
Land ownership status: Arizona Department of Mineral Resources, 12; Verity, V. H.
Lead Mtn. area, Pima Co.: Alexis, C. O., 1
Lees Ferry-Glen Canyon Dam area: Phoenix, D. A., 3, 5
Leupp quad., Coconino Co.: Akers, J. P., 6; Irwin, J. H., 1, 2
Leupp-Holbrook area: Smith, R. S., Jr.
Little Colorado Valley, Coconino Co.: Gregory, H. E., 4; Ward, L. F., 5
Little Dragoon Mts., Cochise Co.: Enlows, H. E., 1
Lone Pine reservoir, Navajo Co.: Kiersch, G. A., 7
Lukachukai dist., Mesa VI, Apache Co.: Ellsworth, P. C.
Luke area, Maricopa Co.: Stulik, R. S.
Madera Canyon, Santa Rita Mts.: Whitacre, H. E.
Mammoth mining camp area, Pinal Co.: Peterson, N. P., 1, 2, 3
Marble Platform, Coconino Co.: Bollin, E. M., 1
Margaret Wash section, Pinal Co.: Jinks, J. E.
Mary G. mine area, Pima Co.: Davis, R. E., 1
Mazatzal Mts.: Ransome, F. L., 21
———, mercury dist.: Faick, J. N., 1
Mesa VI, Lukachukai dist., Apache Co.: Ellsworth, P. C.
Meteor Crater, Coconino Co.: Dodge, N. N.; Fahey, J. J., 3; Longwell, C. R., 5
Mexican Boundary: Emory, W. H., 2, 3; Hall, J.; Schott, A., 2
Miami dist., Gila Co.: Ransome, F. L., 17, 25
Miami-Inspiration dist., Gila Co.: Rubly, G. R.; Tolman, C. F., Jr., 5
Milk Creek, Yavapai Co.: Reed, C. A.
Mineta Ridge area, Pima and Cochise Cos.: Chew, R. T., 3d, 1
Mingus Mtn., quad., Yavapai Co.: Creasey, S. C., 2
Moenkopi Plateau, Coconino Co.: Wanek, A. A.
Mogollon Rim region: McGoon, D. O., Jr.; Sabels, B. E., 4; Twenter, F. R., 6
Mohave Co.: Schrader, F. C., 11, 12; Tovote, W. L., 2

AREAS DESCRIBED *(Continued)*

Mohave Co., northwestern: Moore, R. T., 3
Montezuma's Well: Blake, W. P., 46
Montosa Canyon area, Santa Cruz Co.: Sulik, J. F.
Montosa-Cottonwood Canyon area, Santa Cruz Co.: Anthony, J. W., 2
Monument Valley, Apache and Navajo Cos.: Baker, A. A., 5; Black, R. A., 2; Chester, J. W.; Evensen, C. G., 2; Witkind, I. J., 2, 8, 17, 20
Morgan mine area, Pima dist., Pima Co.: Whitcomb, H. A., 1
Mountain Queen area, Swisshelm Mts., Cochise Co.: Loring, W. B.
Mowry mine area, Santa Cruz Co.: Smith, G. E.
Mule Mts., Cochise Co.: Gilluly, J., 7
Mustang Mts., Santa Cruz Co.: Bryant, D. L., 1
Navajo Country: Harshbarger, J. W., 5; Reagan, A. B., 21, 22, 23, 29
Navajo-Hopi Country: Williams, H., 1, 2
Navajo-Hopi Indian Reservations: Gregory, H. E., 1, 3, 5, 7, 8, 10
Near Latitude 32°, east of Pima Villages: Parke, J. G.
Nokai Mesa, Navajo Co.: Grundy, W. D., 1
Oak Creek Canyon, Coconino Co.: McKee, E. D., 27; Mears, B., Jr., 1
Oatman dist., Mohave Co.: Ransome, F. L., 29
One-Eleven (111) Ranch area, Graham Co.: Seff, P., 1, 2
Painted Desert: Allen, V. T.; Carter, O. C. S.; Richardson, T.; Walton, M. S., Jr.; Wanek, A. A.
Palomas Plain, Yuma Co.: Armstrong, C. A.
Pantano Hill area, Pima Co.: Sears, D., 2d.
Papago Country: Bryan, K., 1, 10; Heindl, L. A., 26, 32
Papagueria: MacDougal, D. T.; Tolman, C. F., Jr., 11
Paradise Valley, Maricopa Co.: McDonald, H. R., 3; Meinzer, O. E., 2
Paradox Basin fold and fault belt: Four Corners Geological Society
Parashant Canyon, Mohave Co.: Fisher, W. L., 1
Paria Plateau, Coconino Co.: Akers, J. P., 4
Pat Hills, Cochise Co.: Ettinger, L. J.
Patagonia Mts., Santa Cruz Co.: Baker, R. C.
Paymaster and Olivette areas, Pima dist., Pima Co.: Waller, H. E., Jr.
Peacock Range, Mohave Co.: Davis, W. M., 17
Peeples Valley, Yavapai Co.: Babcock, H. M., 4
Peloncillo Mts., Cochise Co.: Gillerman, E.
———, central: Quaide, W. L.
Peña Blanca Canyon, Santa Cruz Co.: Nelson, F. J.
Petrified Forest: Carter, O. C. S.; Dickinson, J.; Edwards, I,; Hollick, A.; Knowlton, F. H., 2; Mears, B., Jr., 5; Merrill, G. P., 8; Miller, S. A.; Muench, J. R., 2; Parent, H. L.; Tilden, P. M.; Vokes, H. E.; Walton, M. S., Jr.; Ward, L. F., 2, 3; Williams, F. E.
Petrified Forest National Monument: Arizona Highways
Petrified wood locality: Mayes, W.
Phoenix area: Davis, A. P., 1; Valgean, A.
Phoenix Mts., Maricopa Co.: Schrader, F. C., 15
Pima Co.: Blake, W. P., 52
Pinacate volcanic field: Hornaday, W. T.
Pinedale area, Navajo Co.: Veatch, A. C.
Pinta Dome, Apache Co.: Masters, J. A., 4
Plateau dist.: Robinson, H. H., 1
Plateau Province: Davis, W. M., 5
Point of Pines, Graham Co.: Heindl, L. A., 14
Potts Canyon, Superior area, Pinal Co.: Wardwell, H. R.
Prescott quad., Yavapai Co.: Krieger, M. H., 1
Preston Mesa area, Coconino Co.: McClymonds, N. E., 6

AREAS DESCRIBED *(Continued)*

Putnam Wash area, Pinal Co.: Hillebrand, J. R., 1
Quijotoa Mts., Pima Co.: Gebhardt, R. C.
Quinlan Mts., Pima Co.: Wargo, J. G., 1
Rainbow Valley-Waterman Wash area, Maricopa Co.: Wolcott, H. N., 3, 4
Ranegras Plain, Yuma Co.: Metzger, D. G., 1
Ray area, Pinal Co.: Loel, W.; Ransome, F. L., 17, 25, 28; Tolman, C. F., Jr., 4
Ray to Superior: Wilson, E. D., 72
Red Lake area, Navajo Indian Reservation: Akers, J. P., 3, 5, 10
Red Mtn.: Atwood, W. W., 2
Richmond Basin area, Gila Co.: Bishop, O. M.
Rillito Creek, northwestern, Pima Co.: Maddox, G. E.
Rillito Creek-Tanque Verde Wash area, Pima Co.: Streitz, R.
Rillito Valley, Pima Co.: Smith, G. E. P., 1
Rincon Mts., southwestern foothills, Pima Co.: Layton, D. W.
Roosevelt Dam area: Valgean, A.
Rosemont area, Pima Co.: Thomas, W. L.; Popoff, C.
Ruby Star Ranch area, Pima dist., Pima Co.: Thacpaw, S. C.
Ruin Basin, Gila Co.: Bejnar, W.
Safford Basin, Graham Co.: Davidson, E. S., 1, 3; Marlowe, J. I., 3
Safford Peak, Tucson Mts., Pima Co.: Imswiler, J. B.
Safford Valley, Graham Co.: Van Horn, W. L., 1
Saguaro National Monument, Pima Co.: McColly, R. A.
St. George, Utah, to Gila River: Marvine, A. R.
St. Johns-Cameron area: Gregg, C. C.
St. Johns vicinity, Apache Co.: Woodyard, K. E.
St. Michaels, Apache Co.: DuBois, R. L., 3
Salt River Valley: Davis, A. P., 2; Lee, W. T., 2; McDonald, H. R., 4
San Carlos Indian Reservation: Bromfield, C. A., 3, 4; Thurmond, F. L., 2
San Carlos Valley: Schwennesen, A. T., 2
San Francisco Mts.: Atwood, W. W., 1; Johnson, D. W., 2; Sharp, R. P., 3, 4, 5
San Francisco volcanic field, Coconino Co.: Loel, W.; Robinson, H. H., 4; Sabels, B. E., 1, 2, 3
San Juan Basin: Read, C. B., 2; Silver, C., 2
San Juan oil fields: Woodruff, E. G.
San Manuel mine area, Pinal Co.: Pelletier, J. D.; Schwartz, G. M., 9, 11, 16; Steele, H. J., 1, 2
San Pedro Valley: Bryan, K., 19; Gilluly, J., 7; Smith, D. G.; Tuan, Yi-Fu, 1
San Simon Creek, Graham Co.: Knechtel, M. M., 3
San Simon Valley, Graham Co.: Schwennesen, A. T., 1
San Xavier dist., Pima Co.: Park, C. F., Jr., 1; Wilson, C. A.
San Xavier Indian Reservation, Pima Co.; Heindl, L. A., 15, 27
Santa Catalina Mts., Pima and Pinal Cos.: Bromfield, C. S., 2; Butler, B. S., 18; Davis, W. M., 18; DuBois, R. L., 4; McCullough, E. J., Jr.; Peirce, F. L.; Tolman, C. F., Jr., 12; Voelger, K.
Santa Rita and Patagonia Mts.: Schrader, F. C., 4, 5, 6, 7, 8, 14
Sauceda Mts., Maricopa Co.: Weight, H. O., 2
Sedimentary Hills area, Tucson Mts., Pima Co.: Bennett, P. J.
Segi Mesas, Navajo Co.: Cooley, M. E., 9
Seven Dash Ranch area, Cochise Co.: Cook, F. S.
Seventy-Nine mine area, Gila Co.: Kiersch, G. A., 1, 2, 3
Shinumo quad., Coconino Co.: Noble, L. F., 1, 3
Shiprock quad., Apache Co.: O'Sullivan, R. B., 2
Sierrita area, eastern Pima Co.: Lacy, W. C., 1
Sierrita Mts., Pima Co.: Ransome, F. L., 27
———, Sunshine area: Higdon, C. E.

AREAS DESCRIBED *(Continued)*

Silver and Eureka dists., Yuma Co.: Wilson, E. D., 69
Silver Bell, Pima Co.: Richard, K. E., 1; Stewart, C. A., 2, 3; Tolman, C. F., Jr., 6
Silver Bell Mts., Pima Co.: Barney, W. G.
Silver King area, Superior, Pinal Co.; Galbraith, F. W., 1
Slate Mts., Pinal Co.: Hogue, W. G., 1
Southern Pacific Lines: Darton, N. H., 21
Springerville-St. Johns area, Apache Co.: Sirrine, G. K.
Sulphur Springs Valley, Cochise Co.: Gilluly, J., 7; Meinzer, O. E., 1
Sunset Crater, Coconino Co.: Colton, H. S., 1, 13, 16, 17; Cosner, O. J.; Muench, J. R., 1; Nichols, T.; Smiley, T. L., 2
Superior area, Pinal Co.: Galbraith, F. W., 1; Hammer, D. F., 2; Ransome, F. L., 20; Short, M. N., 3, 4; Steele, H. J., 3; Wardwell, H. R.
Superstition Mts.: Shaw, V., 1
Sweetwater Drive area, Tucson, Mts., Pima Co.: Coulson, O. B.
Swisshelm dist., Cochise Co.: Galbraith, F. W., 9
Swisshelm Mts., Cochise Co.: Loring, W. B.
Sycamore Canyon, Yavapai and Coconino Cos.: Price, W. E., Jr., 1, 2, 3, 4
Sycamore Ridge, Pima Co.: Jones, W. R.
Toh-Atin gas field, Apache Co.: Vaughan, R. H.
Tombstone dist., Cochise Co.: Ransome, F. L., 26; Tenney, J. B., 11
Tombstone Hills, Cochise Co.: Gilluly, J., 7
Tonto Basin, Gila Co.: Lance, J. F., 12
Toronado-Tam O'Shanter area, Gila Co.: Kiersch, G. A., 5
Tortilla Mts.: Pinal Co.: Schwartz, R. J.
Tuba City and Charlie Day Spring, Coconino Co.: Colton, H. S., 7
Tuba Oasis, Coconino Co.: Gregory, H. E., 6
Tucson Mts., Pima Co.: Bennett, P. J.; Brown, W. H., 3; Coulson, O. B.; Jenkins, O. P., 2; Tolman, C. F., Jr., 1; Whitney, R. L.
Tucson quad., Pima Co.: Moore, B. N., 3
Tucson region, Pima Co.: Blake, W. P., 49
Tumamoc Hills, Tucson Mts., Pima Co.: Tolman, C. F., Jr., 1
Turquoise dist., Cochise Co.: Ransome, F. L., 16, 18
Twin Buttes dist., Pima Co.: Gordon, E. R.; Houser, F. N.; Thacpaw, S. C.
Twin Peaks, Pima Co.: Britt, T. L.
Uinkaret Plateau, Mohave Co.: Koons, E. D., 1, 2
United States and Mexican Boundary: Parry, C. C., 1
United States Pacific Railroad exploration: Antisell, T.
Vanar quad, Cochise Co.: Sabins, F. F., Jr., 3
Vekol Mts., Pinal Co.: Carpenter, R. H., 1
Verde River lake beds, Yavapai Co.: Jenkins, O. P., 3
Verde Valley, Maricopa Co.: McDonald, H. R., 1, 2
Verde Valley, Yavapai Co.: Twenter, F. R., 4, 5, 6
Vermillion Cliffs region, Coconino Co.: Wilson, R. F., 2
Walker Canyon, Santa Cruz Co.: Nelson, F. J.
Walnut Canyon, Coconino Co.: Colton, H. S., 8
Walnut Grove Basin, Yavapai Co.: Plafker, L.
Waterman Mts., Pima Co.: McClymonds, N. E., 1
Wellton-Mohawk area, Yuma Co.: Babcock, H. M., 3; Metzger, D. G., 2
West Kaibab fault zone, Coconino Co.: Strahler, A. N., 7
Whetstone Mts., Cochise and Pima Cos.: Tyrell, W. W., Jr.
———, Middle Canyon: Burnette, C. R.
White Mesa dist., Coconino Co.: Read, C. B., 1
Wickenburg area, Maricopa and Yavapai Cos.: Metzger, O. H.
Williams River dam site: Eckel, E. B., 3
Wupatki National Monument, Coconino Co.: Cosner, O. J.

AREAS DESCRIBED *(Continued)*
Yampai Cliffs, Mohave Co.: Wood, W. H., 1
Yavapai Co.: Sparkes, G. M., 1, 2
———, south-central: St. Clair, C. S., 1, 3
Yuma Co., northern: Bancroft, H., 4
———, southern: Frank, F. J.; Wilson, E. D., 15
Yuma Desert: Wilson, E. D., 12
Zion Park region: Gregory, H. E., 15
Zuni River, Sitgreaves, L.

ASBESTOS *See* NONMETALLIFEROUS MINERAL COMMODITIES, Asbestos

BARITE *See* NONMETALLIFEROUS MINERAL COMMODITIES, Barite

BENTONITE *See* NONMETALLIFEROUS MINERAL COMMODITIES, Bentonite

BIBLIOGRAPHIES
Andalusite: Grametbaur, A. B.
Anhydrite: Withington, C. F., 1
Asbestos: Avery, R. B.
Barite deposits: Dean, B. G.
Bituminous substances exclusive of coals: Jones, H. N.
Carbonaceous deposits, radioactive: Cooper, M., 1
Coal and carbonaceous shale, uranium-bearing: Kehn, T. M.
Dumortierite: Grametbaur, A. B.
Geology: Anthony, J. W., 3; Hooker, M.; Lutrell, E.; Wilson, E. D., 23
Gypsum: Withington, C. F., 1
Hayden survey: Schmeckebier, L. F.
High-calcium limestone: Gazdik, G. C.
Iron ore: Luttrell, G. W.
King survey: Schmeckebier, L. F.
Kyanite: Grametbaur, A. B.
Limestone, high-calcium: Gazdik, G. C.
Marine black shales, uranium-bearing: Fix, C. E.
Mercury: Ebner, M. J.
Mineral resources: Anthony, J. W., 3; Wilson, E. D., 23
Mining, Arizona: Lutrell, E.
Paleontology: Miller, H. W., Jr., 1
Powell survey: Schmeckebier, L. F.
Pyrophyllite: Grametbaur, A. B.
Radioactive bituminous substances, exclusive of coals: Jones, H. N.
Radioactive carbonaceous deposits: Cooper, M., 1
Radioactive occurrences: Cooper, M., 3
Salt deposits: Lang, W. B.
Sandstone-type uranium deposits: Melin, R. E.
Shale, uranium in: Fix, C. E.
Silica, high grade: Jaster, M. C., 2
Sillimanite: Grametbaur, A. B.
Thorium: Cooper, M., 3; Soister, P. E.
———, in carbonaceous deposits: Cooper, M., 1
Titanium deposits: Lawthers, R. L.
Topaz: Grametbaur, A. B.
Trace elements: Wallace, J. H.
Uranium: Cooper, M., 2, 3; Soister, P. E.
———, in carbonaceous deposits: Cooper, M., 1
———, in coal and carbonaceous shale: Kehn, T. M.
———, in marine black shale: Fix, C. E.
———, in native bituminous substances, exclusive of coals: Jones, H. N.

BIBLIOGRAPHIES *(Continued)*
Uranium, sandstone-type deposits: Melin, R. E.
U.S. Geological Survey publications relating to Arizona: Jenkins, O. P., 1
Wheeler survey: Schmeckebier, L. F.

BLACK MESA *See* AREAS DESCRIBED, Black Mesa

BORINGS *See* WELL AND DRILL-HOLE DATA

CALICHE *See* PETROLOGY AND PETROGRAPHY, Caliche

CAMBRIAN *See* PALEONTOLOGY; STRATIGRAPHY

CARBONIFEROUS *See* PALEONTOLOGY, Carboniferous, Mississippian, Pennsylvanian; STRATIGRAPHY, Carboniferous, Mississippian, Pennsylvanian

CAVES
Catalina Mts., Pima Co.: Priser, J.
Copper Queen, Bisbee, Cochise Co.: Beasley, W. L.; Hovey, E. O., 2
Ice cave: Stewart, W. O.
Montezuma: Lange, A. L., 3
Muav: Laudermilk, J. D., 1
Paho, Walnut Canyon, Coconino Co.: Schley, R. A.
Papago Spring: Colbert, E. H., 1; Roosevelt, Q.
Rampart: Laudermilk, J. D., 1; Martin, P. S., 1, 2; Miller, L.; Wilson, R. W.
Roaring Springs: Seagle, E. F.
Shattuck mine, Bisbee: Wilson, P. D., 1
Ventana: Bryan, K., 21; Haury, E. W., 2, 3

CENOZOIC *See* PALEONTOLOGY, Cenozoic; STRATIGRAPHY, Cenozoic; STRUCTURAL GEOLOGY, Cenozoic

CLIMATE *See* HISTORICAL GEOLOGY, Climate

COAL *See* FUELS, Coal

COLLAPSED STRUCTURES *See* STRUCTURAL GEOLOGY, Breccia Pipes, Collapsed Structures, Diatremes

COLORADO PLATEAU *See* AREAS DESCRIBED, Colorado Plateau

COPPER *See* METALLIFEROUS MINERAL COMMODITIES, *Copper;* MINES AND MINING DISTRICTS

CRETACEOUS *See* PALEONTOLOGY, Cretaceous; STRATIGRAPHY, Cretaceous

DAMS AND DAM SITES *See* ENGINEERING GEOLOGY

DEVONIAN *See* PALEONTOLOGY, Devonian; STRATIGRAPHY, Devonian

DIATOMACEOUS EARTH *See* NONMETALLIFEROUS MINERAL COMMODITIES, Diatomaceous earth

DIATREMES *See* STRUCTURAL GEOLOGY, Diatremes

ECONOMIC GEOLOGY *See also* ALTERATION; MINES AND MINING DISTRICTS; METALLIFEROUS MINERAL COMMODITIES; NONMETALLIFEROUS MINERAL COMMODITIES
Aerial photos, use of: Loel, W.
Asbestos, origin: Taber, S., 1
Bajada placers: Webber, B. N., 5
Basin and Range Province: Carpenter, R. H., 2; Stringham, B., 1; Tenney, J. B., 7
Bedded manganese deposits, Lake Mead region: McKelvey, V. E., 1
Bedding replacement deposits, Magma mine: Sell, J. D., 2
Block caving, San Manuel, geologic factors: Wilson, E. D., 76, 86
Bornite-chalcocite microtextures: Schwartz, G. M., 7
Bornite-chalcopyrite intergrowths: Schwartz, G. M., 2
Boxwork siderite: Trischka, C., 4

ECONOMIC GEOLOGY *(Continued)*
Breccia and pebble columns: Bryner, L., 3; Locke, A., 2
Breccia pipes: Johnston, W. P., 1, 2; Joralemon, I. B., 5; Kuhn, T. H., 3
Central Arizona Batholith: Ettlinger, I. A., 1
Chinle formation: Wilson, R. L., 2
Cinnabar veins bearing tourmaline: Hummel, K.; Lausen, C., 3
Contact metasomatic deposits: Baker, A., 3d., 1; Knopf, A; MacKenzie, F. D., 1
———, Silver Bell: Buseck, P. R.
———, Washington Camp, Santa Cruz Co.: Crosby, W. O.
Copper carbonate, deposition from mine water: Wilson, P. D., 3
Copper deposits: Butler, B. S., 14; Calkins, F. E., 2; Ely, F. B.; Ransome, F. L., 36; Schmitt, H. A., 7; Tenney, J. B., 10; Wisser, E. H., 2
———, Kaibab Plateau: Jennings, E. P.; Lunt, H. F.
———, southern Arizona: Tolman, C. F., Jr., 3, 9
Copper-molybdenum ore, relations to pegmatites: Lutton, R. J., 3
Copper ore and garnet: Blake, W. P., 41
Copper schist deposits: Crampton, T. H. M.
Deep-level chalcocite, Magma mine: Short, M. N., 1
Depth relations: Butler, G. M., 5, 6
Detrital copper deposits: Tovote, W. L., 9
Differentiation and ore deposition: Lindgren, W., 18
Dispersion of copper: Lovering, T. S., 3
Disseminated copper deposits: Locke, A., 3; Schmitt, H. A., 6; Tolman, C. F., Jr., 4
Downward sulfide enrichment: Ransome, F. L., 13
Enrichment of ore deposits: Emmons, W. H., 1, 2; Probert, F. H., 1; Schwartz, G. M., 13; Short, M. N., 2
Epithermal precious metal deposits: Nolan, T. B., 1
Estimation of ore reserves: Jackson, C. F.; Probert, F. H., 2; Ziesmer, H. M., 2
Folded rocks, relation of ore deposits to: Newhouse, W. H., 1; Wilson, E. D., 11
General: Bateman, A. M., 3; Butler, B. S., 7; Emmons, W. H., 3; Forrester, J. D., 1; Mitcham, T. W., 4; Ries, H.; Tarr, W. A., 2; Wishaw, Q. G.
Genesis of ore deposits: Adler, H. H.; McKelvey, V. E., 3; Miller, D. S., 3; Rickard, T. A., 1
Genesis of uranium belts: Noble, E. A.
Geologic controls in oil and gas exploration: Zeller, R. A., Jr.
Geologic guides to ore deposits: Weed, W. H., 7
Geologic guides to uranium prospecting: Weir, D. B.; Wood, H. B., 1
Geology applied to mining: Bjorge, G. N.; DeWilde, E. J., 1; Michell, W. D.
Geothermal gradients: Lovering, T. S., 1, 2
Gila River Indian Reservation: Wilson, E. D., 93
Gold in granite and plutonic rocks: Blake, W. P., 16
Historical review: Ransome, F. L., 35
Host minerals of native gold: Schwartz, G. M., 10
Hydrothermal emplacement of uranium: McKelvey, V. E., 3
———, Colorado Plateau: International Conference of Peaceful Uses of Atomic Energy; Kerr, P. F., 4, 5
———, southeastern Arizona: Bissett, D. H.
Hypogene zoning, Magma mine: Gustafson, L. B.
Leached outcrops: Blanchard, R.; Locke, A., 1
Leaching: Butler, G. M., 7
Lead deposits, vanadium, molybdenum, tungsten, and chromium in: Newhouse, W. H., 2
Limestone replacement deposits, origin: Garrels, R. M., 1
Lithium bearing pegmatites, Wickenburg: Jahns, R. H., 2, 3
Magmatic differentiation, Silver Bell: Stewart, C. A., 3

ECONOMIC GEOLOGY *(Continued)*

Magmatic iron ore, Eureka dist., Yavapai Co.: Ball, S. H., 1
Magmatic origin of ore solutions: Tovote, W. L., 5
Manganese oxide deposits: Hewett, D. F., 7, 8
Mercury deposits: Schuette, C. N., 1, 2
Mercury in Chinle shales, Lees Ferry region: Lausen, C., 11
Mesothermal copper veins and replacements: Hart, L. H.
Mesothermal deposits: McKnight, E. T., 1
Metalliferous deposits, structural relations: Schmitt, H. A., 2
Metallogenetic epochs: Lindgren, W., 11
Metallogenetic history: Schmitt, H. A., 1
Metallogenic provinces: Burnham, C. W.
Mineral deposits: Lindgren, W., 13
Mineral veins, structure of: Silliman, B., Jr., 3
Mineralization: Butler, B. S., 5; Lindgren, W., 18
———, Ajo dist.: Gilluly, J., 6
———, Bagdad area: Anderson, C. A., 5, 6
———, Colorado Plateau uranium deposits: Miesch, A. T., 2; Weeks, A. D., 3
———, structural control, Seventy-nine mine: Kiersch, G. A., 2
Mineralization stoping: Locke, A., 2
Ore deposition: Lindgren, W., 18
———, Cretaceous and Tertiary: Wilson, E. D., 92
———, relation to faulting: Spurr, J. E., 2
———, relation to folded rocks: Newhouse, W. H., 1; Wilson, E. D., 11
———, relation to igneous rocks: Austin, W. L.; Butler, B. S., 5
———, stratigraphic relations: Butler, B. S., 5
———, structural control, Tombstone: Butler, B. S., 9, 13, 16
———, structural relations: Butler, B. S., 5; Schmitt, H. A., 2
Ore deposits: Lindgren, W., 13; Ransome, F. L., 34
———, correlation with volcanic rocks: Damon, P. E., 6, 12, 13
———, regional relations: Butler, B. S., 3
———, some facts about: Butler, G. M., 32
Ore deposits of the Southwest: Ransome, F. L., 34
Ore districts, structural relations: Billingsley, P., 4; Wisser, E. H., 2
———, tectonic position: Billingsley, P., 1
Ore guides, uranium: Evenson, C. G., 2; Mitcham, T. W., 1, 2
Ore horizons, Bisbee: Rove, O. N., 1, 2
Ore localization, southern Arizona: Mayo, E. B., 7
Ore magmas: Spurr, J. E., 3
Ore shoots, outcrops of: Schmitt, H. A., 3
Ore solutions: Tovote, W. L., 5
Ore textures: Schwartz, G. M., 1
Oxidation, San Manuel: Lovering, T. S., 1, 2
———, sulfide ore bodies: Sato, M.; Williams, S. A., 5
———, zinc deposits: Heyl, A. V.
Oxidation and enrichment: Schwartz, G. M., 13
Paragenesis, Magma mine: Gustafson, L. B.
———, Miami mine: Legge, J. A., Jr.
———, oxidized ores of copper: Schwartz, G. M., 4
Paragenetic studies, silver: Guild, F. N., 7
———, uranium: Laverty, R. A.
Pipe deposits, Copper Creek area: Kuhn, T. H., 2, 3
Pipe deposits in porphyries: Weed, W. H., 8
Porphyry deposits: Channing, J. P.; Creasey, S. C., 8; Parsons, A. B., 1, 3; Sales, R. H.; Schwartz, G. M., 9, 11, 12, 13, 16; Starnes, X. B.; Stringham, B., 1, 2; Tovote, W. L., 6

ECONOMIC GEOLOGY *(Continued)*
Protore: Ransome, F. L., 19
Pyritic copper deposits: Kania, J. E. A.
Pyrometasomatic deposits: Baker, A., 3d., 1; Knopf, A.; MacKenzie, F. D., 1
Replacement: Butler, B. S., 4; Mitchell, G. J., 3
Sampling and estimation of ore deposits: Hazen, S. W., Jr., Jackson, C. F.; Ziesmer, H. M., 2
San Juan oil field: Woodruff, E. G.
Sandstone deposits: Fischer, R. P., 5; Wright, R. J., 3
Santa Cruz Batholith: Bond, J., 2
Secondary enrichment: Burgess, J. A., 1; Butler, G. M., 8; Emmons, S. F., 2; Probert, F. H., 1
Sedimentary deposits: Finch, J. W., 1
———, copper: Bains, T. H.; Finch, J. W., 2; Fischer, R. P., 2, 5
———, manganese: Hewett, D. F., 4
———, silver: Fischer, R. P., 2
———, uranium and vanadium: Fischer, R. P., 2, 5; Hostetler, P. B.; Peterson, R. G., 4
Sedimentary metalliferous deposits, red beds: Finch, J. W., 1
Sedimentary relations in uranium deposits: Stokes, W. L., 5; Witkind, I. J., 1
Sedimentary trends as ore indicators: Stokes, W. L., 4
Silica outcrops, Bisbee: Trischka, C., 2
Silver and gold deposition: Tovote, W. L., 7
Silver ores, primary: Bastin, E. S., 1, 2
Statistical analysis applied to uranium exploration: Bates, R. C.
Stratigraphic relations in uranium deposits: Stokes, W. L., 5; Wood, H. B., 2
Structural control of ore deposition: Anderson, C. A., 5; Butler, B. S., 13, 16; Kiersch, G. A., 2
Structural relations of certain metalliferous deposits: Schmitt, H. A., 2
Structural relations of uranium deposits: Shoemaker, E. M., 3; Stokes, W. L., 5
Structure of mineral veins: Silliman, B., Jr., 3
Sulfide ore bodies, oxidation: Sato, M.; Williams, S. A., 5
Tourmaline-bearing cinnabar veins: Hummel, K.; Lausen, C., 3
Uranium deposits, emplacement of: Kerr, P. F., 5
———, exploration guides: Wood, H. B., 1
———, origin: Adler, H. H.; McKelvey, V. E., 3; Miller, D. S., 3
———, origin from diabase, Dripping Spring dist.: Neurburg, G. J.
———, relation to alteration and mineral zones: Abdel-Gawad, A., 1, 2; Gabelman, J. W., 2; Kerr, P. F., 3, 7
———, relation to origin of host rocks: Wood, H. B., 2
———, roll ore bodies, Colorado Plateau: Shawe, D. R.
———, structural control: Gabelman, J. W., 2; Mitcham, T. W., 2
Vein phenomena: Comstock, T. B., 5
Vein walls: Rickard, T. A., 2
When mining is not a gamble: Carpenter, M. M., 1
Zinc and lead deposits: Wilson, E. D., 58
Zoning in ore deposits: Anderson, J. C., 2

ENGINEERING GEOLOGY
Aggregate for Davis Dam: Rhoades, R. F.
Boulder Canyon: U.S. Bureau of Reclamation, 2
Boulder (Hoover) Dam site: Berkey, C. P., 1, 2; Ransome, F. L., 30
Bridge Canyon dam site: Mielenz, R. C.
Clay, use in development of water resources: Kiersch, G. A., 6
Colorado River Basin: Willis, B., 2
Colorado River dam sites: LaRue, E. C., 1, 2
Colorado River water, quality: Howard, C. S., 1, 3, 4

ENGINEERING GEOLOGY *(Continued)*
Colorado River water, suspended matter: Howard, C. S., 2, 5
Construction materials: Kiersch, G. A., 9, 12, 13
Dams, high: Ransome, F. L., 30, 33
———, rock-filled, Lees Ferry: Bryan, K., 5, 7
Dam sites, Boulder Canyon: Berkey, C. P., 2; U.S. Bureau of Reclamation, 2
———, Bridge Canyon: Mielenz, R. C.
———, Colorado River: LaRue, E. C., 1, 2
———, Glen Canyon: Irwin, W. H.; Lasson, G. D.; Phoenix, D. A., 3
———, Hoover: Berkey, C. P., 1, 2; Nickell, F. A.; Ransome, F. L., 30
———, Kirkland Creek: Eckel, E. B., 3
———, Lees Ferry: Bryan, K., 5, 7; Phoenix, D. A., 3
———, Tres Alamos, San Pedro River: Montgomery, E. L.
———, Williams River: Eckel, E. B., 3
Davis Dam, aggregate for: Rhoades, R. F.
Davis Dam area: U.S. Bureau of Reclamation, 3
Density currents, Lake Mead: Howard, C. S., 6
Development of water resources, use of clay in: Kiersch, G. A., 6
Diamond drilling, United Verde mine: Hansen, M. G., 3
Drilling techniques, exploration, Colorado Plateau: Kellogg, J. P.
Evaporation: Horton, R. E.; Kohler, M. A.; Meyers, J. S.
———, Lake Mead: Harbeck, G. E.
———, Salt River reservoirs: Koberg, G. E.
Evapotranspiration: Lewis, D. D.
Exploration drilling techniques, Colorado Plateau: Kellogg, J. P.
Glen Canyon dam sites: Irwin, W. H.; Lasson, G. D.; Phoenix, D. A., 3
Headgate Rock, Parker area: Strahorn, A. T.
Hoover Dam site: Berkey, C. P., 1, 2; Nickell, F. A.; Ransome, F. L., 30
Industrial utility of public water supplies: Lohr, E. W.
Kirkland Creek dam site: Eckel, E. B., 3
Lakes and reservoirs: Park, J. C.
Lake Mead: Thomas, H. E., 1
———, density currents: Howard, C. S., 6
———, evaporation: Harbeck, G. E.
———, reservoir loading: Carder, D. S., 1, 3, 4
———, sedimentation: Nichols, H. R.; Sherman, I.; Smith, W. O.; Vetter, C. P.
———, surficial sediments: Rolfe, B. N.
Lees Ferry, rock-filled dam: Bryan, K., 5, 7
Lees Ferry-Glen Canyon dam area: Phoenix, D. A., 3
Lone Pine reservoir, east-central Arizona: Kiersch, G. A., 7; Reiche, P., 1
Mine rock, physical properties: Windes, S. L.
Oil wells, Paradox Basin: MacAlister, R. S., Jr.
Reference lists: Happ, S. C.
Reservoirs: Park, J. C.; Thomas, N. O.
———, evaporation from: Harbeck, G. E.; Koberg, G. E.
———, loading effects: Carder, D. S., 1, 2, 3, 4
———, sedimentation: Hains, C. F.; Nichols, H. R.; Rolfe, B. N.; Sherman, I.; Smith, W. O.; Thorp, E. M.; Vetter, C. P.
San Carlos reservoir, sedimentation: Thorp, E. M.
Stream gaging data: Wood, B. D.
Water related to copper production: Michaelson, S. D.
Water resources, use of clay in development of: Kiersch, G. A., 6
Water storage, Gila River: Lippincott, J. B.
———, Salt River: Davis, A. P., 2
Water supplies, public, industrial utilization of: Lohr, E. W.
Williams River dam site: Eckel, E. B., 3

EVAPORATION *See* ENGINEERING GEOLOGY
FAULTS AND FAULTING *See* STRUCTURAL GEOLOGY
FORMATIONS *See* STRATIGRAPHY
FOSSILS *See* PALEONTOLOGY
FRACTURING *See* STRUCTURAL GEOLOGY
FUELS
Arizona: Forrester, J. D., 1; Mineral Industry; Mineral Resources of the United States; Minerals Yearbook; Pye, W. D., 7
———, central, oil and gas possibilities: Huddle, J. W., 3
———, northern, oil and gas exploration: Hager, D., 7
———, northern, oil and gas possibilities: Brown, S. C., 8, 9; McKee, E. D., 43, 44
———, northeastern, oil and gas possibilities: Brown, S. C., 10; Hager, D., 5; Huddle, J. W., 3
———, northwestern, oil and gas possibilities: Sandberg, G. W.; Swapp, C. W., 2
———, southern, oil and gas possibilities: Brown, S. C., 5
———, southeastern, oil and gas exploration: Zeller, R. A., Jr.
———, southeastern, oil and gas possibilities: Buck, L. I; Kottlowski, F. E., 3
———, southwestern, oil and gas possibilities: McCarthy, D. P.
Black Mesa coal fields: Campbell, M. R., 4; O'Sullivan, R. B., 1; Williams, G. A.
Black Mesa, oil exploration: Colton, R. E.
Coal: Andrews, D. A., 2; Rubel, A. C., 2
———, analyses: Lord, N. W.; U.S. Bureau Mines, 1; Whitfield, E.
———, anthracite: Blake, W. P., 19; Griffith, W.
———, bitumin: Morgan, W. C., 1
———, bituminous seams, thickness: Young, W. H., 1, 2
———, Black Mesa: Campbell, M. R., 4; O'Sullivan, R. B., 1; Williams, G. A.
———, briquetting industry: Parker, E. W.
———, burning temperature in seams: Brady, L. F., 15
———, Carboniferous in Arizona: Dumble, E. T., 2
———, Cretaceous in Arizona: Pye, W. D., 6; Williams, G. A.
———, Deer Creek: Campbell, M. R., 1; Devereaux, W. B.; Walcott, C. D., 3; Whitfield, E.
———, Fort Defiance quad.: Allen, J. E.
———, Hopi mines: Colton, H. S., 11
———, Mesa Verde formation: Keyes, C. R., 58
———, Mogollon Rim region: McGoon, D. O., Jr.
———, Navajo Country: Gregory, H. E., 10
———, Navajo-Hopi Indian Reservations: Kiersch, G. A., 14; Krumlauf, H. E.
———, Paleozoic, Mogollon Rim region: McGoon, D. O., Jr.
———, Pinedale, Navajo Co.: Reagan, A. B., 7; Veatch, A. C.
———, reserves: Averitt, P., 2
———, uranium with: Breger, I. A., 2; Kehn, T. M.; Vine, J. D.
Deer Creek coal fields: Campbell, M. R., 1; Devereaux, W. B.; Walcott, C. D., 3; Whitfield, E.
Drilling data, oil and gas: Arizona Oil Report.
Elgin vicinity, Klene structure: MacKay, D. K.
Exploratory drilling: Budd, H., 2, 3, 4; Colton, R. E.; Gardner, F. J., 1, 3; Hager, D., 7; Knapp, L. M.; World Oil; Zeller, R. A., Jr.
Fort Defiance quad., coal and oil resources: Allen, J. E.
Four Corners area, oil and gas: Feemster, L. T.; Gardner, F. J., 2, 3; Knapp, L. M.; Kuhn, P. J.; Picard, M. D., 1, 4; Wengerd, S. A., 2
Gas: Mathews, R. D., 1, 2, 3; Umbach, P. H., 1, 2, 3
———, drilling data: Arizona Oil Report

FUELS *(Continued)*
Gas, exploration: Gardner, F. J., 1, 3; Hager, D., 7; World Oil; Zeller, R. A., Jr.
———, Four Corners area: Feemster, L. T.; Kuhn, P. J.; Picard, M. D., 1, 4
———, helium-bearing: Munnerlyn, R. D.
———, Mississippian: Picard, M. D., 4
———, Navajo-Hopi Indian Reservations: Brown, S. C., 7; Kiersch, G. A., 14
———, North Toh-Atin field, Apache Co.: Vaughan, R. H.
———, Paradox Basin: Putman, C. C.
———, Pennsylvanian: Picard, M. D., 1
———, possibilities: Brown, S. C., 5, 6, 7, 8, 9, 10; Buck, L. I.; Huddle, J. W., 3; Lund, P. H.; McCarthy, D. P.; McKee, E. D., 43, 44; Pye, W. D., 8; Swapp, C. W., 2
———, production: Colby, D. S.
———, radioactive minerals in: Pierce, A. P.
Holbrook area, oil possibilities: Hager, D., 1, 2
Hopi mines, coal: Colton, H. S., 11
Kanab area, oil possibilities: Heylmun, E. B., Jr.
Klene structure, Elgin vicinity: MacKay, D. K.
Land and leasing information: Arizona Oil Report; Putman, C. C.
Lignite seams, thickness: Young, W. H., 1, 2
Mesa Verde coal formation: Keyes, C. R., 58
Mogollon Rim region, Paleozoic coal: McGoon, D. O., Jr.
Navajo-Hopi Indian Reservations, coal mines: Krumlauf, H. E.
———, oil and gas: Brown, S. C., 7; Kiersch, G. A., 14
North Toh-Atin gas field, Apache Co.: Vaughan, R. H.
Oil: Butler, G. M., 15, 26
———, Black Mesa: Colton, R. E.; Forrester, J. D., 3
———, developments: Bates, R. L., 1, 2; Budd, H., 1; Mathews, R. D., 1, 2, 3; Umbach, P. H., 1, 2, 3
——— exploratory drilling: Arizona Oil Report; Budd, H., 2, 3, 4; Colton, R. E.; Gardner, F. J., 1, 2, 3; Hager, D., 7; Knapp, L. M.; World Oil; Zeller, R. A., Jr.
———, Fort Defiance quad.: Allen, J. E.
———, Four Corners area: Feemster, L. T., 3; Gardner, F. J., 2; Knapp, L. M.; Kornfeld, J. A.; Kuhn, P. J.; Wengerd, S. A., 2
———, geology: Butler, G. M., 3
———, Holbrook area: Hager, D., 1, 2
———, Kanab area: Heylmun, E. B., Jr.
———, Klene structure, Elgin vicinity: McKay, D. K.
———, land and leasing: Arizona Oil Report; Putman, C. C.
———, Mesozoic sediments, Four Corners region: Knapp, L. M.
———, Navajo-Hopi Indian Reservations: Brown, S. C., 7; Kiersch, G. A., 14
———, Paradox Basin: MacAlister, R. S., Jr.; Putman, C. C.
———, Pennsylvanian sediments, Four Corners region: Wengerd, S. A., 2
———, petroleum withdrawals and restoration: Ball, M. W.
———, possibilities: Allen, J. E.; Botsford, C. A.; Brown, S. C., 5, 6, 7, 8, 9, 10; Buck, L. I.; Holm, D. A.; Huddle, J. W., 1, 3; Kottlowski, F. E., 3; Lund, P. H.; McCarthy, D. P.; McKee, E. D., 38, 43, 44; Pye, W. D., 8; Sandberg, G. W.; Stoyanow, A. A., 1; Swapp, C. W., 1, 2; Wengerd, S. A., 2
———, production: Arizona Oil Report
———, radioactive minerals in: Hyden, H. J.; Pierce, A. P.
———, San Juan field: Bieberman, R. A.; Woodruff, E. G.
———, Willcox region, Cochise Co.: Stoyanow, A. A., 1
Petroleum withdrawals and restorations: Ball, M. W.
Pinedale coal deposits: Reagan, A. B., 7; Veatch, A. C.

FUELS *(Continued)*
San Juan Basin oil field: Biberman, R. A.; Woodruff, E. G.
Willcox region, Cochise Co., oil prospects: Stoyanow, A. A., 1
GAS *See* FUELS, Gas
GEMS AND GEM MATERIALS
Agate: Getsinger, F.; Kunz, G. F., 1, 3
Apache tears: Moore, H. R.
Chalcedony, Aguila area: Treolar, T.
Diamond in meteoric iron: Carter, N. L.; Foote, A. E., 1; Kunz, G. F., 5
Diamond swindle: Farish, T. E., 1; Rickard, T. A., 13
Ft. Defiance quad., Apache Co.: Allen, J. E.
Garnet: Aitkens, I.; Trainer, J. N.
———, Navajo-Hopi Indian Reservations: Dubois, R. L., 1
General: Culin, F. L., Jr., 8; Duke, A.; Kunz, G. F., 6; Ransom, J. E., 3; Schlegel, D. M.
Geodes, Kofa Mts., Yuma Co.: Walker, L. W.; Weight, H. O., 1
"Green" amethyst, Four Peaks, Mazatzal Mts.: Sinkankas, J.
Jasper: Taylor, F.
Mining by Indians: Ball, S. H., 2
Navajo Country: Gregory, H. E., 10
Olivine: Rocks and Minerals, 2
Onyx marble: Bowles, O., 3; Dekalb, C., 1; Merrill, G. P., 1
———, northern Arizona: McKee, E. D., 29
Opal: Schell, B. E.
Pink marble: Strong, M. F.
Semi-precious stones, Navajo-Hopi Indian Reservations: Kiersch, G. A., 8
Serpentine: Rocks and Minerals, 3
Turquoise: Hill, G. F.
———, Courtland area, Cochise Co.: Crawford, W. P., 2
———, Mineral Park area, Cerbat Mts., Mohave Co.: Sterrett, D. B., 1
———, Mohave Co.: Frenzel, A. B.; Johnston, B.
GEOCHEMISTRY
Anomaly near Jerome: Huff, L. C., 3, 4
"Basalts," southern Arizona: Halva, C. J.
Beryllium, southern Arizona: Balla, J. C.
Biogeochemical data, San Manuel copper deposit: Warren, H. V., 2
Biogeochemical heating of mud, Lake Mead: ZoBell, C. E.
Botanical methods of prospecting, Colorado Plateau: Cannon, H. L., 1, 2, 3, 4
Cat Mountain rhyolite, Tucson Mts., Pima Co.: Bickerman, M., 1
Copper: Huff, L. C., 2
———, deposits in sandstone: Fischer, R. P., 5
———, Dripping Spring dist.: Neurburg, G. J.
———, Pima dist.: Huff, L. C., 5
———, Ray area: Clarke, O. M., Jr., 2
Devonian iron formation: Willden, C. R., 2
Dispersion of copper, San Manuel: Lovering, T. S., 3
Elements in sedimentary rocks, Colorado Plateau: Newman, W. L.
Fluorine in volcanic rocks: Coats, R. R., 3
Heavy metals, detection: Huff, L. C., 1
Iron in sandstone, Oljeto syncline, Navajo Co.: Phoenix, D. A., 1
Lead: Huff, L. C., 2; Miller, D. S., 2
Limestone replacement deposits: Garrels, R. M., 1
Prospecting, Johnson Camp, Cochise Co.: Cooper, J. R., 2
———, Ray area: Clarke, O. M., Jr., 2
Rhenium in plant samples, Colorado Plateau: Myers, A. T.
Sodium-potassium ratios in muscovites: Hedge, C. E.

GEOCHEMISTRY *(Continued)*
Soil sampling, Mission mine area: Canney, F. C.
Trace elements in igneous rocks: Putman, G. W., 2
Trace elements in volcanic rocks: Coats, R. R., 1
Sulfur isotopes: Ault, W. U.; Jensen, M. L.
Uraninite, Bisbee: Bain, G. W., 1
Uranium, Annie Laurie prospect, Santa Cruz Co.: Anderson, R. Y., 2
———, Colorado Plateau: Garrels, R. M., 2; Holland, H. D.; Jensen, M. L.; Miesch, A. T., 1, 3; Stieff, L. R., 2
———, in diabase, Dripping Spring dist.: Neurburg, G. J.
———, isotopic studies: Jensen, M. L.; Miller, D. S., 1, 2, 3; Rosholt, J. N., Jr.; Stieff, L. R., 2
———, organic geochemistry: Breger, I. A., 1
———, plants, association with: Anderson, R. Y., 1; Cannon, H. L., 1
———, sandstone deposits: Fischer, R. P., 5; Jensen, M. L.
Vanadium, Colorado Plateau: Evans, H. T., Jr.
———, sandstone deposits: Fischer, R. P., 5
Zinc: Huff, L. C., 2
———, in magnetite, Bagdad area: Theobald, P. K., Jr.

GEOCHRONOLOGY
Basement rocks: Giletti, B. J.
———, Colorado Plateau: Damon, P. E., 5
Cochise culture: Antevs, E. V., 1
Copper-bearing porphyries: Creasey, S. C., 10
Diabase, Sierra Ancha Mts.: Damon, P. E., 9
Diabase-granophyre, central Arizona: Silver, L. T., 2
Discordant zircons, Santa Catalina Mts.: Catanzaro, E. J., 1, 2
Dragoon quad., Precambrian crystalline rocks: Silver, L. T., 2
Grand Canyon, role of caves in dating: Lange, A. L., 1
Igneous rocks: Aldrich, L. T., 1, 2; Creasey, S. C., 10; Damon, P. E., 1, 4; Jaffee, H. W.; Tilton, G. R.
Lake Cochise (Willcox Playa): Hevly, R. H., 1
Late Cenozoic volcanism: Sabels, B. E., 2, 3
Magnetite, Sierra Ancha Mts.: Damon, P. E., 9
Metamorphic rocks: Damon, P. E., 1, 4
Mogollon Rim: Sabels, B. E., 4
Ore deposits: Damon, P. E., 2, 3, 6, 12, 13; Walker, G. W., 2
Precambrian: Giletti, B. J.
———, Coconino Co.: Damon, P. E., 10
———, diabase differentiates, Gila Co.: Silver, L. T., 1
———, Gila Co.: Damon, P. E., 10; Silver, L. T., 1
———, Older: Aldrich, L. T., 1; Damon, P. E., 6, 8
———, Pinal Co.: Damon, P. E., 10
———, Yavapai Co.: Damon, P. E., 10
Radiocarbon dates: Damon, P. E., 7; Shutler, R., Jr.
Research program: Smiley, T. L., 1
Ruin granite, Sierra Ancha Mts.: Damon, P. E., 9
San Francisco Mtn. volcanic field: Sabels, B. E., 1, 2, 3
Sunset Crater, Flagstaff area: Smiley, T. L., 2
Uranium deposits: Walker, G. W., 2
———, Colorado Plateau: Eckelmann, W. R.; Miller, D. S., 3; Stieff, L. R., 1
Volcanic rocks: Damon, P. E., 2, 3, 6, 12, 13

GEOGRAPHIC DATA
Areas: Batschelet, C. E.
Arizona base map, index: Wilson, E. D., 1
Arizona-Mexican boundary: International Boundary Commission

GEOGRAPHIC DATA *(Continued)*
Arizona place names: Barnes, W. C., 2; Granger, B. H.
General: Douglas, E. M.
River profiles: Gannett, H.
U.S. Pacific Railroad exploration: Antisell, T.
GEOLOGIC MAPS *See* MAPS, *Geologic*
GEOMAGNETISM *See* GEOPHYSICS AND GEOPHYSICAL PROSPECTING
GEOMORPHOLOGY *See* PHYSIOGRAPHY AND GEOMORPHOLOGY
GEOPHYSICS AND GEOPHYSICAL PROSPECTING *See also* MAPS, *Aeromagnetic, Gravity*
Bagdad area, Yavapai Co.: Vacquier, V.
Buried channels, exploration of, Monument Valley: Black, R. A., 2; Wantland, D., 2
Cameron and Leupp quads: Akers, J. P., 6
Coconino sandstone, impact cratering: Moore, H. J.
Colorado Plateau: Black, R. A., 1; Jobin, D. A., 1, 2; Wantland, D., 1, 3
Doney Park-Black Bill Park area: Feth, J. H., 10
General: Butler, G. M., 17, 18, 19, 24
Geomagnetism, Tucson, Pima Co.: Chernosky, E. J.
Geothermal data: Darton, N. H., 11
———, San Manuel mine: Lovering, T. S., 1, 2
Gravity surveys, Carrizo Mts. area, Apache Co.: Plouff, D., 1
———, Meteor Crater, Coconino Co.: Harding, N.
———, Tucson area, Pima Co.: Plouff, D., 2
Ground water studies: Heinrichs, W. E., Jr., 2
Magnetism: Runcorn, S. K., 4
———, lava flows: Opdyke, N. D., 2
———, Pikes Peak iron deposit, Maricopa Co.: Sharp, R. R., Jr.
———, ringdike, Buell Park: DuBois, R. L., 6
Magnetograms, Tucson: U.S. Coast and Geodetic Survey
Meteor Crater: Bingham, W. F.; Jakosky, J. J., 1, 2; Lundberg, H.; Namba, M.; Nininger, H. H., 7
Mohave Co., western: Diment, W. H.
Paleomagnetic survey, Triassic rocks: Kintzinger, P. R.
Paleomagnetism: DuBois, R. L., 2; Runcorn, S. K., 2, 3
———, Colorado Plateau: Babbitt, B. E.; DuBois, R. L., 6; Runcorn, S. K., 1
———, Grand Canyon: Doell, R. R.
———, Pliocene-Pleistocene boundary: Opdyke, N. D., 1
Pima mine, Pima Co.: Grundstedt, H. G.; Heinrichs, W. E., Jr., 1; Thurmond, R. E., 1, 2, 3, 4
Radar surveys, Estrella and Salt River Mts.: Lyytikainen, K. T. E.
Radioactive magnetite: Green, W. D.
Radioactivity, prospecting by: Chew, R. T., 3d, 3
Radiometric survey (airborne): Tavelli, J. A.
———, Defiance Uplift and Carrizo Mts.: Johnson, R. W.
———, Dripping Spring quartzite: Magleby, D. N.
———, Painted Desert: Meuschke, J. L., 1
———, Pinto-Chinle area, Apache Co.: Meuschke, J. L., 2
———, southwestern Arizona: Peterson, A. M.
Resistivity investigations, Colorado Plateau: Davis, W. E.; Keller, G. V., 1
San Manuel area, Pinal Co.: Baldwin, R. W.
Sedimentary Hills area, Pima Co.: Davenport, R. E.
Seismology: Bodle, R. R.; Heck, N. H., 2; Wilson, E. D., 47
———, Boulder (Hoover) Dam area: Mead, T. C.
———, detection of ancient channels: Pakiser, L. C., Jr.
———, earthquake of 1912: Tolman, C. F., Jr., 10

GEOPHYSICS AND GEOPHYSICAL PROSPECTING *(Continued)*
Seismology, Grand Canyon: Donald, E. M.
———, reservoir loading effects, Lake Mead: Carder, D. S., 1, 2, 3, 4
———, Sonoran earthquake, 1887: Heck, N. H., 1
Tombstone, Cochise Co.: Staunton, W. F., 2
Twin Buttes quad., Pima Co.: Frischknecht, F. C., 1; Keller, G. V., 2
Verde Valley, Yavapai Co.: McDonald, H. R., 5

GOLD *See* METALLIFEROUS MINERAL COMMODITIES, *Gold;* MINES AND MINING DISTRICTS

GRAND CANYON *See* AREAS DESCRIBED, Grand Canyon

GROUND WATER AND WATER SUPPLY
Ajo area, Pima Co.: Du Moulin, W. L.
Altar-Avra Valley, Pima Co.: Andrews, D. A., 1
Analyses: Lohr, E. W.; Stabler, H.
———, Big Sandy Valley, Mohave Co.: Morrison, R. B., 2, 3
———, Contention mine, Tombstone, Cochise Co.: Clarke, F. W.
———, Duncan-Virden Valley, Greenlee Co.: Morrison, R. B., 5
———, fluoride content of municipal water supplies: Marx, G. W.
———, Graham Co.: U.S. Geol. Survey, 1
———, Greenlee Co.: U.S. Geol. Survey, 1
———, Mohawk-Wellton area, Yuma Co.: Babcock, H. M., 8
———, Navajo-Hopi Indian Reservations: Harshbarger, J. W., 13; Kister, L. R., 2
———, Queen Creek area, Maricopa & Pinal Cos.: Babcock, H. M., 2; Skibitzke, H. E., 1
———, Safford Valley, Graham Co.: Morrison, R. B., 4
———, Wellton-Mohawk area, Yuma Co.: Babcock, H. M., 8
Apache Co.: Cooley, M. E., 11
———, central: Akers, J. P., 12
Arid lands: Harshbarger, J. W., 12
Arizona: Arizona Underground Water Commission; Darton, N. H., 1; Dennis, P. E.; Guyton, W. F.; Harshbarger, J. W., 11, 14; Maddock, T., Jr.; Piper, A. M., 1; Schwalen, H. C., 4; Skinner, W. W.
———, annual reports, 1956-1962: Hardt, W. F., 1, 2, 3; Harshbarger, J. W., 8; White, N. D., 3, 4
———, central: Halpenny, L. C., 15; Queen, J. R.
———, northern: Darton, N. H., 2, 3
———, western: Lee, W. T., 5
Arizona Watershed Program: Arizona Water Resources Committee; Arizona Water Resources Commission-Arizona State Land Department.
Avra-Altar Valley, Pima Co.: Andrews, D. A., 1
Big Sandy Valley, Mohave Co.: Morrison, R. B., 1, 2, 3
Bill Williams River valley, Yuma and Mohave Cos.: Wolcott, H. N., 5
Black Bill Park-Doney Park area, Coconino Co.: Feth, J. H., 10
Black Mesa Basin: Akers, J. P., 2
Bonita Creek area, Graham Co.: Heindl, L. A., 17, 22
Buckeye Valley: Ibrahim, M. S.
Buell Park-Sawmill area, Navajo Co.: Whitcomb, H. A., 2
Cameron quad.: Akers, J. P., 6
Character: Catlin, C. N.
Chemical composition: Smith, H. V., 2
Chinle area, Navajo Indian Reservation: Halpenny, L. C., 4
Chiricahua National Monument, Cochise Co.: Johnson, P. W., 9
Chiu Chuischu area, Papago Indian Reservation, Pinal Co.: Skibitzke, H. E., 2; Yost, C. B., Jr.
Chuska Mts. area, Apache Co.: Harshbarger, J. W., 6

GROUND WATER AND WATER SUPPLY *(Continued)*
Coconino sandstone, Snowflake-Hay Hollow area, Navajo Co.: Johnson, P. W., 10
Colorado River Basin: Thomas, H. E., 4
———, lower: Hendrickson, G. E.; Khalaf, J. M.; Loeltz, O. J.; McDonald, C. C.; Metzger, D. G., 7, 8
———, upper: Iorns, W. V.; Phoenix, D. A., 4
Copper mine-Preston Mesa area, Coconino Co.: McClymonds, N. E., 6
Cottonwood Wash: Hendricks, E. L., 1
Data, collection of: Halpenny, L. C., 13
Date Creek area, Yavapai Co.: Babcock, H. M., 7
Deer Valley, Maricopa Co.: Bluhm, F. I.
Definition of terms: Halpenny, L. C., 2
Dendora area, Maricopa Co.: Armstrong, C. A.; Cahill, J. M., 1; Johnson, P. W., 4
Desert resources: Bailey, G. E.
Doney Park-Black Bill Park area, Coconino Co.: Feth, J. H., 10
Douglas Basin, Cochise Co.: Coates, D. R., 4, 7
Dripping Spring Basin, Gila and Pinal Cos.: Coates, D. R., 8
Duncan Basin, Greenlee Co.: Feth, J. H., 6; Halpenny, L. C., 1
Duncan-Virden Valley, Greenlee Co.: Morrison, R. B., 5; Turner, S. F., 4
Effect of drought: Cushman, R. L., 3; Gatewood, J. S., 2; Thomas, H. E., 4, 5
Eloy dist., Pinal Co.: Smith, G. E. P., 6
Flagstaff area, Coconino Co.: Akers, J. P., 9; Feth, J. H., 5
Forecasting supply in deserts: Smith, G. E. P., 5
Fort Apache Indian Reservation: Myrick, R. M.
Fort Defiance area, Apache Co.: Halpenny, L. C., 5
Fort Defiance quad.: Allen, J. E.
Fort Huachuca, Cochise Co.: Arizona Water Resources Commission-Arizona State Land Department; Brown, S. C., 11
Future in the Southwest: Thomas, H. E., 3
Geophysical exploration: Feth, J. H., 10; Heinrichs, W. E., Jr., 2; MacDonald, H. R., 5
Geothermal data: Darton, N. H., 11
Gila Bend area, Maricopa Co.: Cahill, J. M., 1; Johnson, P. W., 4
Gila Bend Basin: Babcock, H. M., 6; Coates, D. R., 2
Gila Bend Indian Reservation, Maricopa Co.: Heindl, L. A., 21, 31
Gila region, lower: Griffin, B. E.; Ross, C. P., 2, 3
Gila River Basin: Halpenny, L. C., 9; Hem, J. D., 1; Turner, S. F., 13
Gila River drainage, springs: Feth, J. H., 15
Gila River Valley, Graham Co.: Knechtel, M. M., 3; Lee, W. T., 1; Schwennesen, A. T., 2; Turner, S. F., 2
Globe, Old Dominion mine, Gila Co.: Beckett, P. G.
Graham Co.: U.S. Geol. Survey, 1
Grand Canyon, south rim: Metzger, D. G., 5, 6
Greenlee Co.: U.S. Geol. Survey, 1
Harquahala Plains area, Maricopa and Yuma Cos.: Metzger, D. G., 3
Hay Hollow area, Navajo Co.: Johnson, P. W., 10
Holbrook area, Navajo Co.: Babcock, H. M., 5; Harrell, M. A.
Hopi Buttes area, Navajo Co.: Callahan, J. T., 2
Hualapai Indian Reservation: Twenter, F. R., 1
Indicated by plants: Meinzer, O. E., 4
Intermontane Valleys: Harshbarger, J. W., 15
Investigations: Turner, S. F., 1, 5, 9
Irrigation, development of: Halpenny, L. C., 12
Joseph City Irrigation District, Navajo Co.: Babcock, H. M., 9

Kayenta area, Navajo Indian Reservation: Brown, S. C., 2
Keams Canyon area, Hopi Indian Reservation: Repenning, C. A., 1
Kingman area, Mohave Co.: Bowen, E. R.; Piper, A. M., 2; Turner, S. F., 26, 27
Law: Smith, G. E. P., 2
Leupp quad.: Akers, J. P., 6
Levels in Arizona: Booher, M. B.; Halpenny, L. C., 16, 17, 18; Johnson, P. W., 5, 6; Meinzer, O. E., 5; Turner, S. F., 3, 6, 7, 10, 11, 15, 17, 18, 19, 20, 21, 24, 25
Limitation of reservoir development: Schwalen, H. C., 3
Little Colorado River: Ferry, P., 2
Lonesome Valley area, Yavapai Co.: Metzger, D. G., 4
Lukachukai, Navajo Indian Reservation: Brown, S. C., 3
Luke area, Maricopa Co.: Stulik, R. S.
McMullen Valley area, Maricopa, Yavapai, and Yuma Cos.: Kam, W., 1, 2
Mogollon Rim: Twenter, F. R., 6
———, springs: Feth, J. H., 11, 14
Mohawk-Wellton area, Yuma Co.: Babcock, H. M., 3, 8; Metzger, D. G., 2
Navajo Country: Gregory, H. E., 4, 6, 7, 8, 10; Harshbarger, J. W., 5, 7
Navajo Co.: Cooley, M. E., 11
Navajo Indian Reservation: Akers, J. P., 7; Stevens, P. R.
Navajo-Hopi Indian Reservations: Cooley, M. E., 15; Davis, G. E.; Halpenny, L. C., 6, 7; Harshbarger, J. W., 13; Kister, L. R., 2
Navajo Mts., Navajo Indian Reservation: Brown, S. C., 4
Nogales to Tucson: Coates, D. R., 6
Occurrence, principles of: Heindl, L. A., 4
Old Dominion mine, Globe, Gila Co.: Beckett, P. G.
Oracle to Oracle Junction: Heindl, L. A., 9
Oracle vicinity, Pinal Co.: Heindl, L. A., 8
Organ Pipe Cactus National Monument, Pima Co.: Coates, D. R., 1
Painted Rock Dam site, Maricopa Co.: Cahill, J. M., 2
Paleomovement: Phoenix, D. A., 2
Palomas Plain, Yuma Co.: Armstrong, C. A.
Papago Indian Reservation: Bryan, K., 6, 10; Heindl, L. A., 18, 23, 25, 26
Paradise Valley, Maricopa Co.: McDonald, H. R., 3; Meinzer, O. E., 2
Patagonia area, Santa Cruz Co.: Feth, J. H., 12
Peeples Valley, Yavapai Co.: Babcock, H. M., 4
Phoenix area, Maricopa Co.: Davis, A. P., 1; Vacher, A.
Phreatophyte research: Robinson, T. W.; Turner, S. F., 23
Pinal Creek area, Gila Co.: Hazen, G. E.
Plant associations: Bryan, K., 17; Meinzer, D. E., 4
Point of Pines area, Graham Co.: Wheat, J. B.
Preston Mesa-Copper mine area, Coconino Co.: McClymonds, N. E., 6
Problems in Arizona: Piper, A. M., 1
Quality: Hem, J. D., 2; Smith, H. V., 3
———, Chuska Mts. area, Apache Co.: Harshbarger, J. W., 6
———, Deer Valley, Maricopa Co.: Bluhm, F. I.
———, Douglas Basin, Cochise Co.: Coates, D. R., 7
———, Fort Defiance area, Apache Co.: Halpenny, L. C., 5
———, Gila River Basin above Coolidge Dam: Hem, J. D., 1
———, Mogollon Rim, springs: Feth, J. H., 11
———, Salt River Valley: Hem, J. D., 4
———, San Simon Basin: Halpenny, L. C., 3
———, Santa Cruz area, lower: Hem, J. D., 3; Kister, L. R., 1
Queen Creek area, Maricopa and Pinal Cos.: Babcock, H. M., 2; Halpenny, L. C., 8; Skibitzke, H. E., 1; Turner, S. F., 22

GROUND WATER AND WATER SUPPLY *(Continued)*
Radium concentrations: Scott, R. C., 1, 2
Rainbow Valley and Waterman Wash areas Maricopa and Pinal Cos.: White, N. D., 2; Wolcott, H. N., 3, 4
Ranegras Plain area, Yuma Co.: Metzger, D. G., 1
Recharge: Babcock, H. M., 1
Red Lake area, Navajo Indian Reservation: Akers, J. P., 3, 5, 10
Relation to agriculture: Halpenny, L. C., 11
Rillito Creek-Tanque Verde Wash area, Pima Co.: Streitz, R.
Rillito Valley, Pima Co.: Smith, G. E. P., 1
Safford Basin, Graham Co.: Davidson, E. S., 1, 2; Feth, J. H., 7; Turner, S. F., 12
Safford Valley, Graham Co.: Cushman, R. L., 3; Fair, C. F., 1; Gatewood, J. S., 1; Hollander, J. T.; Morrison, R. B., 4; Turner, S. F., 4
"Salt-Balance" concept, Salt River Valley area: Hem, J. D., 4
Salt River, stream flow: Cooperrider, C. K., 2
Salt River Basin: Turner, S. F., 13
Salt River Valley: Hem, J. D., 4; Lee, W. T., 2; McDonald, H. R., 4; Skibitzke, H. E., 3; Wolcott, H. N., 2
Salt River watershed: Cooperrider, C. K., 1
San Carlos Valley: Schwennesen, A. T., 2
San Manuel mine area, Pinal Co.: U.S. Geol. Survey, 2
San Pedro Basin, lower: Heindl, L. A., 6
———, upper: Heindl, L. A., 5; Montgomery, E. L.
San Pedro River valley, near Mammoth, Pinal Co.: Page, H. G., 2
San Pedro Valley: Bryan, K., 19
San Simon Basin, Cochise and Graham Cos.: Cushman, R. L., 1; DeCook, K. J., 4; Halpenny, L. C., 3; White, N. D., 1
San Simon Creek, Graham Co.: Knechtel, M. M., 3
San Simon Valley: Schwennesen, A. T., 1
San Xavier Indian Reservation, Pima Co.: Heindl, L. A., 27
Santa Cruz area, lower, Pima and Pinal Cos.: Cushman, R. L., 2; Hem, J. D., 3
Santa Cruz Basin: Turner, S. F., 8, 16
———, lower: Kister, L. R., 1
———, upper: Johnson, P. W., 1; Schwalen, H. C., 1
Santa Cruz Valley, Pima and Santa Cruz Cos.: Schwalen, H. C., 2, 5
Santa Fe route, northern Arizona: Darton, N. H., 7
Segi Mesas, Navajo Co.: Cooley, M. E., 9
Sells area, Papago Indian Reservation: Coates, D. R., 5
Snowflake-Hay Hallow area, Navajo Co.: Johnson, P. W., 10
Sources and treatment: Lohr, E. W.
Stock-water reservoirs: Langbein, W. B., 1
Storage: Davis, A. P., 2; Lohr, E. W.
Sulphur Spring Valley, Cochise, Co.: Meinzer, O. E., 1
Sunset Crater, Coconino Co.: Cosner, O. J.
Tanque Verde Wash-Rillito Creek area, Pima Co.: Streitz, R.
Tombstone: Hollyday, E. F.
———, Contention mine: Clarke, F. W.
———, Tres Alamos dam site, Cochise Co.: Montgomery, E. L.
Tuba City, Navajo Indian Reservation: Brown, S. C., 1
Tucson area, Pima Co.: Kidwai, Z. U.; Tucson Daily Citizen, 2; University of Arizona, 2
Tucson quad., Pima Co.: Turner, S. F., 14
Tucson to Nogales: Coates, D. R., 6
Uranium content: Scott, R. C., 2
Use by vegetation: Gatewood, J. S., 1; Hendricks, E. L., 1; Turner, S. F., 23
Utilization: Halpenny, L. C., 10, 14; Harshbarger, J. W., 10

GROUND WATER AND WATER SUPPLY *(Continued)*
Verde Valley, Maricopa and Yavapai Cos.: McDonald, H. R., 1, 2, 5; Twenter, F. R., 5, 6
Volcanic rocks, Kingman vicinity, Mohave Co.: Piper, A. M., 2
Waterman Wash and Rainbow Valley areas, Maricopa and Pinal Cos., White, N. D., 2; Wolcott, H. N., 3, 4
Wells and springs, Big Sandy Valley, Mohave Co.: Morrison, R. B., 2, 3
———, Duncan-Virden Valley, Greenlee Co.: Morrison, R. B., 5
———, Safford Valley: Morrison, R. B., 4
Well records, Big Sandy Valley, Mohave Co.: Morrison, R. B., 3
———, Duncan-Virden Valley, Greenlee Co.: Morrison, R. B., 5
———, Navajo Indian Reservation: Akers, J. P., 7; Cooley, M. E., 15; Harshbarger, J. W., 13
———, Papago Indian Reservation: Heindl, L. A., 18, 23
———, Queen Creek area, Maricopa and Pinal Cos.: Babcock, H. M., 2; Skibitzke, H. E., 1
———, Safford Valley, Graham Co.: Morrison, R. B., 4
Well sites, Chiu Chuischu area, Papago Indian Reservation, Pinal Co.: Skibitzke, H. E., 2
Wellton-Mohawk area, Yuma Co.: Babcock, H. M., 3, 8; Metzger, D. G., 2
Willcox Basin, Cochise and Graham Cos.: Coates, D. R., 3; Jones, R. S.
Wupatki National Monument, Coconino Co.: Cosner, O. J.
Yield: Langbein, W. B., 2
Yuma area, Yuma Co.: Brown, R. H.
Yuma Co., northwestern: Metzger, D. G., 8
———, southwestern: Johnson, P. W., 3

GUIDEBOOKS *See also* ROAD LOGS
Black Mesa Basin: New Mexico Geological Society, 2
Grand Canyon: Darton, N. H., 7
Mogollon Rim region: New Mexico Geological Society, 3
San Juan Basin: New Mexico Geological Society, 1
Santa Fe Route: Darton, N. H., 7
Southern Arizona: Arizona Geological Society, 1, 2
Southern Pacific lines: Darton, N. H., 21

GYPSUM *See* NONMETALLIFEROUS MINERAL COMMODITIES, Gypsum

HELIUM
Analyses: Anderson, C. C.
Chambers area, Apache Co.: Dean, J. W.
Mississippian, Four Corners area: Picard, M. D., 2
Northeastern Arizona: Heindl, L. A., 2
Occurrence in natural gases: Boone, W. J., Jr.; Munnerlyn, R. D.
Pinta Dome, Apache Co.: Arizona State Development Board; Masters, J. A., 3, 4
Prospects, northeastern Arizona: Brown, S. C., 10; Gardner, F. J., 3

HISTORICAL GEOLOGY
Arizona: Lance, J. F., 11; Wilson, E. D., 90
———, northeastern: Heaton, R. L.; Huddle, J. W., 2
———, northern: Colbert, E. H., 3; Hack, J. T., 1; McKee, E. D., 15
———, southeastern: Pye, W. D., 2
Bagdad area: Anderson, C. A., 9
Bajadas, Tucson bolson: Visher, S. S.
Basin Ranges: Osmond, J. C.
Black Mesa, Yavapai Co.: Hughes, P. W., 1
Bright Angel quad., Grand Canyon region: Maxson, J. H., 11; Noble, L. F., 5
Cambrian: McKee, E. D., 28
Cenozoic, Colorado Plateau: Hunt, C. B., 3

HISTORICAL GEOLOGY *(Continued)*
Cenozoic, Jerome area: Lehner, R. E., 2
———, Oak Creek Canyon area: Mears, B., Jr., 2
———, Springerville area: Rutledge, F. W.
———, upper Verde Valley: Mahard, R. H.
Chinle formation: Camp, C. L., 1
Chino Valley area, Yavapai Co.: Hughes, P. W., 2, 3
Climate: Huntington, E., 3; Kangieser, P. C.; Smiley, T. L., 3; Smith, H. V., 1
———, Cenozoic: Anderson, R. Y., 3
———, glacial: Bryan, K., 16
———, Grand Canyon: Schwartz, D. W.
———, Jurassic-Cretaceous interval: Leopold, L. B.
———, Late Paleozoic to Middle Mesozoic, Colorado Plateau: Poole, F. G., 3
———, Quaternary: Antevs, E., 5
Cochise County, central: Gilluly, J., 7
Coconino sandstone: McKee, E. D., 4
Colorado Plateau: Hunt, C. B., 3; Mackin, J. H.; Moore, R. C., 2, 5, 6, 7
Colorado River: Longwell, C. R., 10
Cretaceous, paleoecology: Reeside, J. B., Jr., 5
Devonian and Mississippian, northeastern Arizona: Huddle, J. W., 2
Grand Canyon: Corle, E.; Dutton, C. E., 1, 2, 3; Hewitt, W.; McKee, E. D., 1, 2, 18, 28; Moore, R. C., 3, 4, 5, 6, 7; Noble, L. F., 1, 2, 3, 4, 5, 6; Schwartz, D. W.
Jerome area, Yavapai Co.: Anderson, C. A., 10; Lehner, R. E., 2
Jurassic-Cretaceous interval: Leopold, L. B.
Kaibab formation, northern Arizona: McKee, E. D., 15
Mesozoic, northeastern Arizona: Heaton, R. L.
Miocene: Twenter, F. R., 2
Mississippian and Devonian, northeastern Arizona: Huddle, J. W., 2
Moenkopi formation: McKee, E. D., 48
Mohave Co., northwestern: Moore, R. T., 3
Oak Creek Canyon area, Coconino Co.: Mears, B., Jr., 2
One-eleven (111) Ranch area, Graham Co.: Seff, P., 2
Paleoecology: Reeside, J. B., Jr., 5
Paleogeography, Cretaceous: Reeside, J. B., Jr., 5
———, Devonian, northeastern Arizona: Huddle, J. W., 2
———, Mississippian, northeastern Arizona: Huddle, J. W., 2
———, Paleozoic: Stoyanow, A. A., 13
———, Redwall limestone: McKee, E. D., 53
Paleozoic: McKee, E. D., 18
———, northeastern Arizona: Heaton, R. L.
Pliocene: Twenter, F. R., 2
Post-glacial: Smiley, T. L., 4
Precambrian, Older: Gastil, R. G., 5
Quaternary, climate: Antevs, E., 5
———, valleys: Hack, J. T., 1
Redwall limestone: McKee, E. D., 53
Ripple marks: Laudermilk, J. D., 3
Shinumo quad., Grand Canyon dist.: Noble, L. F., 1, 3
Springerville area, Cenozoic: Rutledge, F. W.
Sub-Aubreyan peneplanation, Grand Canyon: Keyes, C. R., 104
Supai formation: Hughes, P. W., 1, 2, 3
Tertiary, Grand Canyon area: Dutton, C. E., 3
Toroweap formation, northern Arizona: McKee, E. D., 15
Tracks: Laudermilk, J. D., 3, 4
Uinkaret Plateau: Koons, E. D., 2

HISTORICAL GEOLOGY *(Continued)*
Upper Verde Valley: Mahard, R. H.
Wind directions, late Paleozoic to middle Mesozoic, Colorado Plateau: Poole, F. G., 3

HISTORY
Ajo dist., Pima Co.: Arizona Department of Mineral Resources, 5, 10; Greenway, J. C.; Rickard, T. A., 6, 9
Aravaipa Canyon: Kelly, G. H., 2
Arizona Copper mine: Willis, C. F., 67
Arizona place names: Barnes, W. C., 2; Granger, B. H.
Bagdad mine, Yavapai Co.: Arizona Department of Mineral Resources, 3
Bisbee dist., Cochise Co.: Cox, A. M.; Douglas, J., 7; Hodgson, J. P.; Tenney, J. B., 2
Calumet and Arizona mine: McClintock, J. H., 5; Willis, C. F., 67
Camp Verde, salt mining: Young, G. J.
Castle Dome: Arizona Department of Mineral Resources, 10
Cerbat Mts., Mohave Co.: Hernon, R. M., 3
Cerro Colorado dist., Pima Co.: Pumpelly, R., 4
Clifton-Morenci dist., Greenlee Co.: Colquhon, J.; Robinson, G.
Colorado River Delta: Fox, C. K.
Copper deposits, porphyry: Parsons, A. B., 1, 3
Copper industry: Arizona Department of Mineral Resources, 24; Furness, J. W.; Notman, A., 2; Parsons, A. B., 2; Raymer, R. G.; Rickard, T. A., 11
Copper mines: Tuck, F. J., 3
Copper Queen mine, Bisbee dist.: Douglas, J., 7; Hodgson, J. P.; Willis, C. F., 67
Diamond hoax: Rickard, T. A., 13
Douglas, James, the life of: Douglas, W., 2
Early man: Sellards, E. H.
Early mining: Grant, L. S.; Henderson, C. W.; Lockwood, F. C.; Raymer, R. G.; Walker, A. L.; Wilson, E. D., 40
Exploration of the southwest: Rickard, T. A., 10
General: Bancroft, H. H., 2; Burgess, J. D.; Butler, G. M., 1, 2, 11, 20, 28; Defty, W. E., 2; Dunning, C. H., 4; Farish, T. E., 2; Hinton, R. J.; Joralemon, I. B., 3; Kruttschnitt, J., Jr.; McClintock, J. H., 1, 4; Mowry, S., 1, 2; Ransome, F. L., 32, 35; Rinehart, R. E.; Sloan, R. E.; Tenney, J. B., 5
Globe-Miami dist., Gila Co.: Calkins, F. E., 1
Gold placers: Allen, M. A., 9
Indians, mining by: Ball, S. H., 2; University of Arizona, 3
Inspiration, Gila Co.: Arizona Department of Mineral Resources, 6, 10; Willis, C. F., 67
Iron Cap mine: Willis, C. F., 67
Jerome (Verde) area, Yavapai Co.: Bartlett, K., 2; Finlay, J. R., 2; Hall, S. M.; Jewett, J.; Rickard, T. A., 3, 7, 12
La Paz placer dist.: Hunter, A. M.
Magma mine, Superior, Pinal Co.: Willis, C. F., 67
Miami copper mine, Gila Co.: Maclennan, F. W., 1; Willis, C. F., 67
Miami-Globe dist., Gila Co.: Calkins, F. E., 1; Sain, W. G.
Miami-Inspiration dist., Gila Co.: Arizona Department of Mineral Resources, 6, 10
Mineral resources: Hamilton, P.
Mining companies: Mathewson, E. P.
Mining industry: Arizona Bureau of Mines, 1; Arizona Department of Mineral Resources, 19; Blake, W. P., 23; Butler, G. M., 33; Chapman, T. G., 2; Heineman, R. E. S., 7; Kelly, G. H., 1; Mensch, W. A., 3; Pay Dirt; Perkins, E. S.; Prouty, R. W.; Tally, R. E., 2, 3; Tenny, J. B., 4, 5; Tuck, F. J., 2, 4; University of Arizona, 1, 3

HISTORY *(Continued)*
Mining operations, 1870's: Hodge, H. C.
———, 1910: McConnell, A. B.
———, 1915: Dyas, F. R.
———, 1922-1924: Willis, C. F., 64, 69, 72
Mohave Co.: Butler, G. M., 22
Morenci dist., Greenlee Co.: Arizona Department of Mineral Resources, 4, 10; Colquhon, J.; Hoagland, J., 4, 5; Robinson, G.; Watt, R.
Mowry mine: Fontana, B. L.
New Cornelia mine, Ajo, Pima Co.: Arizona Department of Mineral Resources, 5, 10; Greenway, J. C.; Rickard, T. A., 6, 9; Willis, C. F., 67
Newman, Black Jack, the life of: Rollins, R.
Oatman dist., Mohave Co.: Arizona Mining Journal, 5; Doman, R. S.; Rickard, T. A., 5; Willis, C. F., 67
Old Dominion mine: Willis, C. F., 67
Peck mine, Bradshaw Mts.: Henderson, P. C., 2
Phelps Dodge Corp.: Cleland, R. G.; Hoagland, J., 2
Pima Co., mining: Carpenter, M. M., 2; Leach, R. B.; Wilson, E. D., 35
Pima mine, Pima Co.: Heinrichs, W. E., Jr., 1
Place names: Barnes, W. C., 2; Granger, B. H.
Porphyry copper deposits: Parsons, A. B., 1, 3
Prehistoric mining: Bartlett, K., 1; Clark, C. M., 5; University of Arizona, 3; Young, G. J.
Prescott-Bradshaw dists.: Henderson, P. C., 1
Production statistics: Arizona Bureau of Mines, 1, 2; Arizona Department of Mineral Resources, 23; Chapman, T. G., 2; Chew, R. T., 3d., 4; Elsing, M. J., 2; King, C.; Lindgren, W., 1, 3, 5; McClintock, J. H., 2; Mineral Industry; Mineral Resources of the United States; Minerals Yearbook; Mining World, 37; Needham, C. E., 1, 2; Peplow, E. H., Jr.; Pumpelly, R., 3; Raymond, R. W., 1, 2; Trippel, A.; U.S. Mint; Weed, W. H., 1; Wilson, E. D., 64, 90; Woodward, G. E., 1, 2
Prospectors: Fansett, G. R.
Quijotoa dist., Pima Co.: McClintock, J. H., 3; Stephens, B. A.
Ray Consolidated Copper Company: Jackling, D. C., 1, 2 ,3; Willis, C. F., 67
Ray dist., Pinal Co.: Arizona Department of Mineral Resources, 7, 10
Richmond Basin dist., Gila Co.: Rose, D.
Salt mining: McClintock, J. H., 7; Young, G. J.
Sampling and estimation: Jouralemon, I. B., 2
San Manuel mine, Pinal Co.: Buchanan, J. F.; Goss, W. P., 2
Santa Cruz Co. mines: Bird, A. T., 1, 2
Schieffelin, Ed: Kellogg, A. E.
Seven Cities of Cibola: Dutton, B. P.
Shattuck-Arizona mine: Willis, C. F., 67
Silver King mine: Clark, C. M., 1; McClintock, J. H., 6; Willis, C. F., 67
Territorial: Elliott, W. W. and Co.; Fairbanks, H. M.; McClintock, J. H., 1, 4
Tom Reed mine, Oatman dist.: Arizona Mining Journal, 5; Devere, J.; Rickard, T. A., 5; Willis, C. F., 67
Tombstone dist., Cochise Co.: Arizona Mining Journal, 38; Goodale, C. W., 2; Kellogg, A. E.
Tyndall dist., Santa Cruz Co.: Pumpelly, R., 4
United Eastern mine: Rickard, T. A., 5; Willis, C. F., 67
United Verde Copper Company: Young, H. V.
United Verde mine: Hall, S. M.; McCarthy, J.; Willis, C. F., 67
United Verde Extension mine: Rickard, T. A., 3, 7, 12; Willis, C. F., 67
Verde (Jerome) area, Yavapai Co.: Bartlett, K., 2; Finlay, J. R., 2; Jewett, J.
Vignettes of the future: Chapman, T. G., 1

HISTORY *(Continued)*
Vulture mine, Maricopa Co.: Hutchinson, W. S.; McClintock, J. H., 6; Moore, K. T.
Walker dist.: Hinton, H. P.
Yavapai Co.: Wood, H. R.
Yuma Co.: Butler, G. M., 21

HYDROLOGY *See* GROUND WATER

HYDROTHERMAL ALTERATION *See* ALTERATION, Hydrothermal

IGNEOUS ROCKS
Ajo dist., Pima Co.: Gilluly, J., 1, 2, 3, 4, 5, 6, 11, 13
Analyses: Washington, H. S.
Ash flow near Superior: Peterson, D. W., 2, 3, 4
Bagdad area, Yavapai Co.: Anderson, C. A., 4
Basin and Range Province: Stringham, B., 1; Titley, S. R., 1
Bill Williams Mtn., Coconino Co.: Balk, R., 1
Buell Park, Apache Co.: DuBois, R. L., 6
Cameron quad., Coconino Co.: Akers, J. P., 11
Camptonite dike near Boulder (Hoover) Dam: Campbell, I., 8, 10
Carrizo Mtn., Apache Co.: Emery, W. B.
Central and northwestern Arizona, minor elements in igneous rocks: Putman, G. W., 1, 2
Chiricahua Mts., Cochise Co.: Enlows, H. E., 3, 4
———, northern: Mayo, E. B., 6
Cochise Co., central: Gilluly, J., 7
Cordilleran region: Lindgren, W., 14
Coyote Mts., Pima Co.: Kurtz, W. L.; Wargo, J. G., 3
Cuprite mine area, Pima Co.: Browne, J. F.
Dacite near Superior and Globe: Peterson, D. W., 2, 4
Diabase, granite xenoliths in: White, J. F.
Diabase, Sierra Ancha, Gila Co.: Silver, L. T., 1
Empire Mts., Pima Co.: Balk, R., 1; Galbraith, F. W., 11
Eruptive: Loew, O., 2
Gabbro, Eureka dist., Yavapai Co.: Singewald, J. T., Jr.
Globe area, Madera diorite: Balk, R., 1
Laccolithic mtn. groups: Cross, C. W., 1
Lava flows, Grand Canyon: Maxson, J. H., 9
Minor elements in igneous rocks: Coats, R. R., 1; Putman, G. W., 1, 2
Navajo-Hopi Indian Reservations: Balk, R., 1, 2
Oracle granite: Banerjee, A. K.; Mayo, E. B., 5
Pat Hills, Cochise Co.: Ettinger, L. J.
Peña Blanca and Walker Canyons, Santa Cruz Co., volcanic rocks: Nelson, F. J.
Porphyry: Stringham, B., 2
———, Basin and Range Province: Stringham, B., 1
Precambrian, diabase differentiates, Gila Co.: Silver, L. T., 1
———, Younger, southern and southeastern Arizona: Shride, A. F., 2, 3
Ring dike, Buell Park, Apache Co.: DuBois, R. L., 6
Safford Peak area, Tucson Mts., Pima Co.: Imswiler, J. B.
San Francisco volcanic field, Coconino Co.: Balk, R., 1; Colton, H. S., 14; Robinson, H. H., 4
Santa Catalina Mts., northern, Pima Co.: Wallace, R. M., 2
Santa Cruz Co., volcanic rocks: Taylor, O. J.
Structural behavior: Balk, R., 1
Tertiary, distribution: Callahan, E.
———, south-central Yavapai Co.: St. Clair, C., 3
Tombstone dist., Cochise Co.: Gilluly, J., 10

IGNEOUS ROCKS *(Continued)*
Tucson Mts., Pima Co.: Brown, W. H., 3; Mayo, E. B., 4, 8, 9
Tucson to Holbrook: Wilson, E. D., 71
Turkey-track porphyry, southeastern Arizona: Copper, J. R., 9
Uinkaret Plateau: Koons, E. D., 1, 2
Uncle Sam porphyry, emplacement of, Tombstone area: Gilluly, J., 10
Volcanic rocks: McBirney, A. R., 1
———, fluorine in: Coats, R. R., 3
———, northeastern Arizona: Cooley, M. E., 13
———, Santa Cruz Co.: Taylor, O. J.
———, Uranium and trace elements in: Coats, R. R., 1
Western Arizona: Johannsen, A.
Wickenburg area, Maricopa and Yavapai Cos.: Jahns, R. H., 2, 3

IRON *See* METALLIFEROUS MINERAL COMMODITIES, Iron

JURASSIC *See* PALEONTOLOGY, Jurassic; STRATIGRAPHY, Jurassic; STRUCTURAL GEOLOGY, Jurassic

LAND OWNERSHIP STATUS *See* AREAS DESCRIBED

LEAD *See* METALLIFEROUS MINERAL COMMODITIES, *Lead*

LOST MINES
Adams diggings: Mitchell, J. D., 24
Baboquivari's Golden Owls: Mitchell, J. D., 25
Black Maverick mine: Mitchell, J. D., 28
Bright yellow gold: Mitchell, J. D., 3
Doctor Thorne gold mine: Clark, C. M., 3
Don Joaquin and his gold mine: Mitchell, J. D., 4
Frenchie's lost gold ledge: Mitchell, J. D., 17
General: Arizona Mining Journal, 28; Riggs, J. L., Weight, H. O., 3
Glory Hole gold: Mitchell, J. D., 11
Iron-bound Chest: Mitchell, J. D., 5
John Clark's mine: Mitchell, J. D., 1
La Purisima Concepcion: Mitchell, J. D., 18
Lost Dutchman gold mine: Clark, C. M., 4; Ely, S.; Mitchell, J. D., 22; Shaw, V., 2
Lost Jack Rabbit mine: Mitchell, J. D., 26
Lost ledge of Four Peaks: Mitchell, J. D., 23
Lost ledge of Tinajas Altas: Mitchell, J. D., 27
Lost Mexican mine: Mitchell, J. D., 2
Lost Papuan diggings: Shaw, V., 4
Lost Pick ledge: Mitchell, J. D., 6
Lost Portal gold: Shaw, V., 3
Lost silver mine of Colorado: Mitchell, J. D., 14
Lost vein of the Santans: Mitchell, J. D., 16
Mariquita gold mine: Clark, C. M., 2
Mine with the Iron Door: Arizona Mining Journal, 23
Montezuma's treasure: Mitchell, J. D., 9
Organ Grinder's gold mine: Mitchell, J. D., 20
Rock to riches: Dunning, C. H., 4
San Pedro silver mine: Mitchell, J. D., 7
San Xavier del Bac: Mitchell, J. D., 13
Shepherd's lost gold mine: Mitchell, J. D., 15
Shoe Cobbler's placer: Mitchell, J. D., 10
Silver stairway: Mitchell, J. D., 12
Squaw Hollow ledge: Mitchell, J. D., 19
Sweet-toned bells of Guevavi: Mitchell, J. D., 21
(Tubac) In the direction of the sun: Thomas, K., 3
Yuma ledge: Mitchell, J. D., 8

MANGANESE *See* METALLIFEROUS MINERAL COMMODITIES, *Manganese*
MAPS
Aeromagnetic
Bagdad area, Yavapai Co.: Dempsey, W. J., 1, 9; Vacquier, V.
Camelback quad., Maricopa Co.: Dempsey, W. J., 2, 14
Canyon del Muerto quad., Apache Co.: Frischknecht, F. C., 5
Cochise quad., Cochise Co.: Dempsey, W. J., 11
Cortaro quad., Pima Co.: Dempsey, W. J., 3
Dragoon quad., Cochise Co.: Dempsey, W. J., 10
Fisher Hills quad., Cochise Co.: Dempsey, W. J., 4
Globe quad., Gila Co.: Dempsey, W. J., 5
Jerome-Prescott area, Yavapai Co.: Dempsey, W. J., 6
Los Gigantes Buttes quad., Apache Co.: Frischknecht, F. C., 3
Luzena quad., Cochise Co.: Dempsey, W. J., 12
Mammoth quad., Pinal Co.: Dempsey, W. J., 7, 13
Mesa quad., Maricopa Co.: Dempsey, W. J., 2, 14
Nazlini quad., Apache Co.: Frischknecht, F. C., 6
New River SE quad., Maricopa Co.: Dempsey, W. J., 14
Phoenix quad., Maricopa Co.: Dempsey, W. J., 2, 14
Prescott-Jerome area, Yavapai Co.: Dempsey, W. J., 6
Toh-Atin Mesa quad., Apache Co.: Frischknecht, F. C., 2
Twin Buttes area, Pima and Santa Cruz Cos.: Anderson, G. E.
Willcox quad., Cochise Co.: Dempsey, W. J., 4, 12
Yavapai Co., central: Dempsey, W. J., 8
Yellowstone Canyon quad., Apache Co.: Frischknecht, F. C., 4
Evaporation
United States: Horton, R. E.; Kohler, M. A.
Exploratory wells
General: Stipp, T. F.
Gas wells
General: Stipp, T. F.
Geologic (*see also* MAPS, *Photogeologic*)
Apache Co.: Wilson, E. D., 85
Agathla Peak NE quad.: Witkind, I. J., 14
Agathla Peak NW quad.: Witkind, I. J., 13
Agathla Peak SE quad.: Witkind, I. J., 15
Agathla Peak SW quad.: Witkind, I. J., 16
Aravaipa Valley, Pinal and Graham Cos.: Creasey, S. C., 9
Arizona: Arizona Bureau of Mines, 5; Darton, N. H., 13; Wheeler, G. M., 7
———, central and western: Marcou, J., 4
———, cross-sections: Moore, R. T., 5; Wilson, E. D., 91
———, description of project: Shaw, E.
———, igneous rocks, outcrops of: Stipp, T. F.
———, Laramide (Cretaceous and Tertiary) rocks, outcrops of: Arizona Bureau of Mines, 9
———, Mesozoic rocks, outcrops of: Arizona Bureau of Mines, 7
———, metamorphic rocks, outcrops of: Stipp, T. F.
———, northern: Hayden, F. V.
———, Paleozoic rocks, outcrops of: Arizona Bureau of Mines, 7
———, Precambrian rocks, outcrops of: Arizona Bureau of Mines, 8
———, Quaternary igneous rocks, outcrops of: Arizona Bureau of Mines, 6
———, Tertiary igneous rocks, outcrops of: Arizona Bureau of Mines, 6
Big Maria Mts. NE quad., Yuma Co.: Hamilton, W.
Boot Mesa NE quad.: Witkind, I. J., 10
Boot Mesa NW quad.: Witkind, I. J., 9
Boot Mesa SE quad.: Witkind, I. J., 11

MAPS, *Geologic (Continued)*
Boot Mesa SW quad.: Witkind, I. J., 12
Bright Angel quad.: Maxson, J. H., 11
Cameron quad.: Akers, J. P., 11
Cochise Co.: Arizona Bureau of Mines, 4
———, southeastern: Cooper, J. R., 5
Cochise quad.: Cooper, J. R., 7
Coconino Co.: Moore, R. T., 4
Colorado Plateau: Finch, W. I., 1
Copper Bullion mine, Pima dist., Pima Co.: Wilson, E. D., 57
Copper Butte mine, Pima dist., Pima Co.: Wilson, E. D., 57
Copper Glance mine, Pima dist., Pima Co.: Wilson, E. D., 57
Copper Queen mine, Pima dist., Pima Co.: Wilson, E. D., 57
Cross-Sections, Arizona: Moore, R. T., 5; Wilson, E. D., 91
Dinnehotso NE quad.: Witkind, I. J., 5
Dinnehotso NW quad.: Witkind, I. J., 4
Dinnehotso SE quad.: Witkind, I. J., 6
Dinnehotso SW quad.: Witkind, I. J., 7
Dos Cabezas quad.: Cooper, J. R., 7
Emmett Wash NE quad.: Petersen, R. G., 3
Emmett Wash NW quad.: Petersen, R. G., 6
Fisher Hills quad.: Cooper, J. R., 7
Gila Co.: Wilson, E. D., 80
Globe quad.: Peterson, N. P., 15
Graham Co.: Wilson, E. D., 78
Greenlee Co.: Wilson, E. D., 78
Hagerman and O. K. mines, Cochise Co.: Wilson, E. D., 53
Happy Valley quad.: Moore, B. N., 2
Haunted Canyon quad.: Peterson, D. W., 1
House Rock Spring NE quad.: Wells, J. D., 1
House Rock Spring SE quad.: Wells, J. D., 2
Inspiration quad.: Peterson, N. P., 13
Kaibito Plateau, Coconino Co.: Wanek, A. A.
Klondyke quad.: Simons, F. S., 1
Lake Powell: Kennedy, D.
Maricopa Co.: Wilson, E. D., 77
Mayer quad., NW¼ : Anderson, C. A., 11
Minnie mine, Pima dist., Pima Co.: Wilson, E. D., 57
Moenkopi Plateau, Coconino Co.: Wanek, A. A.
Mohave Co.: Wilson, E. D., 81
Mt. Union quad., NE¼ : Anderson, C. A., 12
Mule Mts., Cochise Co.: Hayes, P. T.
Navajo Co.: Wilson, E. D., 85
Navajo Indian Reservation and vicinity: Harshbarger, J. W., 16
Navajo-Hopi Indian Reservations: Kiersch, G. A., 8, 9, 14
North America: Stose, G. W., 2
Ord mercury mine, Gila Co.: McAllister, J. F.
Painted Desert, Coconino Co.: Wanek, A. A.
Paria Plateau NE quad.: Petersen, R. G., 2
Paria Plateau SE quad.: Petersen, R. G., 5
Pima Co.: Wilson, E. D., 84
Pinal Co.: Wilson, E. D., 79
Pinal Ranch quad.: Peterson, N. P., 18
Ruby quad.: Webb, B. P.
San Juan Basin: Silver, C., 1
San Pedro Valley: Creasey, S. C., 9

MAPS, *Geologic (Continued)*
Santa Cruz Co.: Wilson, E. D., 84
Superior quad., western: Peterson, D. W., 5
Tucson quad.: Moore, B. N., 3
United States: Hitchcock, C. H., 1, 2; McGee, W. J., 1; Marcou, J., 1; Stose, G. W., 1
Willcox quad.: Cooper, J. R., 7
Yavapai Co.: Arizona Bureau of Mines, 3
Yuma Co.: Wilson, E. D., 83
Geographic
General: Bancroft, H. H., 1
Lake Powell: Gessel, C. D.
Northern Arizona: Hayden, F. V.
Glacial
North America: Flint, R. F.
Gravity
United States: Lyons, P. L.
Historical
Pima Co.: Roskruge, G. J.
Hydrologic
Papago Indian Reservation: Heindl, L. A., 26
Map interpretation
General: Forrester, J. D., 2
Mineral occurrences
Colorado Plateau, uranium: Finch, W. I., 1; Shoemaker, E. M., 1
General: Arizona Bureau of Mines, 5; Wilson, E. D., 31
Metallic minerals: McCrory, F. J., 1; Wilson, E. D., 41, 74
Navajo-Hopi Indian Reservations, metallic minerals: Kiersch, G. A., 14
Navajo-Hopi Indian Reservations, nonmetallic minerals: Kiersch, G. A., 8, 9
Nonmetallic minerals: McCrory, F. J., 2; Wilson, E. D., 42, 75
Uranium: Stuler, J. E.
Mines and mining districts
General: Wilson, E. D., 43, 88
Mines and patented claims
Santa Cruz Co.: Lenon, R.
Oil wells
General: Stipp, T. F.
Paleogeographic
Cretaceous: Gill, J. R.
Paleozoic: Stoyanow, A. A., 13
Paleotectonic
Jurassic System: McKee, E. D., 50
Photogeologic
Agthla Peak-1 quad.: Ray, R. G., 4
Agathla Peak-2 quad.: Eckstein, W. H.
Agathla Peak-4 quad.: Hackman, R. J., 1
Agathla Peak-8 quad.: Ray, R. G., 5
Buckskin Gulch SE quad.: Minard, J. P., 7
Buckskin Gulch SW quad.: Hackman, R. J., 5
Emmett Wash NE quad.: Detterman, J. S., 2
Emmett Wash NW quad.: Minard, J. P., 3
Four Corners area: Wright, M. S., Jr.
Fredonia NE quad.: Morris, R. H., 2
Fredonia NW quad.: Hemphill, W. R.
Fredonia SW quad.: Marshall, C. H., 8

MAPS, *Photogeologic (Continued)*
Heaton Knolls NW quad.: Marshall, C. H., 3
House Rock Spring NE quad.: Minard, J. P., 5
House Rock Spring NW quad.: Minard, J. P., 6
House Rock Spring SE quad.: McQueen, K., 2
House Rock Spring SW quad.: Pomeroy, J. S., 1
Hurricane Cliffs-2 NE quad.: Marshall, C. H., 11
Hurricane Cliffs-2 NW quad.: Pomeroy, J. S., 2
Isopach, Monument Valley: Witkind, I. J., 18
Jacob Lake NE quad.: Marshall, C. H., 10
Johnson SE quad.: Detterman, J. S., 5
Johnson SW quad.: Detterman, J. S., 4
Kanab SE quad.: Detterman, J. S., 1
Kanab SW quad.: Pillmore, C. L., 4
Lees Ferry NE quad.: McQueen, K., 5
Lees Ferry NW quad.: McQueen, K., 4
Lees Ferry SE quad.: McQueen, K., 1
Lees Ferry SW quad.: Detterman, J. S., 3
Lost Spring Mtn. NE quad.: Marshall, C. H., 5
Lost Spring Mtn. NW quad.: Marshall, C. H., 6
Lost Spring Mtn. SE quad.: Marshall, C. H., 4
Monument Valley, isopach: Witkind, I. J., 18
Navajo Mtn.-13 quad.: Hackman, R. J., 2
Navajo Mtn.-14 quad.: Hackman, R. J., 4
Navajo Mtn.-15 quad.: Hackman, R. J., 3
Paria Plateau NE quad.: McQueen, K., 3
Paria Plateau NW quad.: Minard, J. P., 2
Paria Plateau SE quad.: Marshall, C. H., 9
Paria Plateau SW quad.: Minard, J. P., 1
Paria SW quad.: Olson, A. B.
Setsiltso Springs-3 quad.: Ray, R. G., 1
Setsiltso Springs-4 quad.: Ray, R. G., 2
Setsiltso Springs-5 quad.: Ray, R. G., 3
Shinarump NE quad.: McQueen, K., 6
Shinarump NW quad.: Morris, R. H., 1
Short Creek NE quad.: Pillmore, C. L., 2
Short Creek NW quad.: Marshall, C. H., 2
Short Creek SE quad.: Marshall, C. H., 7
Short Creek SW quad.: Marshall, C. H., 1
Springdale SW quad.: Pillmore, C. L., 1
Tanner Wash NW quad.: Minard, J. P., 4
Virgin SE quad.: Pillmore, C. L., 3
Pipelines
Oil and gas: Stipp, T. F.
Tectonic
Basin and Range Province: Wilson, E. D., 37
Black Mesa Basin: Doeringsfeld, W. W.; Peirce, H. W., 2
Colorado Plateau: Luedke, R. G.
East Kaibab monocline: Babenroth, D. L.
United States: King, P. B., 2

MAZATZAL REVOLUTION *See* STRUCTURAL GEOLOGY, Mazatzal Revolution

MERCURY *See* METALLIFEROUS MINERAL COMMODITIES, *Mercury*

MESOZOIC *See* PALEONTOLOGY, Mesozoic; STRATIGRAPHY, Mesozoic

METALLIFEROUS MINERAL COMMODITIES *See also* MINES AND MINING DISTRICTS

Antimony

General: Joseph, P. E., 7; U.S. Bureau of Mines-U.S. Geological Survey, 1; White, D. E.

Arsenic

General: Tyler, P. M., 2

Beryllium

Baboquivari Mts., Pima Co.: Clark, J. L.

General: Griffitts, W. R.

In unaltered silicic volcanic rocks: Coats, R. R., 2

Non-pegmatitic: Warner, L. A.

Northwestern Arizona: Holmes, G. H., Jr.; Olson, J. C., 1

Southern Arizona: Balla, J. C.

Bismuth

General: Cooper, J. R., 10

Cobalt

Black Hills, Yavapai Co.: Anderson, C. A., 10

General: U.S. Bureau of Mines-U.S. Geological Survey, 4

Copper

Ajo dist., Pima Co.: Dehlinger, M. E.; Dekalb, C., 2; Gilluly, J., 1, 4, 5, 6, 11, 13; Joralemon, I. B., 1; Rickard, T. A., 6; Stewart, L. A., 1

Amargosa mine, Pima dist., Pima Co.: Anderson, C. A., 3; Tainter, S. L., 1

Antler mine, Mohave Co.: Holt, E. B., 4; Romslo, T. M., 2; Wilson, E. D., 51

Apex mine, Coconino Co.: Tainter, S. L., 2

Aravaipa dist., Graham Co.: Ross, C. P., 4

Arizona-Globe property: Cooper, C. M.

Associated minerals: Blake, W. P., 41; Stone, G. H., 1

Bagdad area, Yavapai Co.: Anderson, C. A., 5, 6, 9; Arizona Department of Mineral Resources, 3; Butler, B. S., 12; Hardwick, W. R., 2, 4; Yost, H. W.

Banner dist., Gila Co.: Ross, C. P., 5

Big Bug dist., Yavapai Co.: Anderson, C. A., 10

Bisbee (Warren) dist., Cochise Co.: Arizona Department of Mineral Resources, 9; Billingsley, P., 4; Brinsmade, R. B., 1; DeKalb, C., 3; Douglas, J., 4, 6, 7; Goodwin, J. C.; Notman, A., 1; Ransome, F. L., 3, 4, 5, 7, 8, 9, 17; Rove, O. N., 1, 2; Sherman, G., 1, 2; Tenney, J. B., 1, 2, 8; Tovote, W. L., 4; Trischka, C., 2, 4, 5, 6, 7; Ziesmer, H. M., 1, 2

Black Hills dist., Yavapai Co.: Anderson, C. A., 10

Bradshaw Mts. quad., Yavapai Co.: Lindgren, W., 16

Carbonate from mine water: Wilson, P. D., 3

Carrizo Mts., Apache Co.: Mayo, E. B., 1

Casa Grande dist., Pinal Co.: Tenney, J. B., 9

Castle Dome, Gila Co.: Arizona Department of Mineral Resources, 10; Engineering and Mining Journal, 2; Peterson, N. P., 8, 10, 12

Cerbat Mts., Mohave Co.: Hernon, R. M., 3; Schrader, F. C., 1, 3, 11, 12

Cherry Creek dist., Yavapai Co.: Anderson, C. A., 10

Childs-Aldwinkle mine, Pinal Co.: Kuhn, T. H., 1

Chloride quad., Mohave Co.: Thomas, B. E., 4

Christmas mine, Gila Co.: Eastlick, J. T.; Knoerr, A.; Peterson, N. P., 5, 17; Tainter, S. L., 4

Clifton, Greenlee Co.: Douglas, J., 1; Henrich, C., 1

Clifton-Morenci dist., Greenlee Co.: Butler, B. S., 11; Lindgren, W., 2, 4, 7, 8, 9; Ransome, F. L., 10; Reber, L. E., Jr., 1; Tovote, W. L., 3

Colorado Plateau: Fischer, R. P., 1, 4

Colorado River: Hately, J. G.

Copper Basin dist., Yavapai Co.: Blake, W. P., 11; Johnston, W. P., 1, 2
Copper Butte mine, Mineral Creek dist., Pinal Co.: Phelps, H. D.; Probert, F. H., 3; Wilson, E. D., 44
Copper Canyon dist., Navajo Indian Reservation: Reinhardt, E. V., 1
Copper Cities mine, Gila Co.: Hardwick, W. R., 6
Copper Creek Basin, Pinal Co.: Higgins, E., 3; Kuhn, T. H., 1, 2, 3, 4
Copper Giant mine, Ajo area, Pima Co.: Romslo, T. M., 5
Copper pitch ore: Guild, F. N., 11
Courtland-Gleeson region, Cochise Co.: Wilson, E. D., 4
Cunningham Pass, Yuma Co.: Tovote, W. L., 11
Cuprite dist., Pima Co.: Lee, C. A.
Detrital deposits: Tovote, W. L., 9
Disseminated deposits: Locke, A., 3
El Tiro mine, Silver Bell, Pima Co.: Shoemaker, A. H., 1
Emerald Isle deposit, Mohave Co.: Searls, F., Jr.
Esperanza mine, Pima Co.: Curtis, C. H.; Schmitt, H. A., 6; Tainter, S. L., 1
Fluxing ore: Mining World, 40
Garnet Ridge, Navajo-Hopi Indian Reservations: Mayo, E. B., 1
General: Arizona Department of Mineral Resources, 8, 23, 24; Blake, W. P., 2; Cosulich, B.; Croston, J. J., 2; Douglas, J., 2, 3; Douglas, W., 1; Elsing, M. J., 3, 4, 5; Everhart, D. L., 1; Finlay, J. R., 1; Fulton, C. H.; Gardner, E. D., 3; Joseph, P. E., 8; Keyes, C. R., 6, 7; Kinkle, A. R., Jr.; Lindgren, W., 12; Notman, A., 3; Parsons, A. B., 1, 3; Raymer, R. G.; Rose, L.; Schmitt, H. A., 5, 7; Tenney, J. B., 6, 10; Tolman, C. F., Jr., 7; Tovote, W. L., 10, 12; U.S. Bureau of Mines-U.S. Geological Survey, 5; Wendt, A. F.
Globe dist., Gila Co.: Graichen, W.; Peterson, N. P., 19, 20; Ransome, F. L., 2, 6, 14, 15, 17, 25; Tolman, C. F., Jr., 8; Tovote, W. L., 8
Globe-Kelvin dist., Gila Co.: Higgins, E., 1
Grand Gulch dist., Mohave Co.: Hill, J. M., 6
Harshaw dist., Santa Cruz Co.: Kartchner, W. E.
Helvetia dist., Pima Co.: Creasey, S. C., 1, 7
Hiltano Camp, Empire Mts., Pima Co.: Feiss, J. W.
History of the industry: Furness, J. W.; Parsons, A. B., 2
Inspiration mine, Gila Co.: Hardwick, W. R., 8; Honeyman, P. D., 1; Stoddard, A. C., 1
Iron King mine, Yavapai Co.: Mills, H. F., 1, 2, 3
Jerome area, Yavapai Co.: Anderson, C. A., 10; DeWolf, W. P., 2; Finlay, J. R., 2; Lindgren, W., 16; Reber, L. E., Jr., 2, 3; Rice, M.; Rickard, T. A., 3, 7; Staunton, W. F., 1
Johnson Camp, Cochise Co.: Hardwick, W. R., 1; Heineman, R. E. S., 1; Scott, W. A., 3
Kaibab Plateau: Jennings, E. P.; Lunt, H. F.
Kay mine, Maricopa Co.: Weed, W. H., 11
Keystone mine, Cochise dist., Cochise Co.: Romslo, T. M., 3
Lake Shore mine, Pinal Co.: Freeman, G. A.; Romslo, T. M., 4
Leached outcrops: Blanchard, R.; Locke, A., 1
Limestone replacement deposits: Garrels, R. M., 1
Little Dragoon Mts., Cochise Co.: Enlows, H. E., 1
Little Hill mine, Pinal Co.: Mining World, 40
Loma Prieta mine, Copper Basin dist., Yavapai Co.: Anderson, C. A., 2
Low grade deposits: Tolman, C. F., Jr., 9
Magma mine, Superior, Pinal Co.: Browning, W. C.; Engineering and Mining Journal, 2; Ettlinger, I. A., 2; Foraker, C. B.; Scott, W. A., 2; Short, M. N., 3, 4; Snow, F. W.; Webster, R. N.

METALLIFEROUS MINERAL COMMODITIES, *Copper (Continued)*
Marginal deposits: Arizona Department of Mineral Resources, 1
Mesothermal veins and replacements: Hart, L. H.
Metcalf dist., Greenlee Co.: Scotland, P. B.
Miami dist., Gila Co.: Engineering and Mining Journal, 2; Herrick, R. L., 2, 3; Maclennan, F. W., 2; Ransome, F. L., 17, 25; Rice, C. T.; Weed, W. H., 6
Miami-Inspiration mine, Gila Co.: Arizona Department of Mineral Resources, 6, 10; Reed, E. F.; Rubly, G. R.; Tolman, C. F., Jr., 5.
Mineral Hill mine, Pima dist., Pima Co.: Storms, W. R.
Mineralogy of ores: Schwartz, G. M., 1, 2, 3, 4, 5, 7, 8
Mines: Weed, W. H., 1, 2, 3, 10, 11
Mission mine, Pima Co.: Engineering and Mining Journal, 4; Richard, K. E., 2; Skillings, D. N., Jr., 2
Mohave Co.: Schrader, F. C., 11, 12
Monument Valley: Mayo, E. B., 1
Morenci dist., Greenlee Co.: Arizona Department of Mineral Resources, 4, 10; Hardwick, W. R., 3; Henrich, C., 2; Hoagland, J., 4, 5; Lawson, W. C.
Mountain Queen, Swisshelm Mts., Cochise Co.: Loring, W. B.
Navajo Country: Gregory, H. E., 10
Navajo-Hopi Indian Reservations: Kiersch, G. A., 14
New Cornelia mine, Ajo, Pima Co.: American Institute of Mining and Metallurgical Engineers, 2; Arizona Department of Mineral Resources, 5, 10; Hardwick, W. R., 5; Ingham, G. R.
Northern Arizona: Baroch, C. T.; Brinsmade, R. B., 2
Old Dominion mine, Globe, Gila Co.: Lausen, C., 1; Shoemaker, A. H., 2
Old Hat dist., Pima Co.: Peterson, N. P., 4
Old Reliable mine, Pinal Co.: Denton, T. C., 2
Open-pit mining: Fenzi, W. E.
Palomas Range, Yuma Co.: Keyes, C. R., 26
Payson area, Gila Co.: Lausen, C., 2
Peach-Elgin deposit, Helvetia dist., Pima Co.: Heyman, A. M.
Permian beds: Emmons, S. F., 3
Phelps Dodge prospects: Engineering and Mining Journal, 3
Pima dist., Pima Co.: Anderson, C. A., 3; Huff, L. C., 5
Pima mine, Pima Co.: American Institute of Mining and Metallurgical Engineers, 2; Heinrichs, W. E., Jr. 1; Journeay, J. A.; Thurmond, R. E., 1, 2, 3, 4
Pine Springs, Navajo-Hopi Indian Reservations: Mayo, E. B., 1
Piute-Nokai-Copper Canyons, Navajo-Hopi Indian Reservations: Mayo, E. B., 1
Planet mines, Yuma Co.: McCarn, H. L.
Porphyry deposits: Channing, J. P.; Creasey, S. C., 8; Parsons, A. B., 1, 3; Schwartz, G. M., 12; Tovote, W. L., 6; Trischka, C., 8; Wishaw, Q. G.
Porphyry pipe deposits: Weed, W. H., 8
Ray dist., Pinal Co.: Arizona Department of Mineral Resources, 7, 10; Clarke, O. M., Jr., 1; Clifford, J. O.; Herrick, R. L., 1; Hill, A.; Hoyt, C. L.; Jackling, D. C., 1, 2, 3; Ransome, F. L., 17, 25, 28; Tolman, C. F., Jr., 4; Truesdell, W. H.; Weed, W. H., 5
Red beds: Bains, T. H.; Emmons, S. F., 4
Ridenour mine, Hualapai Indian Reservation, Coconino Co.: Miller, R. D.
Riverview mine, Coconino Co.: Chenoweth, W. L., 3
Rosemont area, Pima Co.: Thomas, W. L.
Saddle Mtn. dist., Pinal Co.: Ross, C. P., 5
Safford area, Graham Co.: Cook, A.
St. George mine, Cochise dist., Cochise Co.: Romslo, T. M., 3
San Carlos Indian Reservation: Bromfield, C. S., 3, 4

San Manuel mine, Pinal Co.: Arizona Department of Mineral Resources, 9; Buchanan, J. F.; Chapman, T. L.; Dale, V. B., 4; Goss, W. P., 1, 2; Hazen, S. W., Jr.; Schwartz, G. M., 9, 11, 13, 16; Steele, H. J., 1, 2; Warren, H. V. 2; Wilson, E. D., 50; Wilson, L. K.
San Xavier mine, Pima Co.: Duff, G. J.; Irwin, G. W.; Wilson, C. A.
Sandstone deposits: Fischer, R. P., 5
Santa Rita and Patagonia Mts.: Schrader, F. C., 7, 8, 14
Schist deposits: Crampton, T. H. M.
Sedimentary deposits: Finch, J. W., 1, 2; Fischer, R. P., 2
Silver Bell dist., Pima Co.: Arizona Department of Mineral Resources, 9; Buseck, P. R.; Hardwick, W. R., 7; Richard, K. E., 1; Stewart, C. A., 2, 3; Tolman, C. F., Jr., 6
Southern Arizona: Tolman, C. F., Jr., 3
Stanley dist., Graham Co.: Ross, C. P., 4
Sullivan mine, Cochise Co.: Kumke, C. A., 1; Wilson, E. D., 49
Sunshine mine area, Sierrita Mts., Pima Co.: Higdon, C. E.
Superior dist., Pinal Co.: Ransome, F. L., 20; Short, M. N., 3, 4; Steele, H. J., 3
Superior and Boston mine: Herrick, R. L., 4
Swisshelm dist., Cochise Co.: Galbraith, F. W., 9
Tennessee-Schuylkill mine, Wallapai dist., Mohave Co.: Garrett, S. K.
Triassic beds: Emmons, S. F., 3
Turquoise dist., Cochise Co.: Ransome, F. L., 16, 18
Twin Buttes dist., Pima Co.: Brown, R. L.; Cummings, J. B., 3; Skillings, D. N., Jr., 1
United Verde mine, Yavapai Co.: Quayle, T. W.; Smith, H. D. W., 1; Tally, R. E., 1
United Verde Extension mine, Yavapai Co.: D'Arcy, R. L.
Vekol Mts., Pinal Co.: Carpenter, R. H., 1; Higgins, E., 4
Verde (Jerome) dist., Yavapai Co.: Douglas, J. S.; Mills, C. E., 1; Smith, H. D. W., 1, 2
Washington camp, Santa Cruz Co.: Crosby, W. O.
White Mesa dist., Coconino Co.: Hill, J. M., 5; Mayo, E. B., 1; Read, C. B., 1
Yuma Co.: Higgins, E., 2
Zonia mine, Yavapai Co.: Kumke, C. A., 2

General

Bateman, A. M., 3; Blake, W. P., 18; Burnham, C. W.; Crabtree, E. H.; Dunning, C. H., 1, 3; Emmons, W. H., 3; Gabrielson, C. W.; Hamilton, P.; Joseph, P. E., 11; McCrory, F. S., 1; Mineral Industry; Mineral Resources of the United States; Mowry, S., 1, 2; Olson, G. G.; Probert, F. H., 2; Reagan, A. B., 23; Sanford, S.; Schrader, F. C., 2, 13; Simmons, W. W., 2; Tonge, T.; Tuck, F. J., 1; U.S. Bureau of Mines, 2; Whitney, J. D., 1; Wilson, E. D., 36, 41, 74, 90; Zimmerman, J.

Gold

Ajo dist., Pima Co.: Gilluly, J., 1, 4, 5, 6, 11, 13
Allison mine, Baboquivari Mts., Pima Co.: Worcester, A. W.
Bagdad area, Yavapai Co.: Anderson, C. A., 9
Banner dist., Gila Co.: Ross, C. P., 5
Big Bug dist., Yavapai Co.: Anderson, C. A., 10
Big Jim mine, Oatman, Mohave Co.: Johnson, C. H.
Black Canyon area, Yavapai Co.: Guiteras, J. R.
Black Hills dist., Yavapai Co.: Anderson, C. A., 10
Black Mts., Mohave Co.: Gardner, E. D., 2
Bradshaw Mts. area, Yavapai Co.: Lindgren, W., 16
Calizona placers: Hedburg, E., 1
Carrizo Mts.: Haskell, H. S.

Casa Grande dist., Pinal Co.: Tenney, J. B., 9
Cerbat Mts., Mohave Co.: Hernon, R. M., 3; Schrader, F. C., 1, 3, 11, 12
Cherry Creek dist., Yavapai Co.: Anderson, C. A., 10; Holt, E. B., 2; Lindgren, W., 10, 16; Reid, J. A., 1, 2
Childs-Aldwinkle mine, Copper Creek, Pinal Co.: Kuhn, T. H., 1
Chloride dist., Mohave Co.: Thomas, B. E., 4
Cleveland mine area, Gila Co.: Simmons, W. W., 1
Commonwealth mine, Cochise Co.: Scott, W. A., 4; Smith, L. A.
Congress mine, Yavapai Co.: Staunton, W. F., 3
Copper Creek area, Bunker Hill dist., Pinal Co.: Kuhn, T. H., 2, 3, 4
Copper ores, associated with: Elsing, M. J., 4
Courtland-Gleeson region, Cochise Co.: Wilson, E. D., 4
Dives and Gold Ridge groups, Dos Cabezas, Cochise Co.: Shields, J. C., Jr.
Doctor Thorne mine: Clark, C. M., 3
Dos Cabezas area, Cochise Co.: Land, G.
Epithermal deposits: Nolan, T. B., 1
Fortuna mine, Yuma Co.: Blake, W. P., 17
General: Emmons, W. H., 4; Fulton, C. H.; Heineman, R. E. S., 4; Koschmann, A. H.; Lindgren, W., 1, 12, 15; Lock, A. G.; Pratt, J. H., 1; Wilson, E. D., 17, 18
Globe dist., Gila Co.: Graichen, W.
Gold Mtn., Galiuro Mts.: Blake, W. P., 32
Gold Road dist., Mohave Co.: Bancroft, H., 5; Ritter, E. A.; Tovote, W. L., 1
Golden Belt mine, Yavapai Co.: Minton, D. C., Jr.
Grand Wash Cliffs, Mohave Co.: Schrader, F. C., 1, 3, 11, 12
Greaterville placers: Hill, J. M., 1
Greens Valley dist., Gila Co.: Hedburg, E., 2
Herron and Laster lease, Superior, Pinal Co.: Gardner, E. D., 1
Hiltano Camp, Empire Mts., Pima Co.: Feiss, J. W.
Idaho mine, Oro Blanco dist., Santa Cruz Co.: Warren, H. V., 1
Iron King mine, Yavapai Co.: Mills, H. F., 1, 2; Schwartz, G. M., 10
Jerome area, Yavapai Co.: Anderson, C. A., 10; Lindgren, W., 16
Katherine dist., Mohave Co.: DeWolf, W. P., 5; Lausen, C., 9, 10, 12
Kofa Mts., Yuma Co.: Jones, E. L., Jr., 2
LaPaz placer dist.: Hunter, A. M.
Lees Ferry, Coconino Co.: Haskell, H. S.; Phoenix, C. A., 5
Lost Dutchman mine: Clark, C. M., 4
Mammoth mining camp area, Pinal Co.: Peterson, N. P., 1, 2, 3
Mariquita mine: Clark, C. M., 2
Martinez dist., Yavapai Co.: Barth, C. G., Jr.
Midnite Test mine, Groom Creek dist., Yavapai Co.: Russell, A. L.
Mohave Co.: Schrader, F. C., 11, 12
Money Metals mine, Yavapai Co.: Sparkes, G. M., 3
Mountain Queen area, Swisshelm Mts., Cochise Co.: Loring, W. B.
Navajo Country: Gregory, H. E., 10
Navajo-Hopi Indian Reservations: Haskell, H. S.; Kiersch, G. A., 14
Oatman dist., Mohave Co.: Boericke, W. F.; Burgess, J. A., 2, 3; Doman, R. S.; Lausen, C., 9, 10, 12; Probert, F. H., 5; Ransome, F. L., 29; Rickard, T. A., 5; Ritter, E. A.; Schwartz, G. M., 10; Scott, W. A., 1; Tovote, W. L., 1
Occurrence in granite and plutonic rocks: Blake, W. P., 16
Octave mine, Yavapai Co.: Wilson, E. D., 22
Oro Blanco dist., Santa Cruz Co.: Milton, M. C.
Patagonia Mts., Santa Cruz Co.: Schrader, F. C., 7, 8, 14
Payson area, Gila Co.: Lausen, C., 2

Pearce dist., Cochise Co.: Endlich, F. M.
Pilgrim mine, Mohave Co.: Hastings, E. F.
Placer deposits: Allen, M. A., 8, 9; Carter, T. L., 1, 2; DeWolf, W. P., 1; Hedburg, E., 1; Hill, J. M., 1; Hunter A. M.; Keiser, W. G.; Konselman, A. S.; McClure, F. G.; Plummer, W. L.; Root, W. A., 2; Webber, B. N., 5; Wilson, E. D., 7, 14, 16, 73, 89
Plomosa placers: Plummer, W. L.
Quartzsite area, Yuma Co.: Jones, E. L., Jr., 1; Keiser, W. G.
Quijotoa Mts., Pima Co.: Gebhardt, R. C.; Stephens, B. A.
Revaluation, effects of: Croston, J. J., 1
River Range, Mohave Co.: Holt, E. B., 1
Saddle Mtn. dist., Gila Co.: Ross, C. P., 5
Salome area, Yuma Co.: Reedall, H. C.
Santa Rita Mts., Pima Co.: Root, W. A., 2; Schrader, F. C., 7, 8, 14
Shinarump formation: Lawson, A. C.
Swisshelm dist., Cochise Co.: Galbraith, F. W., 9
Tennessee-Schuylkill mine: Garrett, S. K.
Tom Reed mine, Mohave Co.: Ritter, E. A.
Tombstone area, Cochise Co.: Butler, B. S., 8, 9; Tenney, J. B., 11
Tres Amigos veins: Keyes, C. R., 23
United Verde mine: Tally, R. E., 1
Vekol Mts., Pinal Co.: Carpenter, R. H., 1
Vulture mine, Maricopa Co.: Defty, W. E., 1; Hutchinson, W. S.; Purington, C. W.
Wallapai dist., Mohave Co.: Thomas, B. E., 1, 2, 4
Weaver dist., Yavapai Co.: Barth, C. G., Jr.
Wickenburg area, Maricopa and Yavapai Cos.: Metzger, O. H.
Yavapai Co.: DeWolf, W. P., 1, 4
Yuma Co., southern: Wilson, E. D., 15

Iron

Apache deposit, Navajo Co.: Stewart, L. A., 3
Bibliography: Luttrell, G. W.
Canyon Creek, Ft. Apache Indian Reservation: Burchard, E. F., 1
Christmas area, Gila Co.: Wilden, C. R., 1, 2
Eureka dist., Yavapai Co.: Ball, S. H., 1
General: Blake, W. P., 3, 4; Carr, M. S.; Dutton, C. E.; Harrer, C. M.; Hayes, C. W.; Jones, C. C.; Joseph, P. E., 9; Julihn, C. E.
New Planet deposit, Yuma Co.: Cummings, J. B., 2
Pikes Peak, dist., Maricopa Co.: Farnham, L. L., 1
Planet dist., Yuma Co.: Upham, W. E.; Wilson, E. D., 46
Plomosa dist., Yuma Co.: Keyes, C. R., 25
San Carlos Indian Reservation: Bromfield, C. S., 3, 4

Lead

Antler mine, Mohave Co.: Holt, E. B., 4
Aravaipa dist., Graham Co.: Denton, T. C., 3; Ross, C. P., 4; Wilson, E. D., 48, 60
Bagdad area, Yavapai Co.: Anderson, C. A., 7, 9
Banner dist., Gila Co.: Ross, C. P., 5; Wilson, E. D., 68
Big Bug dist., Yavapai Co.: Anderson, C. A., 10
Bisbee dist., Cochise Co.: Bishop, H. J.; Hogue, W. G., 2
Black Hills dist., Yavapai Co.: Anderson, C. A., 10
Bridal Veil mines, Cataract Canyon, Coconino Co.: Ferris, H. A.
Castle Dome dist., Yuma Co.: Holt, E. B., 3; Wilson, E. D., 70
Cerbat Mts., Mohave Co.: Hernon, R. M., 3; Schrader, F. C., 1, 3, 11, 12
Chloride quad., Mohave Co.: Thomas, B. E., 4

METALLIFEROUS MINERAL COMMODITIES, *Lead (Continued)*
Copper Basin dist., Yavapai Co.: Johnston, W. P., 1, 2
Courtland-Gleeson region, Cochise Co.: Wilson, E. D., 4
Curtin or Humphrey mine, Gila Co.: Wilson, E. D., 68
Dragoon Mts., Cochise Co.: Wilson, E. D., 65
Empire dist., Pima Co.: Wilson, E. D., 67
General: Bain, H. F.; Callaway, H. M.; Fulton, C. H.; Joseph, P. E., 10; Lindgren, W., 12; McKnight, E. T., 1, 2; U.S. Bureau of Mines-U.S. Geological Survey, 2; Wilson, E. D., 55, 58
Globe-Miami dist., Gila Co.: Peterson, N. P., 9
Harshaw dist., Santa Cruz Co.: Kartchner, W. E.
Hilltop mine, Cochise Co.: Brittain, R. L.
Hiltano Camp, Empire Mts., Pima Co.: Feiss, J. W.
Huachuca Mts., Cochise Co.: Wilson, E. D., 66
Iron King mine, Yavapai Co.: Creasey, S. C., 4, 5; Mills, H. F., 1, 2, 3, 4; Roberts, H. M.
Jerome area, Yavapai Co.: Anderson, C. A., 10
Johnny Bull-Silver Knight property, Mohave Co.: Tainter, S. L., 3
Johnson Camp, Cochise Co.: Baker, A., 3d, 1; Cooper, J. R., 1, 2
Klondyke quad., Graham and Pinal Cos.: Simons, F. S., 5
Mammoth area, Pinal Co.: Creasey, S. C., 3
Map showing location of deposits: McKnight, E. T., 2
Mohave Co.: Schrader, F. C., 11, 12
Montana mine, Ruby dist., Santa Cruz Co.: Fowler, G. M., 1, 2
Mountain Queen area, Swisshelm Mts., Cochise Co.: Loring, W. B.
Mowry mine, Santa Cruz Co.: Brinsmade, R. B., 3; Prout, J. W.; Smith, G. E.
Patagonia Mts., Santa Cruz Co.: Schrader, F. C., 7, 8, 14
Pima dist., Pima Co.: Wilson, E. D., 59
Production summary: Wilson, E. D., 64
Saddle Mtn. dist., Pinal Co.: Ross, C. P., 5
San Xavier mine, Pima Co.: Duff, G. J.; Irvin, G. W.; Wilson, C. A.
Santa Rita Mts., Pima and Santa Cruz Cos.: Schrader, F. C., 7, 8, 14
Silver and Eureka dists., Yuma Co.: Wilson, E. D., 69
Stanley dist., Graham Co.: Ross, C. P., 4
Superior area, Pinal Co.: Wilson, E. D., 61
Swisshelm dist., Cochise Co.: Galbraith, F. W., 9
Tennessee-Schuylkill mine: Garrett, S. K.
Tombstone area, Cochise Co.: Brinsmade, R. B., 4; Butler, B. S., 8, 9; Church, J. A., 1, 2; Tenney, J. B., 11
Wallapai dist., Mohave Co.: Dings, M. G.; Haury, P. S., 2; Thomas, B. E., 1, 2, 4
Yuma Co., southern: Wilson, E. D., 15
Lithium
General: Norton, J. J.
Wickenburg area, Maricopa Co.: Jahns, R. H., 2, 3
Magnesium
Boulder (Hoover) Dam area: Schlocker, J.
Dolomite deposits: Weitz, J. H.
General: Davis, R. E., 2; Wilson, E. D., 33
Manganese
Adams and Woody properties, Coconino Co.: Potter, G. M.
Artillery Mts. region, Mohave Co.: Elkins, D. A.; Head, R. E., 1; Kumke, C. A., 4; Lasky, S. G., 1, 2, 3; Sanford, R. S.; Wilson, E. D., 62
Bisbee dist., Cochise Co.: Ransome, F. L., 26
Chuska Mts. area, Apache Co.: Mayo, E. B., 2
Colorado River desert region: Jones, E. L., Jr., 3

Cow Springs area, Navajo-Hopi Indian Reservations: Mayo, E. B., 2
Eastern Arizona: Farnham, L. L., 3
Fort Defiance quad., Apache Co.: Allen, J. E.
General: Agey, W. W.; Allen, M. A., 1; Crittenden, M. S.; DeVaney, F. D.; Harder, E. C., 1, 2; Hewett, D. F., 3; Jones, E. L., Jr., 4; Joseph, P. E., 1; Ridgway, R. H.; Romslo, T. M., 1; U.S. Bureau of Mines-U.S. Geological Survey, 6; Wilson, E. D., 10, 28; Woodbridge, D. E., 2
Hydrothermal deposits: Hewett, D. F., 5
Lake Mead region: McKelvey, V. E., 1
Lukachukai-Carrizo Mts. area, Apache Co.: Mayo, E. B., 2
Maggie Canyon area, Mohave Co.: Kumke, C. A., 4
Maricopa Co.: Fillo, P. V.
Markets: Coupal, J. S., 2
Mogollon Rim, Coconino Co.: Silver, C., 3
Navajo-Hopi Indian Reservations: Kiersch, G. A., 14; Mayo, E. B., 2
Oxide deposits: Hewett, D. F., 7, 8
Reymert mine, Pinal Co.: Blauvelt, H., 1
Sedimentary deposits: Hewett, D. F., 4
Sonsela Buttes, Navajo-Hopi Indian Reservations: Mayo, E. B., 2
Tombstone area, Cochise Co.: Goodale, C. W., 1; Needham, A. B.; Ransome, F. L., 26; Rasor, C. A., 3
Western Arizona: Farnham, L. L., 2
Winkelman area, Pinal Co.: Dean, K. C.

Mercury
Bibliography: Ebner, M. J.
Central western Arizona: Bancroft, H., 1
Copper Basin dist., Yavapai Co.: Johnston, W. P., 1, 2
Dreamy Draw mine, Phoenix Mts., Maricopa Co.: Hartman, E. W.
General: Joseph, P. E., 4; Lausen, C., 4; Pennington, J. W.; Ross, C. P., 6; Schuette, C. N., 1, 2; Von Bernewitz, M. W.; Wilson, E. D., 29; Wolcott, H. N., 1
Lees Ferry, Coconino Co.: Lausen, C., 11; Phoenix, D. A., 5
Map of occurrences: Bailey, E. H.
Mazatzal Mts.: Faick, J. N., 1; Hummel, K.; Ransome, F. L., 21
Navajo-Hopi Indian Reservations: Kiersch, G. A., 14
Occurrences: Bancroft, H., 2
Ord mine, Mazatzal Mts.: Faick, J. N., 1; McAllister, J. F.
Phoenix Mts., Maricopa Co.: Arizona Mining Journal, 26; Schrader, F. C., 15
Shylock mine, Black Hills, Yavapai Co.: Anderson, C. A., 10

Molybdenum
Amargosa mine, Pima dist., Pima Co.: Anderson, C. A., 3; Tainter, S. L., 1
Bunker Hill dist., Pinal Co.: Kuhn, T. H., 2, 3, 4
Childs-Aldwinkle mine, Copper Creek dist., Pinal Co.: Butler, B. S., 15; Kuhn, T. H., 1
Copper Basin dist., Yavapai Co.: Anderson, C. A., 2; Johnston, W. P., 1, 2
General: Hess, F. L., 4; Horton, F. W.; Joseph, P. E., 2; Kahlmeier, C. M.; McInnis, W.; Petar, A. V., 2
Glove mine, Santa Cruz Co.: See, J. M.
Hualapai Mts., Mohave Co.: Wickes, L. W.
Loma Prieta mine, Copper Basin, Yavapai Co.: Anderson, C. A., 2
Mammoth mining camp area, Pinal Co.: Peterson, N. P., 1, 2, 3
Pima dist., Amargosa mine, Pima Co.: Anderson, C. A., 3; Tainter, S. L., 1
Santa Rita and Patagonia Mts., Pima and Santa Cruz Cos.: Schrader, F. C., 4
Wulfenite: King, J. B.

Niobium
General: Parker, R. L.
Platinum
General: Blake, W. P., 27
Radium
General: Butler, G. M., 16
In ground water: Scott, R. C., 1, 2
Sedimentary deposits: Hess, F. L., 5
Selenium
In sulfides: Coleman, R. G.
In uranium deposits: Davidson, D. F.
Silver
Ajo dist., Pima Co.: Gilluly, J., 1, 4, 5, 6, 11, 13
Allison mine, Baboquivari Mts., Pima Co.: Worcester, A. W.
Aravaipa and Stanley dists., Graham Co.: Ross, C. P., 4
Ash Peak mine, Greenlee Co.: Lines, H. L.
Bagdad area, Yavapai Co.: Anderson, C. A., 9
Banner dist., Gila Co.: Ross, C. P., 5
Big Bug dist., Yavapai Co.: Anderson, C. A., 10
Black Hills dist., Yavapai Co.: Anderson, C. A., 10
Bradshaw Mts. quad., Yavapai Co.: Lindgren, W., 16
Bunker Hill dist., Pinal Co.: Kuhn, T. H., 2, 3, 4
Casa Grande dist., Pinal Co.: Tenney, J. B., 9
Cerbat Mts., Mohave Co.: Hernon, R. M., 3; Schrader, F. C., 1, 3, 11, 12
Cerro Colorado dist., Pima Co.: Jones, R. D.
Cherry Creek dist., Yavapai Co.: Anderson, C. A., 10
Childs-Aldwinkle mine, Copper Creek dist., Pinal Co.: Kuhn, T. H., 1
Chloride quad., Mohave Co.: Thomas, B. E., 4
Commonwealth mine, Pearce, Cochise Co.: Scott, W. A., 4; Smith, L. A.
Copper Basin dist., Yavapai Co.: Johnston, W. P., 1, 2
Copper Creek dist., Pinal Co.: Kuhn, T. H., 2, 3, 4
Courtland-Gleeson region, Cochise Co.: Wilson, E. D., 4
Epithermal precious metal deposits: Nolan, T. B., 1
General: Anderson, A. D.; Blake, W. P., 2; Fulton, C. H.; Guild, F. N., 7; Lindgren, W., 12, 15; McKnight, E. T., 1; Pumpelly, R., 1, 4; Romslo, T. M., 1; Wilson, E.
Globe area, Gila Co.: King, J. S.
Gold Road, Oatman, Mohave Co.: Bancroft, H., 5
Harshaw dist., Santa Cruz Co.: Kartchner, W. E.
Hilltop mine, Cochise Co.: Brittain, R. L.
Hiltano Camp, Empire Mts., Pima Co.: Feiss, J. W.
Idaho mine, Oro Blanco dist., Santa Cruz Co.: Warren, H. V., 1
In Arizona copper ores: Elsing, M. J., 4
Iron King mine, Humboldt, Yavapai Co.: Mills, H. F., 1, 2, 3, 4
Jerome area, Yavapai Co.: Anderson, C. A., 10; Lindgren, W., 16
Mohave Co.: Schrader, F. C., 11, 12
Montana mine, Oro Blanco dist., Santa Cruz Co.: Fowler, G. M., 1, 2; Warren, H. V., 1
Mountain Queen area, Swisshelm Mts., Cochise Co.: Loring, W. B.
Mowry mine, Patagonia Mts., Santa Cruz Co.: Brinsmade, R. B., 3; Prout, J. W.; Smith, G. E.
Oatman dist., Mohave Co.: Scott, W. A., 1
Octave mine, Yavapai Co.: Wilson, E. D., 22
Ores, origin of in arid regions: Keyes, C. R., 10
Pearce dist., Cochise Co.: Endlich, F. M.

Quijotoa Mts., Pima Co.: Gebhardt, R. C.
Resources: Lindgren, W., 12
Reymert mine, Pinal Co.: Blauvelt, H., 1
Richmond Basin area, Gila Co.: Bishop, O. M.; Rose, D.
Rosemont area, Pima Co.: Thomas, W. L.
Saddle Mtn. dist., Gila Co.: Ross, C. P., 5
Santa Rita and Patagonia Mts., Pima and Santa Cruz Cos.: Schrader, F. C., 7, 8, 14
San Xavier mine, Pima Co.: Duff, G. J.; Wilson, C. A.
Sedimentary deposits: Fischer, R. P., 2
Silver King mine, Pinal Co.: Blake, W. P., 10; Clark, C. M., 1; Galbraith, F. W., 1
Stanley dist., Graham Co.: Ross, C. P., 4
Swisshelm dist.: Cochise Co.: Galbraith, F. W., 9
Tip Top dist., Bradshaw Mts., Yavapai Co.: Ensign, O. A.
Tombstone dist., Cochise Co.: Brinsmade, R. B., 4; Butler, B. S., 8, 9; Church, J. A., 1, 2; Goodale, C. W., 1; Tenney, J. B., 11
United Verde mine, Yavapai Co.: Tally, R. E., 1
Vekol Mts., Pinal Co.: Carpenter, R. H., 1
Wallapai dist., Mohave Co.: Thomas, B. E., 1, 2, 4
Yuma Co., southern: Wilson, E. D., 15

Strontium
General: Schreck, A. E.

Tantalum
General: Parker, R. L.

Tellurium
General: Everett, F. D.

Thorium
Bibliography: Cooper, M., 13; Soister, P. E.
General: Anthony, J. W., 1; Moore, R. T., 1; Olson, J. C., 2

Titanium
Bibliography: Lawthers, R. L.
Occurrences: Rogers, C. L.
San Juan Basin area: Murphy, J. F.
Titaniferous magnetites, Eureka dist., Yavapai Co.: Singewald, J. T., Jr.

Tungsten
Acquarius Range, Mohave Co.: Hobbs, S. W.
Bagdad area, Yavapai Co.: Anderson, C. A., 9
Boriana dist., Mohave Co.: Hobbs, S. W.
Calabasas area, Santa Cruz Co.: Hill, J. M., 2
Cochise Co.: Dale, V. B., 2
Distribution of deposits: Lemmon, D. M.
Dragoon dist., Cochise Co.: Richards, R. W.
General: Hess, F. L., 2, 3; Hill, J. M., 3; Kerr, P. F., 1; Rickard, F.; Rubel, A. C., 1; Taft, H. H.; Vanderburg, W. O.; Willis, C. F., 4; Wilson, E. D., 30, 32
Gila Co.: Dale, V. B., 3
Graham Co.: Dale, V B., 1
Huebnerite: Blake, W. P., 24
Maricopa Co.: Dale, V. B., 1
Maudina and Morning Star mines, Pinal Co.: Bateman, P. C.; Bromfield, C. S., 1
Minerals: Hess, F. L., 2; Hill, J. M., 3
Mohave Co.: Dale, V. B., 3
Morristown area, Maricopa Co.: Bell, G. L.
Ores, Taft, H. H.
Pima Co.: Dale, V. B., 2

Pinal Co.: Dale, V. B., 1
Santa Cruz Co.: Dale, V. B., 2
Whetstone Mts., Pima and Santa Cruz Cos.: Hess, F. L., 1
Wolframite: Blake, W. P., 22, 25
Yavapai Co.: Dale, V. B., 3
Yuma Co.: Dale, V. B., 1

Uranium

Age of ores: Steiff, L. R., 1
Aguila area, Maricopa Co.: Hewett, D. F., 1, 2
Annie Laurie prospect, Santa Cruz Co.: Wright, R. J., 2
Basin and Range province: Davis, D. L.; Sharp, B. J.
Black Mesa, Apache Co.: Clinton, N. J., 1; Merrin, S.
Black Mtn.-Yale Point, Black Mesa, Navajo Indian Reservation: Clinton, N.J., 1
Bibliography: Cooper, M., 1, 2, 3; Kehn, T. M.; Soister, P. E.
Cameron area, Coconino Co.: Akers, J. P., 6, 11; Austin, S. R., 1, 2; Bollin, E. M., 2; Chenoweth, W. L., 4; Hinckley, D. N., 1, 2
Carbonaceous shale, associated with: Kehn, T. M.
Carnotite deposits: Davis, W. E.; Stokes, W. L., 3
Carrizo area, Apache Co.: Chenoweth, W. L., 1; Jones, D. J.; Stokes, W. L., 3
Chinle formation, Colorado Plateau: Abdel-Gawad, A., 1, 2; Isachsen, Y. W., 2
Chuska Mts., Apache Co.: Lowell, J. D., 1
Clastic rocks, occurrence in: Davis, D. L.
Coal, associated with: Breger, I. A., 2; Kehn, T. M.; Vine, J. D.
Colorado Plateau: Abdel-Gawad, A., 1, 2; Bain, G. W., 2, 4, 5; Bates, R. C.; Black, R. A., 1; Botinelly, T., 1, 2; Bush, A. L.; Cannon, H. L., 1; Carithers, L. W.; Chew, R. T., 3rd, 4; Davidson, D. F.; Davis, W. E.; Ebbley, N.; Finch, W. I., 1, 3; Fischer, R. P., 3, 4; Garrels, R. M., 2; Gruner, J. W., 1, 2, 3, 4, 5; Holland, H. D.; International Conference Peaceful Uses of Atomic Energy; Isachsen, Y. W., 1, 2; Jensen, M. L.; Jobin, D. A., 1, 2; Johnson, H. S., Jr., 2; Keller, G. V., 1; Kelley, V. C., 3, 4; Kerr, P. F., 5, 7; Laverty, R. A.; Miesch, A. T., 2, 3; Miller, D. S., 1, 3; Noble, E. A.; O'Sullivan, R. B., 2; Payne, A. L.; Reinhardt, E. V., 2; Rosenzweig, A.; Senftle, F. E.; Shoemaker, E. M., 1, 3; Stokes, W. L., 5; Wantland, D., 3; Weir, D. B.; Wright, R. J., 3
Copper Canyon area, Navajo Indian Reservation: Reinhardt, E. V., 1
Cove Mesa, Carrizo Mts., Apache Co.: Jones, D. J.
Diatremes, occurrences in: Lowell, J. D., 2; Shoemaker, E. M., 4, 9
Distribution of deposits: Butler, A. P., 1; Kaiser, E. P., 3; Klepper, M. R.; Stocking, H. E.
Dripping Spring dist., Gila Co.: Neurburg, G. J.
Dripping Spring quartzite: Granger, H. C., 1
Elements in Colorado Plateau ore: Davidson, D. F.; Miesch, A. T., 2, 4
Epigenetic deposits: Butler, A. P., Jr., 2; Finch, W. I., 2
Fossil wood, association with: Scott, R. A.
Fluorite deposits, association with: Wilmarth, V. R.
General: Abdel-Gawad, A., 1, 2; American Institute of Mining and Metallurgical Engineers, 2; Anthony, J. W., 1; Butler, A. P., Jr., 1; Butler, G.M., 16; Everhart, D. L., 1, 2; Granger H. C., 2; Johnson, H. S., Jr., 1; Moore, R. T., 1; Pierce, A. P.; Schnabel, R. W.; Twenhofel, W. S.; U.S. Atomic Energy Commission; Wright, R. J., 1
Geochemistry, Colorado Plateau: Garrels, R. M., 2; Miesch, A. T., 3
———, organic: Breger, I. A., 1
Geophysical prospecting: Black, R. A., 1; Davis, W. E.; Jobin, D. A., 1, 2; Keller, G. V., 1
Ground water, association with: Scott, R. C., 2

Hillside mine, Yavapai Co.: Axelrod, J. M.
Hopi Buttes, Navajo Co.: Lowell, J. D., 2; Shoemaker, E. M., 9
Host rocks, Colorado Plateau: Isachsen, Y. W., 1; Wood, H. B.
Hunt's Mesa, Monument Valley: Chester, J. W.
Hydrothermal emplacement, Colorado Plateau: International Conference Peaceful Uses of Atomic Energy
Isotopes, Colorado Plateau: Miller, D. S., 1; Senftle, F. E.
Isotopic fractionation in sandstone: Rosholt, J. M., Jr.
King No. 1 claim, Gila Co.: Weathers, G.
Leupp quad., Coconino Co.: Akers, J. P., 6
Limestone, deposits in: Gabelman, J. W., 1
Lukachukai Mts., Apache Co.: Dare, W. L., 3; Ellsworth, P. C.; King, J. W., 1, 2; Masters, J. A., 1, 2
Map of active and probable areas: Stuler, J. E.
Map of deposits, Colorado Plateau: Finch, W. I., 1
Map of region, Colorado Plateau: Shoemaker, E. M., 1
Marine black shales, bibliography: Fix, C. E.
Mesa VI, Lukachukai dist., Apache Co.: Ellsworth, P. C.
Mineral associations, Colorado Plateau: Gruner, J. W., 1, 2, 5
Mineralization, stages of on Colorado Plateau: Miesch, A. T., 2
Mineralogy, Colorado Plateau: Botinelly, T., 2; Garrels, R. M., 2; Gruner, J. W., 4
Mining, Colorado Plateau: Dare, W. L., 1, 2
Mohave Co.: Hart, O. M., 1, 2
Monument No. 1-Mitten No. 2 mines, Monument Valley: Witkind, I. J., 19
Monument No. 2 mine, Apache Co.: Finnell, T. L., 1
Monument Valley dist., Navajo and Apache Cos.: Grundy, W. D., 2; Mitcham, T. W., 1, 2; Witkind, I. J., 1, 2, 8, 17, 20; Young, R. G., 2
Morrison formation, Colorado Plateau: Dodd, P. H., Miesch, A. T., 1
Navajo Country: Gregory, H. E., 10
Navajo-Hopi Reservations, occurrence in diatremes: Shoemaker, E. M., 4
Nokai Mesa, Navajo Co.: Grundy, W. D., 1
Northern Arizona: Birdseye, H. S.
Oil, occurrence in: Hyden, H. J.
Ore bearing formations, Colorado Plateau: Finch, W. I., 1
Ore guides, Monument Valley: Evensen, C. G., 2; Mitcham, T. W., 1, 2
———, rock alteration: Kerr, P. F., 3
Ore reserve estimate, Colorado Plateau: Bush, A. L.
Origin of deposits: Adler, H. H., McKelvey, V. E., 3; Wood, H. B., 2
Orphan mine, Coconino Co.: Adler, H. H.; Marks, R. L.
Pitchblende deposits: King, R. U., 1, 2
Plants, accumulation in: Anderson, R. Y., 1
Porphyry copper, occurrence in: Still, A. R.
Precambrian structure, relation to: Osterwald, F. W.
Precipitates and evaporites, occurrences in: Bell, K. G.
Prospecting: McKelvey, V. E., 2
Prospecting, botanical methods: Cannon, H. L., 1, 2, 3, 4
Red Bluff prospect, Gila Co.: Kaiser, E. P., 1
Red Hills (Tate) prospect, Mohave Co.: Kaiser, E. P., 2
Ridenour mine, Hualapai Indian Reservation: Miller, R. D.
Riverview mine, Coconino Co.: Chenoweth, W. L., 3
San Carlos Indian Reservation: Bromfield, C. S., 3, 4
Sandstone deposits: Adler, H. H.; Carithers, L. W.; Clinton, N. J., 2; Davidson, D. F.; Fischer, R. P., 3, 5; Hostetler, P. B.; Jensen, M. L.; Wyant, D. G.
Secondary deposits: Stugard, F., Jr.

METALLIFEROUS MINERAL COMMODITIES, *Uranium (Continued)*
Sedimentary deposits: Fischer, R. P., 2; Hess, F. L., 5; Johnson, H. S., Jr., 2; Kerr, P. F., 7
Shinarump channel deposits: Bain, G. W., 3; Witkind, I. J., 1, 3, 8
Shiprock quad., Apache Co.: O'Sullivan, R. V., 2
Sierra Ancha region, Gila Co.: Williams, F. J.
Southeastern Arizona: Bissett, D. H.
Structural control: Bissett, D. H.; Gabelman, J. W., 2; Kelley, V. C., 3, 4; Osterwald, F. W.
Tertiary lake sediments, southwestern Yavapai Co.: Reyner, M. L.
Uraniniferous and radioactive native bituminous substances, exclusive of coals: Jones, H. N.
Vein deposits: Everhardt, D. L., 3; Walker, G. W., 1, 3, 4, 5
Volcanic rocks, occurrence in: Sharp, B. J.
White Canyon dist., Navajo and Apache Cos.: Grundy, W. D., 2; Young, R. G., 2
Wilson Creek area, Gila Co.: Wells, R. L.

Vanadium
Apache mine, Globe area, Gila Co.: Keithley, H. S.
Castle Dome mine, Yuma Co.: Blake, W. P., 6.
Colorado Plateau: Botinelly, T., 2; Bush, A. L.; Cannon, H. L., 1; Chew, R. T., 3rd, 4; Fischer, R. P., 4; Ross, M.; Witkind, I. J., 19, 20
General: Allen, M. A., 7; Argall, G. O., Jr.; Fischer, R. P., 6; Johnson, A. C.; Joseph, P. E., 5
Mammoth mining camp area, Pinal Co.: Peterson, N. P., 1, 2, 3
Pinal Co.: Blake, F. H.
Sandstone deposits: Hostetler, P. B.; Fischer, R. P., 5
Sedimentary deposits: Fischer, R. P., 2

Zinc
Antler mine, Mohave Co.: Holt, E. B., 4; Romslo, T. M., 2; Wilson, E. D., 51
Aravaipa deposit, Graham Co.: Denton, T. C., 3; Wilson, E. D., 48, 60
Bagdad area, Yavapai Co.: Anderson, C. A., 7, 9; Theobald, P. K., Jr.
Big Bug dist., Yavapai Co.: Anderson, C. A., 10
Bisbee dist., Cochise Co.: Hogue, W. G., 2
Black Hills dist., Yavapai Co.: Anderson, C. A., 10
Castle Dome dist., Yuma Co.: Holt, E. B., 3; Wilson, E. D., 70
Cerbat Mts., Mohave Co.: Hernon, R. M., 3; Schrader, F. C., 1, 3, 11, 12
Chloride quad., Mohave Co.: Thomas, B. E., 4
Copper Basin dist., Yavapai Co.: Johnston, W. P., 1, 2
Courtland-Gleeson area, Cochise Co.: Wilson, E. D., 4
Curtin or Humphrey mine, Banner dist., Gila Co.: Wilson, E. D., 68
Dragoon Mts., Cochise Co.: Wilson, E. D., 65
Empire dist., Pima Co.: Wilson, E. D., 67
Eureka dist., Yuma Co.: Wilson, E. D., 69
General: Bain, H. F.; Joseph, P. E., 6; McKnight, E. T., 1, 3; Lindgren, W., 12; Ralston, O. C.; Tenney, J. B., 3; U.S. Bureau of Mines-U.S. Geological Survey, 3; Wilson, E. D., 55, 58
Globe-Miami dist., Gila Co.: Peterson, N. P., 9
Huachuca Mts., Cochise Co.: Wilson, E. D., 66
Hualpai dist., Mohave Co.: Gregory, N. B.
Humphrey mine, Banner dist., Gila Co.: Wilson, E. D., 68
Iron King mine, Yavapai Co.: Creasey, S. C., 4, 5; Mills, H. F., 1, 2, 3, 4; Roberts, H. M.
Jerome area, Yavapai Co.: Anderson, C. A., 10
Johnny Bull-Silver Knight property, Wallapai dist., Mohave Co.: Tainter, S. L., 3

METALLIFEROUS MINERAL COMMODITIES, *Zinc (Continued)*
Johnson Camp, Cochise Co.: Baker, A., 3rd, 1; Cooper, J. R., 1, 2; Hardwick, W. R., 1; Heineman, R. E. S., 1
Keystone mine, Cochise dist., Cochise Co.: Romslo, T. M., 3
Klondyke quad., Graham and Pinal Cos.: Simons, F. S.
Little Dragoon Mts., Cochise Co.: Enlows, H. E., 1
Mammoth area, Pinal Co.: Creasey, S. C., 3
Map showing location of deposits: McKnight, E. T., 3
Mohave Co.: Schrader, F. C., 11, 12
Mohawk prospect, Pima Co.: Haury, P. S., 1; Wilson, E. D., 45
Mountain Queen area, Swisshelm Mts., Cochise Co.: Loring, W. B.
Pima dist., Pima Co.: Wilson, E. D., 59
Reward (Vekol) deposit, Pinal Co.: Denton, T. C., 1
St. George mine, Cochise Co.: Romslo, T. M., 3
San Xavier mine, Pima Co.: Duff, G. J.; Irvin, G. W.; Wilson, C. A.
Santa Rita and Patagonia Mts., Pima and Santa Cruz Cos.: Schrader, F. C., 7, 8, 14
Silver dist., Yuma Co.: Wilson, E. D., 69
Superior area, Pinal Co.: Wilson, E. D., 61
Swisshelm dist., Cochise Co.: Galbraith, F. W., 9
Wallapai dist., Mohave Co.: Dings, M. G.; Gregory, N. B.; Haury, P. S., 2; Thomas, B. E., 1, 2, 4

METAMORPHISM
Bagdad area, Yavapai Co.: Anderson, C. A., 4
Bradshaw Mts. quad., Yavapai Co.: Jaggar, T. A., Jr.
Buehman Canyon, Santa Catalina Mts., Pima Co.: Raabe, R. C.
Bullock Canyon, Santa Catalina Mts., Pima Co.: Raabe, R. C.
Johnson Camp, Cochise Co.: Cooper, J. R., 4
Oracle granite: Banerjee, A. K.
Precambrian: Keyes, C. R., 40, 85
———, Grand Canyon: Campbell, I., 1
———, Greenstone complex, Jerome quad., Yavapai Co.: Lausen, C., 8; Lindgren, W., 17
Santa Catalina Mts., Pima Co.: Butler, B. S., 18; DuBois, R. L., 4; Raabe, R. C.; Wood, M. M.
———, northern: Wallace, R. M., 2
Siliceous sandstone: Merrill, G. P., 2
Tucson quad., Pima Co.: Moore, B. N., 3

METEORITES
Barringer: Barringer, D. M., Jr., 1
Canyon Diablo: Brady, L. F., 14; Derby, O. A.; Keyes, C. R., 14; Lord, J. O.; Merrill, G. P., 3, 4; Meunier, S.; Moissan, H.; Newton, A. M.; Nininger, H. H., 10; Thurmond, F. L., 3
———, analysis: Buddhue, J. D., 3, 7
———, diamonds in: Carter, N. L.; Ksanda, C. J.; Kunz, G. F., 5; Leiper, H.; Nininger, H. H., 3
———, schreibersite: Adler, I.
———, siderites: Breed, W. J., 2
Coon Butte: Keyes, C. R., 8; Mallet, J. W.; Pickering, W. H.
Craters: Boon, J. D., 1, 2, 3; Nininger, H. H., 2; Pecora, W. T.; Spencer, L. J.
Ehrenburg, Yuma Co.: Leonard, F. C., 3
Elden, Coconino Co.: Heineman, R. E. S., 5
General: Brady, L. F., 1, 2, 3, 4; Cohen, E. W.; Nininger, H. H., 6; Thomson, E.
Harvard University Museum collection: Palache, C., 3
Holbrook: Buddhue, J. G., 6; Foote, W. M.; Leonard, F. C., 1; Mason, B.; Merrill, G. P., 7

METEORITES *(Continued)*
Hualpai Indian Reservation: Merrill, G. P., 11
Impact experiments: Charters, A. C.; Shoemaker, E. M., 10
Iron: Brush, G. J., 1; Fletcher, L.; Foote, A. E., 1, 2; Genth, F. A.; McGough, P. J.; Nininger, H. H., 4; Pickering, W. H.; Whitney, J. D., 2
Iron oxide: Buddhue, J. D., 5
Meteor Crater: Barringer, D. M., 1, 2, 3, 4, 5; Barringer, D. M., Jr., 1, 2; Bingham, W. F.; Bjork, R. L.; Boot, D. H.; Boutwell, W. D.; Campbell, W. W.; Colvocoresses, G. M.; Darton, N. H., 8, 23; Davison, J. M.; Dellenbaugh, F. S., 2; Dodge, N. N.; Dolezal, E.; Engineering and Mining Journal, 1; Fairchild, H. L., 1, 2, 3, 4; Fisher, C.; Gentieu, N. P.; Guild, F. N., 4; Hager, D., 4, 6, 8, 9; Hastings, J. B.; Holland, L. F. S.; Keyes, C. R., 8, 11, 16, 55; Kreins, E. R.; Leonard, F. C., 2; Lewis, W. S.; Longwell, C. R., 5; Lundberg, H.; Magie, W. F.; Mallet, J. W.; Margerie, E. de, 2; Meinecke, F.; Merrill, G. P., 5, 9; Nininger, H. H., 1, 8, 11, 12, 13, 15; Pickering, W. H.; Rinehart, J. S., 1, 2, 3; Robie, E. H.; Russell, H. N.; Science, 2; Shoemaker, E. M., 5, 6, 7; Sjogren, H.; Skerrett, R. G.; Stutzer, O., 1, 2; Thomas, K., 4; Tilghman, B. C.; Tschirwinsky, P.; Watson, F. G., Jr.; Wilson, C. H.; Wylie, C. C., 1, 2
———, age: Blackwelder, E., 3; Brown, F. M.
———, coesite in: Chao, E. C. T., 1; Fahey, J. J., 3
———, discovery: Barnes, W. C., 1
———, experiment on Kaibab limestone: Shoemaker, E. M., 8
———, geophyiscal data: Lundberg, H.
———, geophysical studies: Harding, N.; Jakosky, J. J., 1, 2; Namba, M.; Nininger, H. H., 7
———, impact experiments: Charters, A. C.
———, iron shale, analysis: Farrington, O. C., 2
———, lechatelierite in: Rogers, A. F., 3
———, metallic spheroids: Mead, C. W.; Zaslow, B.
———, slag: Nininger, H. H., 14
———, stishovite in: Chao, E. C. T., 2, 3; Fahey, J. J., 3
———, thermoluminescence investigations: Roach, C. H.
Mt. Elden, Coconino Co.: Buddhue, J. D., 2, 6
Navajo: Merrill, G. P., 10; Roy, S. K.
Nickel-iron: Nininger, H. H., 4
Nininger collection: Nininger, H. H., 9
Painted Desert: Keyes, C. R., 9
Penetration mechanics: Shoemaker, E. M., 7
Pima Co.: Henderson, E. P., 1
San Francisco Mts., Coconino Co.: Perry, S. H.
Thermal properties: Butler, C. P.
Tucson, Pima Co.: Brush, G. J., 1; Fletcher, L.; Genth, F. A.; McGough, P. J.
Weaver Mts., Henderson, E. P., 2
Winona, Coconino Co.: Heineman, R. E. S., 2

MINERAL OCCURRENCE MAPS *See* MAPS, *Mineral Occurrence*

MINERALOGY AND MINERALS
Agatized woods: Kunz, G. F., 1, 3
Ajoite: Schaller, W. T., 4
Alabandite, Tombstone: Moses, A. J., 1, 3
Allanite, Quijotoa Mts.: Williams, S. A., 2
Analcite, sedimentary: Ross, C. S., 1
Analayses: Wells, R. C., 3
Anauxite, in volcanic rocks: Rogers, A. F., 4
Andalusite, bibliography: Grametbaur, A. B.
Anglesite: Brush, G. J., 2

MINERALOGY AND MINERALS *(Continued)*

Antlerite: Palache, C., 5
Arizonite: Flinter, B. H.; Karkhanavala, M. D.; Overholt, J. L.; Palmer, C.
Arsenic, native: Warren, C. H.
Asbestos: Butler, G. M., 23; Wilson, E. D., 8
———, origin: Taber, S., 1
Axinite: Wherry, E. T.
Azurite: Farrington, O. C., 1; Kunz, G. F., 1
Beraunite: Wherry, E. T.
Bermanite: Hurlbut, C. S., Jr., 2
Bibliography; andalusite, dumortierite, kyanite, pyrophylite, sillimanite, topaz: Grametbaur, A. B.
Bisbeeite: Gordon, S. G.; Rogers, A. F., 2
Bornite-chalcocite microtextures: Schwartz, G. M., 7
Bornite-chalcopyrite intergrowths: Schwartz, G. M., 2
Boxwork siderite: Eckel, E. B., 1; Trischka, C., 4
Brochantite: Palache, C., 6
Bromyrite, Tombstone: Rasor, C. A., 2
Cahnite: Palache, C., 7
Calcite, Bisbee: Hovey, E. O., 1
Calcite-chlorite pseudomorphs, Ray: Schwartz, G. M., 15
Canyon Diablo meteorite: Derby, O. A.
Ceruliofibrite, Bisbee: Holden, E. F., 1, 2
Cerussite twin, Mammoth mine, Pinal Co.: Pogue, J. E.
Chalcoalumite, Bisbee: Larsen, E. S.
Chalcocite: Tolman, C. F., Jr., 13
Chalcocite-bornite, microtextures: Schwartz, G. M., 7
Chalcophyllite, Bisbee: Palache, C., 1
Chalcopyrite, Johnson Camp: Baker, A., 3rd, 2
———, Pontotoc mine and Pima dist.: Guild, F. N., 1
Chevkinite (Tscheffkinite): Kauffman, A. J.
Chlorite-calcite pseudomorphs, Ray: Schwartz, G. M., 15
Chrome diopside, Buell Park, Apache Co.: Williams, S. A., 1
Chrysocolla: Ming-Shan Sun, 2; Palmer, C. M.
Cinnabar veins, tourmaline-bearing: Hummel, K.
Claudetite, Jerome: Buerger, M. J.
Clay, in Arizona's soils: Robinson, D. O.
Clay minerals, in Morrison formation: Keller, W. D., 3
———, in Triassic rocks, Colorado Plateau: Schultz, L. G.
Coesite, Meteor Crater: Chao, E. C. T., 1; Fahey, J. J., 3
Colemanite, in fossil egg: Ward, T. W.
Conichalcite: Qurashi, M. M., 1, 2
Connellite, Bisbee: Ford, W. E., 2; Holden, E. F., 2; Palache, C., 1
Copper, minerals associated with: Stone, G. H., 1
———, native, Bisbee: Petereit, A. H.
———, paragenesis of oxidized ores of: Schwartz, G. M., 4
Copper minerals: Kunz, G. F., 1, 2
Copper ores: Fulton, C. H.
———, Ajo: Stewart, L. A., 1
———, Bisbee dist.: Friedrich, J. J.; Schwartz, G. M., 3
———, Castle Dome: Peterson, N. P., 6, 8
———, Globe: Schwartz, G. M., 1
———, United Verde Extension mine: Schwartz, G. M., 5
Copper pitch ore: Guild, F. N., 11
Copper-sulphate stalactites: Mitchell, G. J., 4
Copper sulphide ores: Graton, L. C.

Cornwallite: Berry, L. G.
Coronadite: Frondel, C., 2; Lindgren, W., 19
Cuprodescloizite, Bisbee: Wells, R. C., 1
Cuprotungstite: Schaller, W. T., 3
Cyanotrichite: Gordon, S. G.; Palache, C., 4
Davidite, Quijotoa Mts.: Pabst, A., 2
Delafossite: Pabst, A., 1; Rogers, A. F., 1
Descloizite: Qurashi, M. M., 2
———, analyses: Hillebrand, W. F., 2
Diabase, central Arizona: Anthony, J. W., 5
Diaboleite, Mammoth mine: Palache, C., 8
Diamonds, in meteoric iron: Foote, A. E., 1; Ksanda, C. J.; Kunz, G. F., 5; Leiper, H.; Nininger, H. H., 3
Diopside: Williams, S. A., 1
Dioptase: Galbraith, F. W., 3
Display at State Fair: Flagg, A. L., 2
Dumortierite: Bowen, N. L.; Schaller, W. T., 1
———, bibliography: Grametbaur, A. B.
———, composition: Ford, W. E., 1
———, Yuma Co.: Diller, J. S., 1; Wilson, E. D., 9
Emmonsite, Tombstone: Hillebrand, W. F., 1
Ettringite, Tombstone: Moses, A. J., 2, 3, 4
Flagstaffite: Guild, F. N., 8, 9, 10
Fluorescent minerals: Flagg, A. L., 4, 8
———, Colorado desert: Eaton, A. L.
Footeite: Ford, W. E., 2; Koenig, G. A., 2
Garnets, Santa Catalina Mts.: Pilkington, H. D., 1
Gerhardite: Wells, H. L.
———, Mineral Hill mine, Pima dist.: Williams, S. A., 4
Gold ores: Fulton, C. H.
Hematite, Pontotoc mine and Pima dist.: Guild, F. N., 1
———, in veins, Globe dist.: Sanders, J.
Hetaerolite: Frondel, C., 2
Higginsite: Berry, L. G.; Palache, C., 2
Hollandite: Frondel, C., 2
Hollow quartz crystals: Kunz, G. F., 4
Hydrohetaerolite: Frondel, C., 2
Hydrous sulphates, United Verde mine: Lausen, C., 7
Hypogene zoning, Magma mine, Superior: Gustafson, L. B.
Iodobromite: Blake, W. P., 45
Jarosite: Penfield, S. L., 1
Johannsenite: Simons, F. S., 4
Journeys: Flagg, A. L., 7
Keweenawite: Koenig, G. A., 3
Kyanite, bibliography: Grametbaur, A. B.
Lawrencite, Mt. Elden meteorite: Buddhue, J. D., 2
Lead ores: Fulton, C. H.
Lechatelierite, Meteor Crater: Rogers, A. F., 3
Loellingite: Rasor, C. A., 4
London-Arizona mine, Banner dist.: Brooks, E. W.
Magnesium, Boulder (Hoover) Dam area: Schlocker, J.
Magnetite, Pontotoc mine and Pima dist.: Guild, F. N., 1
———, radioactivity: Green, W. D.
Magnetite in sulfide ores: Schwartz, G. M., 8
Malachite, Bisbee: Hills, R. C., 2; Kunz, G. F., 1

Mamoth mining camp area, Pinal Co.: Palache, C., 8, 9; Peterson, N. P., 1, 2, 3; Pogue, J. E.; Wise, F.
Manganese: Fairbanks, E. E.
———, Tombstone: Rasor, C. A.
Manganese ore: Blake, W. P., 53; Head, R. E., 2
———, Artillery Peak: Head, R. E., 1; Mouat, M. M.
Manganese oxide banding: Tarr, W. A., 1
Manganese oxide, thallium in: Crittenden, M. D.
Marcasite, Twin Buttes area: Webber, B. N., 2
Melanochalcite: Hunt, W. F.; Koenig, G. A., 3
Meteor Crater: Kreins, E. R.
Mildren and Steppe mining areas, Pima Co.: Williams, S. A., 3, 5
Mimetite: Bowman, H. L.
Mineral collecting, Mohave Co.: Hammons, L.
Mineralight, prospecting: Rocks and Minerals, 4
Minerals of Arizona: Bideaux, R. A., 2; Blake, W. P., 50; Flagg, A. L., 1, 3, 5, 7; Galbraith, F. W., 6, 8, 10; Guild, F. N., 5; Moore, R. T., 2; Rath, G. vom, 2; Willis, C. F. 1
Molybdenian stolzite: Faick, J. N., 2
Molybdite: Guild, F. N., 3
Monazite: Heineman, R. E. S., 3
Murdochite: Christ, C. L.; Fahey, J. J., 2
Natrojarosite, Kingman: Shannon, E. V.
Navajoite: Weeks, A. D., 2
Notes: Diller, J. S., 2; Garrison, F. L.; Guild, F. N., 6; Headden, W. P.; Moses, A. J., 5; Schaller, W. T., 2; Silliman, B., Jr., 4
Obsidianites: Buddhue, J. D., 1
Olivine bombs: Lausen, C., 6
Papagoite, Ajo: Hutton, C. O., 4
Paragenesis, Magma mine, Superior: Gustafson, L. B.
———, Miami mine: Legge, J. A., Jr.
———, uranium minerals: Walker, G. W., 4; Witkind, I. J., 20
Paragenesis of oxidized ores of copper: Schwartz, G. M., 4
Paralaurionite, Mammoth mine: Palache, C., 9
Paramelaconite: Frondel, C., 1; Koenig, G. A., 1
Pegmatite quartz: Jahns, R. H., 1
Perlite, Superior area: Keller, W. D., 2
Petite minerals: Flagg, A. L., 6
Phosphate minerals: Hurlbut, C. S., Jr., 1, 2
———, Castle Dome copper deposit: Peterson, N. P., 7
Piedmontite: Guild, F. N., 13
———, Sulphur Spring Valley: Lausen, C., 5
Potash in copper and gold ores: Butler, B. S., 2
Pseudomalachite, Safford: Hutton, C. O., 2
Psittacinite, Higgins mine, Bisbee: Taber, S., 2
Public services for identification: Tyler, P. M., 1
Pyrite: Guild, F. N., 12
———, concretions, Chuar group, Grand Canyon: Bryan, J. J., 1
———, Pontotoc mine and Pima dist.: Guild, F. N., 1
———, Tucson: Ayers, V. L.
Pyromorphite: Bowman, H. L.
Pyrophylite, bibliography: Grametbaur, A. B.
Quartz, pegmatitic: Jahns, R. H., 1
Quartz crystals: Johnson, R.
———, hollow: Kunz, G. F., 4

MINERALOGY AND MINERALS *(Continued)*
Rare and radioactive minerals: Moore, R. T., 1
Rare minerals, southern Arizona: Pellegrin, A. L.
Rhenium, associated with uraninite: Petersen, R. G., 1
Rickardite: Crawford, W. P., 1
San Xavier mine, Pima Co., supergene minerals: Arnold, L. C.
Schreibersite, in Canyon Diablo meteorite: Adler, I.
———, synthetic: Buddhue, J. D., 8
Selenium: Colemar, R. G., 2; Davidson, D. F.
Sengierite, Bisbee: Hutton, C. O., 1
Siderite, boxwork: Eckel, E. B., 1; Trischka, C., 6
Sillimanite, bibliography: Grametbauer, A. B.
———, Grand Canyon: Campbell, I., 4
Silver ores: Fulton, C. H.; Guild, F. N., 7; Pumpelly, R., 1
Simplotite, Colorado Plateau: Thompson, M. E.
Spangolite: Penfield, S. L., 3
Spectrographic determinations: Wartman, F. S.
Sphalerite, Johnson Camp: Baker, A., 3d., 2
Staurolite, Grand Canyon: Campbell, I., 4
Stishovite, Meteor Crater: Chao, E. C. T., 2, 3; Fahey, J. J., 3
Stolzite: Palache, C., 7
———, molybdenian: Faick, J. N., 2
Strontium minerals: Harness, C. L.
Sulfates, Bisbee dist.: Merwin, H. E., 1
Sulfate incrustations, Copper Queen mine: Merwin, H. E., 2
Table Mountain mine, Galiuro Mts.: Thomssen, R. W., 2
Thallium: Crittenden, M. D.
Thorium: George, D'Arcy
Titanclinohumite: Ming-Shan, Sun, 1
Tombstone dist.: Rasor, C. A., 1
Topaz, bibliography: Grametbaur, A. B.
Tourmaline-bearing cinnabar veins: Hummel, K.
Triplite: Hurlbut, C. S., Jr., 2
Tscheffkinite: Kauffman, A. J.
Turquoise: Blake, W. P., 9; Crawford, W. P., 2
Tyrolite: Berry, L. G.
Ultrabasite: Palache, C., 7
Umohoite: Hamilton, P. K.
Uraninite, in Shinarump member of Chinle formation: Petersen, R. G., 4
———, rhenium associated with: Petersen, R. G., 1
Uranium: George, D'Arcy; Rosholt, J. N., Jr.; Walker, G. W., 4
———, Cameron area: Austin, S. R., 2
———, Colorado Plateau: Botinelly, T., 1, 2; Coleman, R. G., 1; Garrels, R. M., 2; Gruner, J. W., 2, 4, 5; Jensen, M. L.; Weeks, A. D., 1, 3; Witkind, I. J., 20
———, Hillside mine, Yavapai Co.: Axelrod, J. M.
Useful minerals: Sanford, S.; Willis, C. F., 3
Vanadinite: Bowman, H. L.; Penfield, S. L., 2; Rocks and Minerals, 1
———, Pinal Co.: Blake, F. H.
———, Yuma Co.: Hills, R. C., 1
Vanadium, Colorado Plateau: Botinelly, T., 2; Ross, M.; Weeks, A. D., 1
Voltaite, Jerome: Anderson, C. A., 1
Wherryite, Mammoth mine: Fahey, J. J., 1
Wolframite: Guild, F. N., 12; Wherry, E. T.
Wulfenite: King, J. B.
———, Glove mine: Bideaux, R. A., 1
Xenotime: Gastil, R. G., 1

MINERALOGY AND MINERALS *(Continued)*
Yavapaiite, Jerome: Hutton, C. O., 3
Yuma Co., localities: Foshag, W. L.
Zincite: Palache, C., 7
MINE TAXES AND PROPERTY VALUATION
General: Arizona Department of Mineral Resources, 2, 11, 13, 14, 15, 16, 17, 20, 21, 22, 25; Arizona Tax Commission; Hoagland, J., 3, Rickard, T. A., 8
MINES AND MINING DISTRICTS
Abril mine, Dragoon Mts., Cochise Co.: Perry, D. V.
Ajo dist., Pima Co.: Allen, A. W.; Arizona Department of Mineral Resources, 5, 10; Arizona Mining Journal, 11; Bramwell, A. W., 1, 2; Calumet and Arizona Mining Company; Creasey, S. C., 8; Dehlinger, M. E.; Dekalb, C., 2; Du Moulin, W. L.; Gilluly, J., 1, 2, 3, 4, 5, 6, 11, 13; Greenway, J. C.; Hardwick, W. R., 5; Hillebrand, J. R., 2; Hutton, C. O., 4; Ingham, G. R.; Jouralemon, I. B., 1, 4; Lakes, A., 1; Rickard, T. A., 6, 9; Romslo, T. M., 5; Schmitt, H. A., 4; Schwartz, G. M., 8, 18; Stewart, L. A., 1; Trischka, C., 8
Allison mine, Baboquivari Mts., Pima Co.: Worcester, A. W.
Amargosa mine, Pima dist., Pima Co.: Anderson, C. A., 3; Tainter, S. L., 1
American Ores asbestos mine, Sierra Ancha Mts., Gila Co.: Bateman, A. M., 1
Amole dist., Pima Co.: Allen, M. A., 4; Kinnison, J. E., 1
Annie Laurie uranium prospect, Santa Cruz Co.: Anderson, R. Y., 2; Wright, R. J., 2
Antler mine, Mohave Co.: Holt, E. B., 4; Romslo, T. M., 2; Wilson, E. D., 51
Apache iron deposit, Navajo Co.: Stewart, L. A., 3
Apache mines, Owl Head dist., Pinal Co.: Pickard, B. O., 1
Apache vanadium mine, Gila Co.: Keithley, H. S.
Apex mine, Coconino Co.: Tainter, S. L., 2
Aquarius Range, Mohave Co.: Hobbs, S. W.
Aravaipa dist., Graham Co.: Arizona Mining Journal, 31; Denton, T. C., 3; Ross, C. P., 4; Simons, F. S., 4; Wilson, E. D., 48, 60
Arizona Commercial mine, Globe dist., Gila Co.: Watkins, R. A., 5; Willis, C. F., 34
Arizona Copper Company, Morenci dist., Greenlee Co.: Arizona Mining Journal, 7; Gilbert, J.; Willis, C. F., 67
Arizona-Globe copper property: Cooper, C. M.; Watkins, R. A., 8
Arizona United Mining Company: Scott, H. E.
Arizota Mining Company: Simmons, J.
Artillery Mts. manganese dist., Mohave Co.: Elkins, D. A.; Kumke, C. A., 4; Lasky, S. G., 1, 2, 3; Sanford, R. S.; Wilson, E. D., 62
Asbestos mines: Mining World, 5, 30; Pratt, J. H., 2; Stewart, L. A., 2, 4, 5, 7; Wilson, E. D., 8
Ash Peak mine, Greenlee Co.: Lines, H. L.
Atlas mine, Pima Co.: Agenbroad, L. D.
Aubrey dist., Mohave Co.: Mensch, W. A., 2
Bagdad, Yavapai Co.: Aldrich, L. T., 2; Anderson, C. A., 6, 7, 9; Arizona Department of Mineral Resources, 3; Butler, B. S., 12; Creasey, S. C., 8; Dempsey, W. J., 9; Dickie, E. R.; Hardwick, W. R., 2, 4; Mining Journal, 20; Mining World, 1, 16; Theobald, P. K., Jr.; Tilton, G. R.; Trischka, C., 8; Yost, H. W.
Banner dist., Gila Co.: Brooks, E. W.; Mining World, 25, 33; Ross, C. P., 5; Wilson, E. D., 68
Banner mine, Pima dist., Pima Co.: Bowman, A. B.
Bannie gold and copper mine: Burgess, D., 3
Barite deposits: Stewart, L. A., 6
Basin and Range Province: Stringham, B., 1; Tenney, J. B., 7
Belmont-Queen Creek dist., Pinal Co.: Harshman, E. N.

MINES AND MINING DISTRICTS *(Continued)*

Big Bug dist., Yavapai Co.: Anderson, C. A., 10
Big Jim mine, Oatman dist., Mohave Co.: Johnson, C. H.; Spillman, C.
Bill Arp mine, Black Canyon dist., Yavapai Co.: Arizona Mining Journal, 27
Bisbee (Warren) dist., Cochise Co.: Arizona Department of Mineral Resources, 9; Arizona Mining Journal, 8, 14; Beasley, W. L.; Billingsley, P., 4; Bishop, H. J.; Bonillas, Y. S.; Bradley, W.; Brinsmade, R. B., 1; Calumet and Arizona Mining Company; Cox, A. M.; Dekalb, C., 3; DeWilde, E. J., 1, 2; Douglas, J., 4, 6, 7; Elsing, M. J., 1; Friedrich, J. J.; Goodwin, J. C.; Hills, R. C., 2; Hodgson, J. P.; Hogue, W. G., 2; Hovey, E. O., 1, 2; Hutton, C. O., 1; Kantner, W. H.; Knopf, A.; Larsen, E. S.; Lavender, H. M.; Little, J. M.; Locke, A., 2; McClintock, J. H., 5; Merwin, H. E., 1, 2; Mitchell, G. J., 1, 2, 3; Notman, A., 1; Palache, C., 1, 2; Peng, Chi-jui; Petereit, A. H.; Ransome, F. L., 3, 4, 5, 7, 8, 9, 17, 26; Rogers, A. F., 1; Rove, O. N.. 1, 2; Sato, M.; Schmitt, H., 1, 2, 3, 4; Schwartz, G. M., 2, 3, 4, 7, 8, 18; Sherman, G., 1, 2; Skillings Mining Review, 2; Taber, S., 2; Tenney, J. B., 1, 2, 8; Tovote, W. L., 4; Trischka, C., 2, 4, 5, 6, 7, 8; Wilson, P. D., 1; Wisser, E. H., 1; Ziesmer, H. M., 1, 2
Bishop Knoll, Payson area, Gila Co.: Willis, C. F., 11
Black Canyon dist., Yavapai Co.: Arizona Mining Journal, 27; Guiteras, J. R.
Black Hills, Yavapai Co.: Anderson, C. A., 10
Black Mesa, Apache Co.: Merrin, S.
Black Mts., Mohave Co.: Gardner, E. D., 2; Schrader, F. C., 1, 3, 11, 12
Blue Bird Company Crown King area, Yavapai Co.: Burgess, D., 2
Boriana mine, Aquarius Range, Mohave Co.: Hobbs, S. W.
Boulder (Hoover) Dam area: U.S. Bureau of Reclamation, 1
Bradshaw Mts., Yavapai Co.: Dempsey, W. J., 8; Henderson, P. C., 1, 2; Jagger, T. A., Jr.; Lindgren, W., 16; Wheeler, G. M., 2
Bridal Veil mines, Cataract Canyon, Coconino Co.: Ferris, H. A.
Bunker Hill dist., Pinal Co.: Higgins, E., 3; Kuhn, T. H., 2, 3, 4; Martin, A. H., 2; Pickard, B. O., 2; Sibley, R. R.
Calabasas area, Santa Cruz Co.: Hill, J. M., 2
California dist., Cochise Co.: Brittain, R. L.; Coll, A., 1
California mine area, Pima Co.: Gillingham, T. E.
Calizona placers: Hedburg, E., 1
Calumet and Arizona mine, Bisbee dist., Cochise Co.: Arizona Mining Journal, 8; Calumet and Arizona Mining Company; McClintock, J. H., 5; Mining Journal, 2; Newett, G. A.; Willis, C. F., 67
Calumet and Jerome, Yavapai Co.: Willis, C. F., 55
Campbell mine, Bisbee dist., Cochise Co.: Lavender, H. M.; Schwartz, G. M., 3
Campo Bonito area, Pinal Co.: Ludden, R. W.
Casa Grande dist., Pinal Co.: Tenney, J. B., 9
Castle Dome dist., Yuma Co.: Blake, W. P., 5, 6; Burchard, E. F., 2; Holt, E. B., 3; Nevius, J. N., 1; Thompson, A. P., 4; Wilson, E. D., 70
Castle Dome mine, Gila Co.: Arizona Department of Mineral Resources, 10; Creasey, S. C., 8; Engineering and Mining Journal, 2; Mining World, 8; Paulson, H.; Peterson, N. P., 6, 8, 10, 12; Schmitt, H., 4; Trischka, C., 8; Willis, C. F., 40
Cave Creek, Maricopa Co.: Lewis, A. S., 2; Sill, R. T.
Cedar Valley dist., Mohave Co.: Berger, H. W., 2
Central Copper Company, Dos Cabezas, Cochise Co.: Arizona Mining Journal, 21, 29, 32, 33, 37; Norman, S.; Thomas, K., 2; Willis, C. F., 17, 29, 44
Cerbat Range, Mohave Co.: Schrader, F. C., 1, 3, 11, 12
Cerro Colorado dist., Pima Co.: Chaffee, M. A.; Jones, R. D.; Pumpelly, R., 4; Tucson Citizen, 1

MINES AND MINING DISTRICTS *(Continued)*

Cherry Creek dist., Yavapai Co.: Anderson, C. A., 10; Holt, E. B., 2; Lindgren, W., 10; Reid, J. A., 1, 2
Childs-Aldwinkle mine, Copper Creek, Pinal Co.: Butler, B. S., 15; Kuhn, T. H., 1
Chilson Brothers, locations of: Chilson, S. C. W.
Chiricahua Mts., Cochise Co.: Keyes, C. R., 27
Chloride dist., Mohave Co.: Arizona Mining Journal, 1; Comstock, T. B., 4; Mining World, 6; Smith, F. C.; Thomas, B. E., 1, 2, 4; Willis, C. F., 13
Christmas mine, Gila Co.: Bogert, J. R.; Eastlick, J. T.; Knoerr, A.; Peterson, N. P., 5, 17; Schwartz, G. M., 8; Tainter, S. L., 4
Cleveland mine area, Gila Co.: Simmons, W. W., 1
Clifton-Morenci dist., Greenlee Co.: Butler, B. S., 11; Colquhon, J.; Dinsmore, C. A., 5; Douglas, J., 1; Henrich, C., 1, 2; Lindgren, W., 2, 4, 7, 8, 9; Ransome, F. L., 10; Reber, L. E., Jr., 1; Robinson, G.; Schwartz, G. M., 4; Tovote, W. L., 3
Climax Uranium Company: Dare, W. L., 2
Coal deposits: Rubel, A. C., 2
Cobabi dist., Pima Co.: MacKallor, J. A.
Cochise dist., Cochise Co.: Franke, R. P.; Kellogg, L. O.
C. O. D. mine, Cerbat Mts., Mohave Co.: Willis, C. F., 23
Colorado Plateau: Bates, R. C.; Butler, B. S., 3; Dare, W. L., 1, 2; Joralemon, I. B., 5
Colorado River region: Jones, E. L., Jr., 3; Silliman, B., Jr., 1
Commonwealth mine, Pearce, Cochise Co.: Scott, W. A., 4; Smith, L. A.
Comstock-Dexter mine, Eureka dist., Yavapai Co.: Hoagland, J., 1
Congress Junction dist., Yavapai Co.: Dinsmore, C. A., 13
Congress mine, Yavapai Co.: Shaw, S. F., 1; Staunton, W. F., 3
Contention mine, Tombstone dist., Cochise Co.: Clarke, F. W.
Contention mine, Twin Buttes dist., Pima Co.: Houser, F. N.
Continental Commission Company mines: Willis, C. F., 19
Copper Basin dist., Yavapai Co.: Anderson, C. A., 2; Blake, W. P., 11; Johnston, W. P., 1, 2
Copper Bullion mine, Pima dist., Pima Co.: Wilson, E. D., 57
Copper Butte mine, Mineral Creek dist., Pinal Co.: Phelps, H. D.; Probert, F. H., 3; Wilson, E. D., 44
Copper Butte mine, Pima dist., Pima Co.: Wilson, E. D., 57
Copper Canyon area, Navajo Indian Reservation: Reinhardt, E. V., 1
Copper Chief mine, Jerome area, Yavapai Co.: Willis, C. F., 53
Copper Cities mine, Gila Co.: Hardwick, W. R., 6; Peterson, N. P., 14; Trischka, C., 8
Copper Creek dist., Pinal Co.: Butler, B. S., 15; Denton, T. C., 2; Higgins, E., 3; Joralemon, I. B., 5; Kuhn, T. H., 2, 3, 4; Martin, A. H., 2; Sibley, R. R.
Copper Creek dist., Yavapai Co.: Hafer, C., 3
Copper deposits, general: Blake, W. P., 2; Butler, B. S., 14; Douglas, J., 2, 3; Douglas, W., 1; Gardner, E. D., 3; Schmitt, H. A., 4, 7; Tenney, J. B., 4, 6, 10; Weed, W. H., 1, 2, 3, 9, 10; Wisser, E. H., 2
Copper Giant mine, Ajo dist., Pima Co.: Romslo, T. M., 5
Copper Glance mine, Pima dist., Pima Co.: Wilson, E. D., 57
Copper Queen Gold Mine Company: Dinsmore, C. A., 11
Copper Queen mines, Bisbee dist., Cochise Co.: Douglas, J., 4, 5, 7; Hodgson, J. P.; Hovey, E. O., 2; Mining World, 9; Willis, C. F., 67
Copper Queen, Pima dist., Pima Co.: Wilson, E. D., 57
Courtland-Gleeson dist., Cochise Co.: Crawford, W. P., 2; Dinsmore, C. A., 3; Platt, J. M.; Ransome, F. L., 16, 18; Wilson, E. D., 4
Cove Mesa, northeastern Arizona: King, J. W., 3
Cunningham Pass dist., Yuma Co.: Tovote, W. L., 11

MINES AND MINING DISTRICTS *(Continued)*

Cuprite mine area, Pima Co.: Browne, J. F.; Lee, C. A.
Curtin or Humphrey mine, Banner dist., Gila Co.: Wilson, E. D., 68
Daisy mine, Pima dist., Pima Co.: Bowman, A. B.; MacKenzie, F. D., 1
Dardenelles mine, Chloride dist., Mohave Co.: Willis, C. F., 22
Deluge Wash area, Mohave Co.: Berger, H. W., 2
Detroit mine, Morenci dist.: Sullivan, M.
Dives and Gold Ridge groups, Dos Cabezas, Cochise Co.: Shields, J. C., Jr.
D. M. B. D. mine: Mining World, 38
Doctor Thorne gold mine: Clark, C. M., 3
Dos Cabezas dist., Cochise Co.: Arizona Mining Journal, 21, 29, 32, 33, 37; Coll, A., 2; Land, G.; Norman, S.; Thomas, K., 2; Willis, C. F., 17, 29, 44
Dragoon dist., Cochise Co.: Dempsey, W. J., 10; Dinsmore, C. A., 2; Richards, R. W.; Wilson, E. D., 65
Dreamy Draw mine, Phoenix Mts., Maricopa Co.: Hartman, E. W.
Dripping Springs Copper Company: Watkins, R. A., 10
Dripping Springs Mts.: Willis, C. F., 5, 16, 38
Dudley interests: Smith, A.
Duncan area, Greenlee Co.: Burchard, E. F., 2
East Sierrita area, Pima Co.: Lacy, W. C., 1
El Capitan mine: Willis, C. F., 37
El Tiro mine, Silver Bell, Pima Co.: Shoemaker, A. H., 1
Emerald Isle copper deposit, Wallapai dist., Mohave Co.: Searls, F., Jr.; Thomas, B. E., 3
Empire dist., Pima Co.: Wilson, E. D., 67
Esperanza mine, Pima Co.: Buchella, F. H., Jr.; Curtis, C. H.; Schmitt, H. A., 6
Eureka dist.: Yavapai Co.: Ball, S. H., 1; Butler, B. S., 12; Hoagland, J., 1; Singewald, J. T., Jr.; Wilson, E. D., 69
Ewing and Hooker group: Willis, C. F., 60
Fluorspar deposits: Wilson, E. D., 63
Fortuna gold mine: Blake, W. P., 17
Galena Gulch, Yavapai Co.: Blandy, J. F., 2
General: Anderson, A. D.; Anderson, J. C., 1; Arizona State Mine Inspector; Arrowsmith, R.; Barock, C. T.; Bateman, A. M., 3; Billingsley, P., 4; Blake, W. P., 13, 15, 28, 31, 43; Brinsmade, R. B., 2; Browne, J. R.; Butler, B. S., 5, 6, 10; Carpenter, R. H., 2; Comstock, T. B., 1, 2, 3; Dinsmore, C. A., 6; Finlay, J. R., 1; Hill, J. M., 4; Jacobs, E.; Jerome, S. E., 2; Lakes, A., 3; Lockwood, F. C.; Los Angeles Chamber of Commerce; Lyle, D. A., 1, 2; Mason, R. T.; Mining Journal, 3, 12, 21; Mining World, 11, 14, 15, 17, 20, 27, 32, 35, 36, 37; Mitchell, W. G.; Mott, L. C.; Neale, W. G.; Prouty, R. W.; Rand, L. R.; Rickard, T. A., 10, 11; Richetts, L. D., 1; Rinehart, R. E.; Root, W. A., 1; Schmitt, H. A., 1, 2; Stevens, H. J.; Stoneham, W. J.; Sykes, Glenton G.; Tenney, J. B., 5; Tolman, C. F., Jr., 3; Tovote, W. L., 10, 12; Tuck, F. J., 2, 3, 4; Watkins, R. A., 1; Wilson, E. D., 36, 90; Wilson, P. D., 2; Woodbridge, D. E., 1; Zimmerman, J.
Gibson Consolidated Copper Company: Watkins, R. A., 9
Gila Basin: Lakes, A., 1
Globe dist., Gila Co.: Arizona Mining Journal, 12, 15, 36; Beckett, P. G.; Bjorge, G. N.; Calkins, F. E., 1; Graichen, W.; Hamil, J. H.; King, J. S.; Lausen, C., 1; Peterson, N. P., 14, 15, 16, 19, 20; Ransome, F. L., 2, 6, 14, 15, 17, 25; Sanders, J.; Schwartz, G. M., 1, 2, 4, 7; Shoemaker, A. H., 2; Spear, W. B.; Thomas, K., 1; Tolman, C. F., Jr., 8; Tovote, W. L., 8
Globe-Gila manganese dist.: Mining World, 4
Globe-Kelvin dist.: Higgins, E., 1
Glove mine, Santa Cruz Co.: Bideaux, R. A., 1; Olson, H. J.; See, J. M.
Gold Cliff property: McDevitt, G.

MINES AND MINING DISTRICTS *(Continued)*

Gold deposits, general: Lock, A. G.; Pratt, J. H., 1; Wilson, E. D., 17, 18, 34
Gold Mtn. dist., Galiuro Mts.: Blake W. P., 32
Gold placers: Allen, M. A., 8; Wilson, E. D., 7, 14, 16, 73, 89
Gold Road dist., Mohave Co.: Bancroft, H., 5; Dinsmore, C. A., 12; Ritter, E. A.; Sperr, J. D.; Tovote, W. L., 1
Golden Bell mine: Willis, C. F., 18
Golden Belt mine, Yavapai Co.: Minton, D. C., Jr.
Goldfield camp, Pinal Co.: Dinsmore, C. A., 8; Lewis, A. S., 1; Massey, A. C.
Grand Canyon: Blandy, J. F., 6
Grand Gulch, Mohave Co.: Hill, J. M., 6
Grand Wash Cliffs, Mohave Co.: Schrader, F. C., 1, 3, 11, 12
Gray Metals mine: Willis, C. F., 12
Great Republic mine: Willis, C. F., 24
Greaterville gold placers, Pima Co.: Hill, J. M., 1
Greenback mine: Richie, R. L.
Greens Valley dist.: Hedberg, E., 2
Groom Creek dist.: Russell, A. L.
Gunsight dist., Pima Co.: Bramwell, A. W., 2
Harshaw dist., Santa Cruz Co.: Kartchner, W. E.
Helmet Peak area, Pima Co.: Mayuga, M. N., 2
Helvetia dist., Pima Co.: Creasey, S. C., 1, 7; Heyman, A. M.; Johnson, V. H., 1, 2; Michel, F. A., Jr.
Herron and Laster lease, Superior, Pinal Co.: Gardner, E. D., 1
Higgins mine, Bisbee dist., Cochise Co.: Taber, S., 2
Highland Chief mines, Oatman dist., Mohave Co.: Willis, C. F., 28
Hillside mine, Yavapai Co.: Axelrod, J. M.; Schwartz, G. M., 4; Storms, W. H.
Hilltop mine, Cochise Co.: Brittain, R. L.; Papke, K. G.
Hiltano Camp, Empire Mts., Pima Co.: Feiss, J. W.
Howard Copper Company: Willis, C. F., 15
Huachuca Mts., Cochise Co.: Wilson, E. D., 66
Hualpai dist., Mohave Co.: Gregory, N. B.
Hualpai Mts., Mohave Co.: Wickes, L. W.
Idaho mine, Oro Blanco dist., Santa Cruz Co.: Warren, H. V., 1
Imperial Copper Company mines: Shaw, S. F., 3
Indiana mine area, Pima Co.: Ruff, A. W.
Inspiration dist., Gila Co.: Arizona Department of Mineral Resources, 6; Honeyman, P. D. I.; Rubly, G. R.; Tolman, C. F., Jr., 5
Inspiration mine, Gila Co.: Arizona Mining Journal, 9; Hardwick, W. R., 8; Krumb, H.; Mining Journal, 9, 15, 19; Moore, R. G.; Ricketts, L. D., 2; Stoddard, A. C., 1, 2; Trischka, C., 8; Willis, C. F., 30, 67
Inspiration Needles: Willis, C. F., 43
Irene mine, Globe dist., Gila Co.: Arizona Mining Journal, 15
Iron Cap mine, Globe area, Gila Co.: Watkins, R. A., 6; Willis, C. F., 35, 67
Iron King mine, Humboldt, Yavapai Co.: Creasey, S. C., 4, 5; Kumke, C. A., 3; Mills, H. F., 1, 2, 3, 4; Mitchell, R. J., 1; Roberts, H. M.; Schwartz, G. M., 10
Jackrabbit area, Pinal Co.: Hammer, D. F., 1
Jerome-Bisbee shaft: Willis, C. F., 58
Jerome dist., Yavapai Co.: Anderson, C. A., 10; Arizona Mining Journal, 16, 17, 19, 20, 30, 35; Calumet and Arizona Mining Company; D'Arcy, R. L.; Davidson, R. N.; DeWolf, W. P., 2; Dickson, R. H., 1, 2; Douglas, J. S.; Fearing, J. L., Jr., 1, 2; Finlay, J. R., 2; Huff, L. C., 3, 4; Hutton, C. O., 3; Jewett, J.; Lindgren, W., 16; Mills, C. E., 1, 2; Provot, F. A.; Ransome, F. L., 17, 31; Reber, L. E., Jr., 2, 3; Rice, M.; Rickard, T. A., 3, 7, 12; Schwartz, G. M., 4; Staunton, W. F., 1; Thompson, A. P., 1; Willis, C. F., 65

MINES AND MINING DISTRICTS *(Continued)*
Jerome-Grande Company mine: Willis, C. F., 20, 62
Johnny Bull-Silver Knight property: Tainter, S. L., 3
Johnson Camp, Cochise Co.: Baker, A., 3rd, 1, 2; Cooper, J. R., 1, 2; Dempsey, W. J., 10; Dinsmore, C. A., 2; Hardwick, W. R., 1; Heineman, R. E. S., 1; Scott, W. A., 3; Wilson, E. D., 53
Junction mine, Bisbee dist., Cochise Co.: Mitchell, G. J., 2
Kaibab Plateau copper deposits: Lunt, H. F.
Katherine dist., Mohave Co.: DeWolf, W. P., 5; Lausen, C., 9, 10, 12
Katherine mine, Union Pass dist., Mohave Co.: Willis, C. F., 21
Kay mine, Maricopa Co.: Arizona Mining Journal, 22, 39; Bower, F. W., 2; Weed, W. H., 11; Willis, C. F., 6, 71, 73
Keystone mine, Cochise Co.: Romslo, T. M., 3
Keystone mine, Gila Co.: Stoddard, A. C., 2
King mine, Helvetia dist., Pima Co.: Michel, F. A., Jr.
King No. 1 claim, Gila Co.: Weathers, G.
King of Arizona region, Yuma Co.: Thompson, A. P., 5
Kingman area, Mohave Co.: Weed, W. H., 4
Kingman Consolidated mines: Willis, C. F., 25
Kinusta (Tree) Mesa, northeastern Arizona: King, J. W., 3
Klondyke area, Graham and Pinal Cos.: Simons, F. S., 5
Kofa Mts., Yuma Co.: Jones, E. L., Jr., 2
La Paz placer dist., Yuma Co.: Hunter, A. M.
Lake Shore mine, Casa Grande dist., Pinal Co.: Freeman, G. A.; Romslo, T. M., 4
Lead deposits: Wilson, E. D., 55, 58
Little Dragoon Mts., Cochise Co.: Enlows, H. E., 1
Little Hill mine, Pinal Co.: Mining World, 40
Live Oak mine, Gila Co.: Stoddard, A. C., 2
Loma Prieta mine, Copper Basin, Yavapai Co.: Anderson, C. A., 2
London-Arizona mine, Banner dist., Gila Co.: Brooks, E. W.
Lost Dutchman gold mine: Clark, C. M., 4
Louis d'Or property: Willis, C. F., 41
Lukachukai dist., Apache Co.: Ellsworth, P. C.; King, J. W., 1, 2
Lukachukai Mts., Apache Co.: Dare, W. L., 3; Joralemon, I. B., 5
Magma mine, Superior, Pinal Co.: Arizona Mining Journal, 20; Browning, W. C.; Engineering and Mining Journal, 2; Ettlinger, I. A., 2; Foraker, C. B.; Gustafson, L. B.; Mining Journal, 4, 6, 8, 13; Michell, W. D.; Mitchell, R. J., 2; Sato, M.; Scott, W. A., 2; Sell, J. D., 1, 2; Short, M. N., 1, 2, 3, 4; Snow, F. W.; Webster, R. N.; Willis, C. F., 49, 67
Magmatic Copper Company: Willis, C. F., 50
Mammoth mine area, Pinal Co.: Butler, B. S., 15; Creasey, S. C., 3; Dempsey, W. J., 13; Fahey, J. J., 1; Peterson, N. P., 1, 2, 3; Wise, F.
Manganese deposits: Jones, E. L., Jr., 4; Wilson, E. D., 10
———, eastern Arizona: Farnham, L. L., 3
———, Maricopa Co.: Fillo, P. V.
———, western Arizona: Farnham, L. L., 2; Jones, E. L., Jr., 3
Manganese-silver mines: Romslo, T. M., 1
Marginal copper mines: Arizona Department of Mineral Resources, 1
Maricopa Copper Company: Willis, C. F., 68
Mariquita gold mine: Clark, C. M., 2
Martinez dist., Yavapai Co.: Barth, C. G., Jr.; Wheeler, G. M., 2
Mary G mine, Pima Co.: Davis, R. E., 1
Maudina and Morning Star mines, Pinal Co.: Bateman, P. C.; Bromfield, C. S., 1
Mayer vicinity, Yavapai Co.: Burgess, D., 4
Maynard dist., Mohave Co.: Wheeler, G. M., 2
Mazatzal Mts., Mercury dist.: Faick, J. N., 1; Hummel, K.; Ransome, F. L., 21

MINES AND MINING DISTRICTS *(Continued)*

Mercury deposits: Lausen, C., 4; Von Bernewitz, M. W.; Wolcott, H. N., 1
Metcalf dist., Greenlee Co.: Butler, B. S., 1; Scotland, P. B.
Miami Copper Company mines, Gila Co.: Arizona Mining Journal, 10; Carey, J. F.; Herrick, R. L., 2, 3; Legge, J. A., Jr.; Loveman, M. H.; Maclennan, F. W., 1, 2; Mining Journal, 10, 14; Mining World, 18; Willis, C. F., 31, 67
Miami dist., Gila Co.: Arizona Department of Mineral Resources, 6, 10; Calkins, F. E., 1; Creasey, S. C., 8; Engineering and Mining Journal, 2; Hamil, J. H.; Peterson, N. P., 6, 14, 16; Ransome, F. L., 17, 25; Reed, E. F.; Rice, C. T.; Rubly, G. R.; Sain, W. G.; Schwartz, G. M., 18; Spear, W. B.; Still, A. R.; Tolman, C. F., Jr., 5; Trischka, C., 8; Weed, W. H., 6
Miami-Inspiration mine: Arizona Department of Mineral Resources, 10; Reed, E. F.
Midnite Test mine, Groom Creek dist.: Russell, A. L.
Mildren and Steppe mining areas, Pima Co.: Williams, S. A., 3, 5
Mineral Basin Copper Co.: Arizona Mining Journal, 24
Mineral Creek dist., Pinal Co.: Arizona Department of Mineral Resources, 7; Gowing, F. A.; Phelps, H. D.; Probert, F. H., 3; Wilson, E. D., 44
Mineral Hill mine, Pima dist., Pima Co.: MacKenzie, F. D., 1; Storms, W. R.; Williams, S. A., 4
Mineral Hill mine area, Pima Co.: Bowman, A. B.; Eckel, E. B., 2
Mineral Park, Mohave Co.: Carpenter, R. H., 2
Mining companies, history: Mathewson, E. P.
Mining district map and index: Wilson, E. D., 43, 88
Minnie mine, Pima dist., Pima Co.: Wilson, E. D., 57
Mission mine, Pima dist., Pima Co.: Canney, F. C.; Engineering and Mining Journal, 4; McDonald, J.; Mining World, 28, 34; Richard, K. E., 2; Skillings, D. N., Jr., 2; Skillings Mining Review, 1
Mohave Co.: Johnston, B.; Mensch, W. A., 1; Schrader, F. C., 11, 12; Toll, R. H.; Tovote, W. L., 2
Mohawk zinc prospect, Pima Co.: Haury, P. S., 1; Wilson, E. D., 45
Money Metals mine, Yavapai Co.: Sparkes, G. M., 3
Montana mine area, Empire Mts., Pima Co.: Sopp, G. P.
Montana mine, Oro Blanco dist., Santa Cruz Co.: Fowler, G. M., 1, 2; Warren, H. V., 1
Monument No. 1-Mitten No. 2 mines, Monument Valley: Witkind, I. J., 19
Monument No. 2 mine, Apache Co.: Finnell, T. L., 1
Monument Valley: Bain, G. W., 5; Grundy, W. D., 2; Mitcham, T. W., 1, 2
Morenci dist., Greenlee Co.: Arizona Department of Mineral Resources, 4, 10; Arizona Mining Journal, 7; Butler, B. S., 1, 11; Dinsmore, C. A., 5; Hardwick, W. R., 3; Henrich, C., 2; Hoagland, J., 4, 5; Lawson, W. C.; Lindgren, W., 4, 7, 8, 9; Mosier, M.; Ransome, F. L., 10; Reber, L. E., Jr., 1; Robinson, G.; Schwartz, G. M., 4, 8; Sullivan, M.; Tovote, W. L., 3; Trischka, C., 8; Watt, R.
Morgan mine area, Pima dist., Pima Co.: Whitcomb, H. A., 1
Mountain Maid ore body, Bisbee, Cochise Co.: Peng, Chi-jui
Mountain Queen area, Swisshelm Mts., Cochise Co.: Loring, W. B.
Mowry mine, Santa Cruz Co.: Brinsmade, R. B., 3; Fontana, B. L.; Prout, J. W.; Schrader, F. C., 10; Smith, G. E.
Navajo Indian Reservation: Mining World, 24
New Cornelia mine, Ajo, Pima Co.: Allen, A. W.; American Institute of Mining and Metallurgical Engineers, 2; Arizona Department of Mineral Resources, 5, 10; Arizona Mining Journal, 11; Calumet and Arizona Mining Company; Greenway, J. C.; Hardwick, W. R., 5; Ingham, G. R.; Rickard, T. A., 6, 9; Willis, C. F., 67
New Dominion mine, Globe, Gila Co.: Willis, C. F., 39

Nonmetallic deposits: Wilson, E. D., 38, 52
Northwest Inspiration: Willis, C. F., 42
Oatman dist., Mohave Co.: Arizona Mining Journal, 4, 5, 6; Boericke, W. F.; Bollinger, E. E.; Burgess, J. A., 2, 3; Doman, R. S.; Lausen, C., 9, 10, 12; Martin, A. H., 1; O'Brien, J. F., 1, 2; Palmer, L. A.; Probert, F. H., 5; Ransome, F. L., 29; Rickard, T. A., 5; Ritter, E. A.; Schwartz, G. M., 10; Scott, W. A., 1; Shaw, E. A.; Sperr, J. D.; Spillman, C.; Spilman, C. F.; Tovote, W. L., 1; Wiseman, P.; Wolle, M. S.
Octave mine, Yavapai Co.: Nevius, J. N., 2; Watson, H. B., 2; Wilson, E. D., 22
Old Dick mine: Mining World, 39
Old Dominion mine, Globe, Gila Co.: Arizona Mining Journal, 12; Beckett, P. G.; Bjorge, G. N.; Lausen, C., 1; Shoemaker, A. H., 2; Watkins, R. A., 4; Willis, C. F., 32, 67
Old Hat dist., Pinal Co.: Hillebrand, J. R., 2; Peterson, N. P., 4; Stewart, S. O.
Old mines: DeWolf, W. P., 3
Old Reliable copper mine, Pinal Co.: Denton, T. C., 2; Trischka, C., 8
Olivette mine area, Pima dist., Pima Co.: Waller, H. E., Jr.
Open-cut metal mines: Gardner, E. D., 4
Open-pit copper mines: Fenzi, W. E.
Ord mine, Mazatzal dist.: Faick, J. N., 1
Oro Blanco dist., Santa Cruz Co.: Fowler, G. M., 1, 2; Milton, M. C.; Warren, H. V., 1
Oro Flame mine, Yavapai Co.: Kirkbride, G. A.
Orphan mine, Grand Canyon: Adler, H. H.; Marks, R. L.; Mining World, 26
Owl Head dist., Pinal Co.: Barter, C. F.; Pickard, B. O., 1
Pacific Slope mines: Willis, C. F., 66
Palomas Range, Yuma Co.: Keyes, C. R., 26
Patagonia dist., Santa Cruz Co.: Carpenter, M. M., 4; Davis, H. E.; Dinsmore, C. A., 1; Keener, H.; Probert, F. H., 4
Patagonia Mts., Santa Cruz Co.: Baker, R. C.; Schrader, F. C., 4, 5, 6, 7, 8, 13, 14
Paymaster mine, Pima Co.: Nye, T. S.; Waller, H. E., Jr.
Payson area, Gila Co.: Lausen, C., 2; Willis, C. F., 10, 33
Peach-Elgin copper deposit, Helvetia dist., Pima Co.: Heyman, A. M.
Pearce, Cochise Co.: Endlich, F. M.
Peck mine, Bradshaw Mts., Yavapai Co.: Henderson, P. C., 2
Phelps Dodge Corp.: Engineering and Mining Journal, 3; Mining Journal, 5, 16, 21; Phelps Dodge Corporation
Phoenix mine, Ricketts, P. P.
Phoenix Mts., Maricopa Co.: Schrader, F. C., 15
Pikes Peak dist., Maricopa Co.: Farnham, L. L., 1; Sharp, R. R., Jr.
Pilgrim mine, Mohave Co.: Hastings, E. F.
Pima Co.: Allen, M. A., 2; Leach, R. B.; Wilson, E. D., 35
Pima dist., Pima Co., Anderson, C. A., 3; Arnold, L. C.; Bowman, A. B.; Cooper, J. R., 8; Eckel, E. B., 2; Engineering and Mining Journal, 4; Huff, L. C., 5; Irvin, G. W.; MacKenzie, F. D., 1, 2; Mayuga, M. N., 2; Mining World, 2; Nye, T. S.; Park, C. F., Jr., 1; Richard, K. E., 2; Skillings, D. N., Jr., 2; Skillings Mining Review, 1; Storms, W. R.; Tainter, S. L., 1; Venable, B. W.; Waller, H. E., Jr.; Whitcomb, H. A., 1; Williams, S. A., 4; Wilson, E. D., 57, 59
Pima mine, Pima Co.: American Institute of Mining and Metallurgical Engineers, 2; Heinrichs, W. E., Jr., 1; Journeay, J. A.; Mining World, 19, 23; Thurmond, R. E., 1, 2, 3, 4
Pinal Mts.: Wheeler, G. M., 2
Placer mines, Yavapai Co.: DeWolf, W. P., 1
Planet copper mines, Yuma Co.: McCarn, H. L.; Thurmond, F. L., 1

MINES AND MINING DISTRICTS *(Continued)*

Planet iron dist., Yuma Co.: Cummings, J. B., 2; Upham, W. E.; Wilson, E. D., 46
Ploma King mine: Willis, C. F., 70
Plomosa placers, Yuma Co.: Plummer, W. L.
Plumosa dist., Yuma Co.: Keyes, C. R., 25
Pontatoc mine, Santa Catalina Mts., Pima Co.: Guild, F. N., 1; Medhi, P. K.
Porphyry Consolidated Copper Company: Watkins, R. A., 7
Porphyry copper dists.: Channing, J. P.; Parsons, A. B., 1, 3; Weed, W. H., 8
Potts Canyon, Superior area, Pinal Co.: Wardwell, H. R.
Power for mining: Webber, B. N., 3, 4
Prescott region, Yavapai Co.: Blandy, J. F., 1
Prince of Arizona mine: Willis, C. F., 9
Production statistics: Arizona Bureau of Mines, 2; Mineral Industry; Mineral Resources of the United States; Minerals Yearbook; Raymond, R. W., 1, 2
Prospecting: Thompson, A. P., 6, 8
Putnam Wash area, Pinal Co.: Hillebrand, J. R., 1
Quartzsite area, Yuma Co.: Jones, E. L., Jr., 1; Keiser, W. G.
Quijotoa Mts., Pima Co.: Gebhardt, R. C.; McClintock, J. H., 3; Stephens, B. A.
Radioactive deposits: U.S. Atomic Energy Commission
Ranier mines: Willis, C. F., 7
Ray Consolidated Copper Company: Arizona Mining Journal, 13; Clifford, J. O.; Dinsmore, C. A., 4; Herrick, R. L., 1; Jackling, D. C., 1, 2, 3; Willis, C. F., 45, 67
Ray dist., Pinal Co.: Arizona Department of Mineral Resources, 7, 10; Clarke, O. M., Jr., 1, 2; Dinsmore, C. A., 4, 9; Hill, A.; Hoyt, C. L.; Ransome, F. L., 17, 25, 28; Schmitt, H., 4; Schwartz, G. M., 4, 18; Thomas, R. W.; Tolman, C. F., Jr., 4; Trischka, C., 8; Truesdell, W. H.; Weed, W. H., 5; Wilson, E. D., 72
Ray Hercules mine: Willis, C. F., 46
Red Bluff prospect, Gila Co.: Kaiser, E. P., 1
Red Hills (Tate) uranium prospect, Mohave Co.: Kaiser, E. P., 2
Red Rock, northeastern Arizona: King, J. W., 3
Regal asbestos mine, Gila Co.: Stewart, L. A., 7
Reward (Vekol) mine, Pinal Co.: Denton, T. C., 1
Reymert mine, Pinal Co.: Blauvelt, H., 1
Rich Hill, Octave dist.: Watson, H. B., 2
Richmond Basin area, Gila Co.: Bishop, O. M.; Rose, D.; Watkins, R. A., 2
Ridenour mine, Hualapai Indian Reservation: Miller, R. D.
River Range, Mohave Co.: Holt, E. B., 1
Riverview mine, Coconino Co.: Chenoweth, W. L., 3
Rosemont camp, Pima Co.: Popoff, C.; Thomas, W. L.
Sacramento Hill, Bisbee dist., Cochise Co.: Dekalb, C., 3; Sherman, G., 1, 2; Skillings Mining Review, 2; Ziesmer, H. M., 1, 2
Saddle Mts., dist., Pinal Co.: Ross, C. P., 5
Safford area, Graham Co.: Carpenter, R. H., 2; Cook, A.; Hutton, C. O., 2; Mining World, 29, 31
Saint George deposit, Cochise Co.: Romslo, T. M., 3
Salome area, Yuma Co.: Reedall, H. C.
San Francisco dist., Mohave Co.: Martin, A. H., 1
San Manuel mine area, Pinal Co.: Arizona Department of Mineral Resources, 9; Baldwin, R. W.; Buchanan, J. F.; Chapman, T. L.; Dale, V. B., 4; Dempsey, W. J., 13; Goss, W. P., 1, 2; Griswold, G. B.; Hazen, S. W., Jr.; Hillebrand, J. R., 2; Johnson, G. H.; Lovering, T. S., 2, 3; McLehanen, J. D., Jr.; Mining World, 7, 12, 22; Pelletier, J. D.; Sato, M.; Schwartz, G. M., 9, 11, 13, 16, 18; Steele, H. J., 1, 2; Trischka, C., 8; Warren, H. V., 2; Wilson, E. D., 50, 76, 86; Wilson, L. K.

MINES AND MINING DISTRICTS *(Continued)*

San Xavier dist., Pima Co.: Guild, F. N., 1; Park, C. F., Jr., 1
San Xavier mine, Pima dist., Pima Co.: Arnold, L. C., Duff, G. J.; Irvin, G. W.; Mining World, 2; Wilson, C. A.
Santa Cruz Co.: Bird, A. T., 1, 2; Bond, J., 2; Lenon, R.
Santa Rita Mts., Pima and Santa Cruz Cos.: Root, W. A., 2; Schrader, F. C., 4, 7, 8, 14
Seventy-nine mine, Gila Co.: Kiersch, G. A., 1, 2, 3; Willis, C. F., 47
Shattuck-Arizona mine: Arizona Mining Journal, 14; Willis, C. F., 67
Shattuck-Denn mine, Bisbee, Cochise Co.: Bradley, W.; Mining Journal, 18; Wilson, P. D., 1
Shea mine: Willis, C. F., 56
Sierra Ancha Mts., Gila Co.: Bateman, A. M., 1
Sierrita Mts., Pima Co.: Ransome, F. L., 27
Silver Bell area, Pima Co.: Arizona Department of Mineral Resources, 9; Barney, W. G.; Buseck, P. R.; Hardwick, W. R., 7; Kerr, P. F., 2; Knopf, A.; Mining World, 21; Richard, K. E., 1; Stewart, C. A., 2, 3; Tolman, C. F., Jr., 6; Trischka, C., 8
Silver deposits: Blake, W. P., 2; Wilson, E.
Silver dist., Yuma Co.: Hills, R. C., 1; Thompson, A. P., 3; Wilson, E. D., 69
Silver King mine, Pinal Co.: Blake, W. P., 10; Clark, C. M., 1; Galbraith, F. W., 1; McClintock, J. H., 6; Willis, C. F., 51, 67
Silver Lillie copper mines: Arizona Mining Journal, 18
Silver Trails (Diamond Joe) mine: Willis, C. F., 27
Snowball fluorite deposit, Maricopa Co.: Denton, T. C., 4
Squaw Peak mine, Camp Verde area: Mining World, 3; Thacker, E.
Stanley Butte dist., Graham Co.: Arizona Mining Journal, 31; Ross, C. P., 4; Wolf, F., Jr.
Stargo mines: Willis, C. F., 14
Sullivan copper mine, Cochise Co.: Kumke, C. A., 1; Wilson, E. D., 49
Sunshine mine, Papago dist., Pima Co.: Higdon, C. E.
Superior area, Pinal Co.: Gardner, E. D., 1; Hammer, D. F., 2; Ransome, F. L., 20; Schwartz, G. M., 2, 7; Short, M. N., 1, 2, 3, 4; Simon, W. W.; Steele, H. J., 3; Wilson, E. D., 61, 72
Superior and Boston mine, Globe, Gila Co.: Arizona Mining Journal, 36; Herrick, R. L., 4; Willis, C. F., 36
Superior perlite dist., Pinal Co.: Keller, W. D., 2
Swisshelm dist., Cochise Co.: Galbraith, F. W., 9
Table Mtn. mine, Pinal Co.: Thomssen, R. W., 2
Tennessee-Schuylkill mine, Wallapai dist., Mohave Co.: Garrett, S. K.; Schoder, J.
Three R mine, Patagonia dist., Santa Cruz Co.: Handverger, P. A.; Probert, F. H., 4
Thumb Butte dist., Yavapai Co.: McCorkell, S. R.
Tiger dist.: Wheeler, G. M., 2
Tip Top mine, Bradshaw Mts., Yavapai Co.: Coupal, J. S., 1; Ensign, O. A.
Tom Reed mine, Oatman dist., Mohave Co.: Arizona Mining Journal, 5; Bollinger, E. E.; Mining Journal, 11; Ritter, E. A.; Sperr, J. D.; Spilman, C. F.; Willis, C. F., 67
Tombstone dist., Cochise Co.: Blake, W. P., 7, 8, 34, 40; Brinsmade, R. B., 4; Butler, B. S., 8, 9, 13, 16; Church, J. A., 1, 2; Clarke, F. W.; Devere, J.; Gilluly, J., 10; Goodale, C. W., 1, 2; Hillebrand, W. F., 1; Hollyday, E. F.; Lakes, A., 2; Moses, A. J., 1, 2, 3, 4; Needham, A. B.; Ransome, F. L., 26; Rasor, C. A., 1, 2, 3, 4; Shaw, S. F., 2; Staunton, W. F., 2; Tenney, J. B., 11
Tornado-Tam O'Shanter area, Dripping Spring Mts.: Kiersch, G. A., 5
Tres Amigos gold veins: Keyes, C. R., 23
Tucson area, Pima Co.: Willis, C. F., 63

Tungsten deposits: Blake, W. P., 22, 25; Dale, V. B., 1, 2, 3; Kerr, P. F., 1; Rickard, F.; Rubel, A. C., 1; Wilson, E. D., 30, 32
Turquoise dist., Cochise Co.: Crawford, W. P., 2; Platt, J. M.; Ransome, F. L., 16, 18
Twin Buttes dist., Pima Co.: Brown, R. L.; Cummings, J. B., 3; Gordon, E. R.; Guild, F. N., 1; Houser, F. N.; Keller, G. V., 2; Lacy, W. C., 3; Skillings, D. N., Jr., 1; Wilson, E. D., 57
Tyndall dist., Santa Cruz Co.: Pumpelly, R., 4
United American Mining Company, Oatman dist., Mohave Co.: Shaw, E. A.
United Arizona mine: Mining Journal, 1
United Eastern mine, Oatman dist., Mohave Co.: Arizona Mining Journal, 6; Bollinger, E. E.; Burgess, J. A., 2, 3; Willis, C. F., 67; Wiseman, P.
United Verde mine, Jerome, Yavapai Co.: Arizona Mining Journal, 17; Hall, S. M.; Hansen, M. G., 2, 3; McCarthy, J.; Mills, C. E., 2; Parsons, L. A.; Pullen, J. B.; Quayle, T. W.; Smith, H. D. W., 1, 2; Tally, R. E., 1; Willis, C. F., 67; Young, H. V.
United Verde Extension mine, Jerome, Yavapai Co.: Arizona Mining Journal, 16, 20; D'Arcy, R. L.; Mining Journal, 7; Rickard, T. A., 3, 7, 12; Schwartz, G. M., 5; Willis, C. F., 52, 67
Uranium dists.: American Institute of Mining and Metallurgical Engineers, 2; Wright, R. J., 1
———, southeastern Arizona: Bissett, D. H.
Van Dyke mine, Miami, Gila Co.: Stacy, F. N.; Watkins, R. A., 3
Vekol dist., Pinal Co.: Carpenter, R. H., 1; Higgins, E., 4
Verde Central mine, Jerome, Yavapai Co.: Arizona Mining Journal, 30, 35; Calumet and Arizona Mining Company; Dickson, R. H., 1, 2; Fearing, J. L., Jr., 1; Willis, C. F., 54
Verde Chief: Willis, C. F., 61
Verde Cobre: Willis, C. F., 59
Verde dist., Yavapai Co.: Anderson, C. A., 10; Douglas, J. S.; Jewett, J.; Miller, G. W.; Mills, C. E., 1; Smith, H. D. W., 1, 2
Verde Jerome copper: Arizona Mining Journal, 19; Willis, C. F., 57
Vulture mining camp, Maricopa Co.: Defty, W. E., 1; Dinsmore, C. A., 7; Hafer, C., 2; Hutchinson, W. S.; McClintock, J. H., 6; Moore, K. T.; Penfield, S. L., 1; Purington, C. W.; Thompson, A. P., 9; Wheeler, G. M., 2
Walker dist., Yavapai Co.: Hinton, H. P.
Wallapai dist., Mohave Co.: Arizona Mining Journal, 1; Dings, M. G.; Garrett, S. K.; Gregory, N. B.; Haury, P. S., 2; Hernon, R. M., 3; Schoder, J.; Searls, F., Jr.; Smith, F. C.; Tainter, S. L., 3; Thomas, B. E., 1, 2, 4
Washington camp, Pima Co.: Crosby, W. O.; Knopf, A.
Weaver dist., Yavapai Co.: Barth, C. G., Jr.; Wheeler, G. M., 2
White Canyon dist., Monument Valley: Grundy, W. D., 2; Young, R. G., 2
White Hills dist., Mohave Co.: Thompson, A. P., 7; Willis, C. F., 26
White Mesa dist., Coconino Co.: Hill, J. M., 5; Read, C. B., 1
White Metals Company: Willis, C. F., 48
White Picacho dist., Maricopa and Yavapai Cos.: Jahns, R. H., 3; Stewart, G. W.
Wickenburg area, Maricopa Co.: Bastin, E. S., 1; Burgess, D., 1; Dinsmore, C. A., 10; Jahns, R. H., 2; Metzger, O. H.; Watson, H. B., 1
Winkelman area, Pinal Co.: Dean, K. C.; Willis, C. F., 8
World's Fair mine, Santa Cruz Co.: Arizona Mining Journal, 2
Yavapai Co.: Blandy, J. F., 5, 7; DeWolf, W. P., 1, 4; Hafer, C., 1; Milnes, P. R., 1, 2; Sparkes, G. M., 1, 2; Wood, H. R.
Young Mines Company: Arizona Mining Journal, 34
Yuma Co.: Bancroft, H., 3, 4; Higgins, E., 2; Minhinnick, H. J.; Wilson, E. D., 15

MINES AND MINING DISTRICTS *(Continued)*
Zinc dists.: Tenney, J. B., 3; Wilson, E. D., 55, 58
Zonia copper mine, Yavapai Co.: Kumke, C. A., 2
MINOR ELEMENTS
General: Kaiser, E. P., 4
Mill and smelter products, contents: Kaiser, E. P., 4
Monazite, western Arizona: Heineman, R. E. S., 3
Rare and radioactive minerals: Moore, R. T., 1
Rare earths: Olson, J. C., 2
———, in Devonian iron formation, Christmas quad., Gila Co.: Willden, C. R., 2
MIOCENE *See* PALEONTOLOGY, Miocene; STRATIGRAPHY, Miocene
MISSISSIPPIAN *See* PALEONTOLOGY, Mississippian; STRATIGRAPHY, Mississippian
MOLYBDENUM *See* METALLIFEROUS MINERAL COMMODITIES, *Molybdenum*
NATURAL GAS *See* FUELS
NONMETALLIFEROUS MINERAL COMMODITIES
Aggregate, Hoover Dam region: Price, T. M.
———, manufactured, Navajo-Hopi Indian Reservations: Haff, J. C., 2; Kiersch, G. A., 9
———, natural, Navajo-Hopi Indian Reservations: Kiersch, G. A., 9, 13
Alunite: Heineman, R. E. S., 8; Thoenen, J. R.
———, Patagonia, Santa Cruz Co.: Schrader, F. C., 5, 6
———, Sugarloaf Butte, Yuma Co.: Heineman, R. E. S., 6
Andalusite: Petar, A. V., 1
Anhydrite: Moyer, F. T.; Withington, C. F., 1, 3
Asbestos: Allen, M. A., 5; Bowles, O., 4, 6, 7, 8; Butler, G. M., 23, 25; Chidester, A. H.; Diller, J. S., 3, 4, 5, 6; Jaquays, D. W.; Joseph, P. E., 3; Melhase, J.; Mining World, 5, 30; Nelson, C.; Pratt, J. H., 2; Regelman, E. S., 1, 2; Sampson, E., 1; Shanley, W. G.; Shride, A. F., 1; Stewart, L. A., 2, 4, 5, 7; Trischka, C., 1; Wilson, E. D., 8
———, American Ores mine, Sierra Ancha Mts., Gila Co.: Bateman, A. M., 1
———, origin: Taber, S., 1
———, Salt River area, Gila Co.: Ransom, J. E., 1
———, San Carlos Indian Reservation: Bromfield, C. S., 3, 4
Barite: Allen, M. A., 3; Brobst, D. A.; Mining World, 10; Peters, W. C.; Stewart, L. A., 6
———, bibliography: Dean, B. G.
———, Grand Canyon: Bryan, J. J., 2
———, map of deposits: Dean, B. G.
———, Mesa area, Maricopa Co.: Linter, R. E.
Bentonite: Davis, C. W.
———, Navajo-Hopi Indian Reservations: Kiersch, G. A., 8; Wilson, R. L., 1
———, Painted Desert: Allen, V. T.
Bleaching clay, Chambers-Cheto area, Apache Co.: Schroter, G. A.
———, Navajo-Hopi Indian Reservations: Kiersch, G. A., 8, 10, 11
Boulder (Hoover) Dam region: Hewett, D. F., 6; U. S. Bureau of Reclamation, 1
Brucite: Gildersleeve, B.
Building stones: Culin, F. L., Jr., 6; Currier, L. W.
———, Ft. Defiance quad., Apache Co.: Allen, J. E.
Carbon dioxide, Four Corners region: Picard, M. D., 2
Celestite: Culin, F. L., Jr., 5; Phalen, W. C., 1
Cement materials: Culin, F. L., Jr., 4; Duryee, E., 1, 2; Eckel, E. C., 1, 2
———, Navajo-Hopi Indian Reservations: Kiersch, G. A., 8
Chemical industry, minerals for: Wilson, E. D., 54

NONMETALLIFEROUS MINERAL COMMODITIES *(Continued)*

Clays, adsorbent: Nutting, P. G.
———, bentonitic: Davis, C. W.; Kiersch, G. A., 8; Wilson, R. L., 1
———, bleaching: Kiersch, G. A., 8, 10, 11; Schroter, G. A.
———, Ft. Defiance quad., Apache Co.: Allen, J. E.
———, Lees Ferry area, Coconino Co.: Phoenix, D. A., 5
———, Morrison formation: Keller, W. D., 3
———, Painted Desert: Allen, V. T.
———, St. Johns vicinity, Apache Co.: Woodyard, K. E.
———, structural, Navajo-Hopi Indian Reservations: Howell, P. W., 1
———, use in development of water resources: Kiersch, G. A., 6
Coal (exclusive of fuel): Kiersch, G. A., 8
Construction materials: Bowles, O., 1; Culin, F. L., Jr., 6; Currier, L. W.; Day, W. C.; Duryee, E., 1, 2; Price, T. M.
———, Basin and Range province: Gallagher, B. J.
———, Cameron quad., Coconino Co.: Akers, J. P., 11
———, Colorado Plateau province: Gallagher, B. J.
———, Ft. Defiance quad., Apache Co.: Allen, J. E.
———, Glen Canyon area, Coconino Co.: Cooley, M. E., 6
———, Lees Ferry area, Coconino Co.: Phoenix, D. A., 5
———, Navajo Country: Gregory, H. E., 10
———, Navajo- Hopi Indian Reservations: Haff, J. C., 2; Kiersch, G. A., 9, 13; Peirce, H. W., 1
Crushed stone, Navajo-Hopi Indian Reservations: Haff, J. C., 2; Kiersch, G. A., 9
Diatomaceous earth: Blake, W. P., 36, 37; Hatmaker, P., 1; Trischka, C., 3; Wilson, E. D., 25
———, San Carlos Indian Reservation: Bromfield, C. S., 3, 4
Dimension stone: Currier, L. W.
———, Navajo-Hopi Indian Reservations: Kiersch, G. A., 9; Peirce, H. W.,1
Dolomite: Weitz, J. H.
Dumortierite: Diller, J. S., 1; Petar, A. V., 1; Wilson, E. D., 9
Fluorspar: Allen, M. A., 6; Ladoo, R. B., 1, 2, 4; Wilson, E. D., 63
———, Castle Dome, Yuma Co.: Burchard, E. F., 2; Gillson, J. L.
———, Duncan area, Greenlee Co.: Burchard, E. F., 2; Gillson, J. L.
———, Packard property, Gila Co.: Cummings, J. B., 1
———, Snowball deposit, Maricopa Co.: Denton, T. C., 4
———, Wickenburg, Maricopa Co.: Gillson, J. L.
———, Yuma Co., southern: Wilson, E. D., 15
Ft. Apache region: Reagan, A. B., 8
Garnet, Navajo-Hopi Indian Reservations: DuBois, R. L., 1; Gregory, H. E., 9; Kiersch, G. A., 8
General: American Institute of Mining and Metallurgical Engineers, 1; Dunning, C. H., 1, 2; Lacy, W. C., 2; Ladoo, R. B., 3, 5; Mineral Industry; Mineral Resources of the United States; Olson, G. G.; Sanford, S.; U. S. Bureau of Mines, 2; Willis, C. F., 2; Wilson, E. D., 52, 90
Gila River Indian Reservation, Maricopa and Pinal Cos.: Wilson, E. D., 93
Gravel, Ft. Defiance, Apache Co.: Allen, J. E.
———, Glen Canyon area, Coconino Co.: Cooley, M. E., 6
Gypsum: Blake, W. P., 14, 42; Culin, F. L., Jr., 3; Galbraith, F. W., 2; Moyer, F. T.; Santmyers, R. M.; Stone, R. W., 1, 2; Withington, C. F., 1, 3
———, Feldman, Pinal Co.: Withington, C. F., 2
———, Navajo-Hopi Indian Reservations: Anthony, J. W., 4; Kiersch, G. A., 8
———, San Carlos Indian Reservation: Bromfield, C. S., 3, 4
———, Whetstone Mts., Cochise Co.: Graybeal, F. T.
Kaolin, Navajo-Hopi Indian Reservations: Kiersch, G. A., 8
Kyanite: Petar, A. V., 1

NONMETALLIFEROUS MINERAL COMMODITIES *(Continued)*
Lime: Bowles, O., 5; Culin, F. L., Jr., 7
Limestone: Bowles, O., 2
———, high-calcium, bibliography: Gazdik, G. C.
———, Navajo-Hopi Indian Reservations: Kiersch, G. A., 8
Magnesite: Culin, F. L., Jr., 1; Gildersleeve, B.
Map of known nonmetallic mineral commodities: McCrory, F. J., 2; Wilson, E. D., 42, 75
Marble, Chiricahua Mts., Cochise Co.: Paige, S.
———, onyx: Bowles, O., 3; Dekalb, C., 1; Merrill, G. P., 1
———, pink: Strong, M. F.
Mica: Culin, F. L., Jr., 2; Sterrett, D. B., 2; Wilson, E. D., 26
Mineral pigments, iron oxide: Wilson, H.
Navajo Country: Reagan, A. B., 23
Nitrate deposits: Gale, H. S.; Mansfield, G. R.
———, southeastern Arizona: Noble, L. F., 7
Nitrogen, Four Corners region: Picard, M. D., 2
Perlite: Jaster, M. C., 1; Mining World, 13; Wilson, E. D., 39
———, composition: Anderson, F. G.
———, Superior area, Pinal Co.: Keller, W. D., 2
Potash: Hance, J. H.
Primitive stone industry: Bartlett, K., 3
Pumice: Hatmaker, P., 2
Puzzolan, Navajo-Hopi Indian Reservations: Kiersch, G. A., 8, 12
Quartz: Heineman, R. E. S., 9
Red argillite resembling pipestone: Bartlett, K., 1
Refractories: Culin, F. L., Jr., 1; Gildersleeve, B.; Petar, A. V., 1; Wilson, E. D., 9
Salt: Phalen, W. C., 2
———, analysis: Taylor, W. W.
———, bibliography: Lang, W. B.
———, Camp Verde, Yavapai Co.: Young, G. J.
———, Hopi Trail, Grand Canyon: Eiseman, F. B., Jr.
———, Navajo Country: Gregory, H. E., 10
———, Supai basin: Pierce, W. G.
———, Verde Valley, Yavapai Co.: Blake, W. P., 12
Sand, Ft. Defiance quad., Apache Co.: Allen, J. E.
———, Navajo-Hopi Indian Reservations: Kiersch, G. A., 8
Sandstone: Bowles, O., 1
Serpentine, Salt Creek Canyon: Ransom, J. E., 4
Silica, bibliography: Jaster, M. C., 2
Sillimanite: Petar, A. V., 1
Slate: Dale, T. N.
Sodium sulfate: Tyler, P. M., 3; Wells, R. C., 2
———, Camp Verde, Yavapai Co.: American Appraisal Company; Sturges, E. L.
———, Verde Valley, Yavapai Co.: Blake, W. P., 12
Stone: Day, W. C.
Strontium: Culin, F. L., Jr., 5; Harness, C. L.; Moore, B. N., 1; Schreck, A. E.
Sulfur: Kelly, F. J.; Wideman, F. L.
Vermiculite: Wilson, E. D., 27
Yavapai Co.: Hansen, M. G., 1
OIL *See* FUELS, Oil; MAPS, Oil Well
ORDOVICIAN *See* PALEONTOLOGY, Ordovician; STRATIGRAPHY, Ordovician
ORE DEPOSITS *See* ECONOMIC GEOLOGY; METALLIFEROUS MINERAL COMMODITIES; MINES AND MINING DISTRICTS; NONMETALLIFEROUS MINERAL COMMODITIES

PALEOGEOGRAPHIC MAP *See* MAPS, *Paleogeographic*
PALEOMAGENTISM *See* GEOPHYSICS AND GEOPHYSICAL PROSPECTING
PALEONTOLOGY
Algae, Cretaceous, early, Cochise Co.: Konishi, K.
———, Precambrian, Grand Canyon: White, C. D., 3
Amole arkose, Lower Cretaceous, Tucson Mts.: Bryant, D. L., 4
Amphibians, Cenozoic, southeastern Arizona: Brattstrom, B. H.
Animal tracks and trackways: Farmer, M. F.; McKee, E. D., 31; Nininger, H. H., 5; Peabody, F. E., 7; Riggs, E. S.
———, Chinle formation, Petrified Forest National Monument: Caster, R. E.
———, Coconino sandstone: Brady, L. F., 17, 21; McKee, E. D., 25
———, Grand Canyon: Gilmore, C. W., 2, 3, 4, 5, 6, 7; Lull, R. S.; Peabody, F. E., 5
———, Moenkopi sandstone: Brady, L. F., 9; Peabody, F. E., 4, 6
———, Morrison formation: Stokes, W. L., 6
———, Navajo and Wingate sandstones: Brady, L. F., 31
———, Permian rocks: Brady, L. F., 32; Gilmore, C. W., 3; Laudermilk, J. D., 3; Peabody, F. E., 5; Vaughn, P. P., 1
———, Triassic rocks: Laudermilk, J. D., 4; Peabody, F. E., 2
———, Verde formation, Montezuma Castle National Monument: Brady, L. F., 29
Apache Co., Cretaceous Cephalopods: Young, K. P.
Arachnids: Petrunkevitch, A.
Arthropods, Cambrian: Ulrich, E. O.
———, Cenozoic, late: Chamberlin, R. V.
———, in onyx marble: Pierce, W. D., 1, 2
———, Permian, Grand Canyon: Carpenter, F. M.
———, Triassic, Petrified Forest National Monument: Walker, M. V.
Aubrey limestone: Reagan, A. B., 3
Basin and Range Province, late Tertiary microflora: Gray, J., 1, 3
Bass formation, Grand Canyon: Alf, R. M.
Bidahochi formation: Repenning, C. A., 2
Bioherms, upper Devonian: Huddle, J. W., 1
Birds, condor: DeSaussure, R.; Miller, L.
———, rail, Pliocene: Wetmore, A., 3
———, southeastern Arizona: Wetmore, A., 1
———, swan, Miocene: Wetmore, A., 2
Bisbee quad., Carboniferous: Girty, G. H.
———, Devonian: Keyes, C. R., 80; Williams, H. S., 2
Bottomless Pits area, Coconino Co., Permian: Pattison, H. M.
Brachiopods: McKee, E. D., 21
———, Cretaceous: Cooper, G. A.
———, Devonian: Stainbrook, M. A.
Bryozoan, Permian: Condra, G. E., 1, 2
Buell Park, Apache Co., mollusks: Drake, R. J., 1
Cambrian System: Walcott, C. D., 4, 6, 8
———, Arthropods: Ulrich, E. O.
———, correlations: Walcott, C. D., 5, 9, 12; Wheeler, H. E., 1
———, Grand Canyon: Resser, C. E.; Schenk, E. T., 3; Schuchert, C., 2
———, Trilobites: Stoyanow, A. A., 3, 18
———, worms: Howell, B. F., 2
Carbonate rocks, Yampai Cliffs, Mohave Co.: Wood, W. H., 1
Carboniferous System, animal tracks: Gilmore, C. W., 3
———, Bisbee quad.: Girty, G. H.
———, correlations: Williams, H. S., 1

PALEONTOLOGY *(Continued)*
Carboniferous System, fossils: White, C. A., 3
———, Grand Canyon: Schuchert, C., 1
Cenozoic, Arthropods: Chamberlin, R. V.
———, *Capybara*: Lance, J. F., 5
———, flora: Laudermilk, J. D., 1; Martin, P. S., 3
———, fossil localities: Lance, J. F., 10
———, Hopi Buttes: Reagan, A. B., 25
———, Lehner Mammoth site: Antevs, E. V., 4; Haury, E. W., 6; Lance, J. F., 9
———, Milk Creek, Yavapai Co.: Reed, C. A.
———, mollusks: Hannibal, H.; Reagan, A. B., 25
———, Naco, mammoth, Cochise Co.: Antevs, E. V., 3
———, Navajo Country: Reagan, A. B., 24, 27
———, pollen: Malde, H. E., 2; Martin, P. S., 4
———, San Pedro Valley: Gazin, C. L.
———, Tonto Basin: Lance, J. F., 12
———, Verde formation: Brady, L. F., 29; Twenter, F. R., 4
———, Wellton, Yuma Co.: Wood, P. A., 1
Cephalopods, Cretaceous: Young, K. P.
———, Permian: Brady, L. F., 26; Miller, A. K., 1, 2; Miller, J. W., Jr., 6; Stoyanow, A. A., 19
Chinle formation, animal tracks: Caster, R. E.
———, reptiles: Camp, C. L., 4
Chiricahua Mts., Cochise Co., Fusulinids: Zirkle, R. G.
Cochise Co., central: Gilluly, J., 7, 8
———, Cretaceous algae: Konishi, K.
———, Devonian System: Langenheim, R. L., Jr., 1
Cochise-Mogollon-Hohokam sequence: Haury, E. W., 1
Coconino sandstone, animal tracks: Brady, L. F., 17, 21; McKee, E. D., 26
Colorado Plateau, Permian Cephalopods: Miller, A. K., 2
Conodonts: Schwab, K. W.
———, Devonian: Ethington, R. L., 1, 2
Conrad's type fossils: Keyes, C. R., 61
Conularia, Permian: McKee, E. D., 9
Corals, Devonian: Stumm, E. C.
———, Mississippian: Easton, W. H.; Gutschick, R. C., 1; Sando, W. J., 1, 2; Stoyanow, A. A., 5
———, Ordovician: Hill, D.
Cretaceous System: Cobban, W. A.; Reagan, A. B., 19, 20; Stoyanow, A. A., 6, 8, 9, 10, 17; Ward, L. F., 1
———, algae: Konishi, K.
———, ammonites: Miller, H. W., Jr., 4
———, brachiopods: Cooper, G. A.
———, cephalopods: Young, K. P.
———, Empire Mts., Pima Co.: Moore, R. A., 1
———, flora: Bailey, I. W.; Read, C. B., 4
———, Mogollon Rim: Miller, H. W., Jr., 2
———, ostracods: Bryant, D. L., 4
———, reptiles: Miller, H. W., 5
Crinoids, Mississippian: Bowsher, A. L.
Deer Creek coal fields: Walcott, C. D., 3
Devonian System: Brady, L. F., 6; Keyes, C. R., 66, 102; Stoyanow, A. A., 4
———, bioherms: Huddle, J. W., 1
———, Bisbee: Keyes, C. R., 80; Williams, H. S., 2
———, brachiopods: Stainbrook, M. A.
———, Cochise Co.: Langenheim, R. L., Jr., 1

PALEONTOLOGY *(Continued)*
Devonian System, conodonts: Ethington, R. L., 1
———, corals: Stumm, E. C.
———, correlation: Williams, H. S., 1
———, fishes: Hussakof, L., 1
———, flora: Teichert, C.
———, mollusks: Stoyanow, A. A., 14
———, Pinal Creek: Stauffer, C. R., 2
———, Santa Rita Mts.: Stauffer, C. R., 1, 3
Empire Mts., Pima Co., Cretaceous: Moore, R. A., 1
Escabrosa limestone, Holothurians: Langenheim, R. L., Jr., 2
Fishes, Devonian: Hussakof, L., 1
———, Paleozoic: Gass, H. J.
———, Permian: Hussakof, L., 2
———, shark, Permian: David, L. R.
Flora, Cenozoic: Damon, P. E., 11; Laudermilk, J. D., 1
———, Devonian: Teichert, C.
———, Hermit shale: Laudermilk, J. D., 4; White, C. D., 1
———, leaf beds, Petrified Forest: Stagner, H. R.
———, leaves: Reagan, A. B., 15
———, Mesozoic: Ward, L. F., 6
———, Paleozoic, upper: Read, C. B., 7
———, Permian: Laudermilk, J. D., 4; White, C. D., 1, 2, 6, 7, 8
———, petrified wood: Bailey, I. W.; Briscoe, R. J.; Byers, C. A.; Daugherty, L. H., 1, 2, 3, 4, 5; Geithmann, H.; Gordon, W. T.; Jeffery, E. C.; Knowlton, F. H., 1, 2; Le Duchat d'Aubigny, J.; Mayes, W.; Merrill, G. P., 6, 8; Platen, P.; Ransom, J. E., 2; Read, C. B., 4; Reagan, A. B., 16, 17; Van Cleave, P. F.; Ward, L. F., 2, 3
———, pollen analyses and early man: Malde, H. E., 2; Martin, P. S., 4
———, pollen analyses, late Tertiary: Gray, J., 1, 2, 3; Martin, P. S., 3
———, pollen analysis, Laguna Salada, Apache Co.: Hevly, R. H., 2
Foraminifera: Douglass, R. C.; Skipp, B. A.
Fort Apache region: Reagan, A. B., 2, 4
Fossil collecting: Gilmore, C. W., 8; Welles, S. P., 2
Fossil egg: Morgan, W. C., 2; Ward, T. W.
Fusulinids, Permo-Pennsylvanian: Dubin, D. J.; Horvath, E. A.; Sabbins, F. F., Jr., 4; Williams, F.; Zirkle, R. G.
General: Fenton, C. L.; Lance, J. F., 11; Pan-American Geologist, 1; Wilson, E. D., 90
Grand Canyon: Carnegie Institution Washington; McKee, E. D., 33; Science, 1
———, animal tracks: Lull, R. S.
———, Cambrian: Schenk, E. T., 3; Schuchert, C., 2; Resser, C. E.
———, Carboniferous: Schuchert, C., 1
———, mammals: Schenk, E. T., 1
———, Permian, Arthropods: Carpenter, F. M.
———, Permian, fishes: David, L. R.
———, Permian, flora: White, C. D., 1, 2, 4, 6, 7, 8
———, Precambrian: Alf, R. M.; White, C. D., 3
———, Precambrian, jellyfish: Bassler, R. S.; Hinds, N. E. A., 13; Van Gundy, C. E., 3
———, Pre-Carboniferous: Walcott, C. D., 2
———, reptiles: McKee, E. D., 5
———, worms: McKee, E. D., 3
Hermit shale, animal tracks: Peabody, F. E., 5
———, flora: Laudermilk, J. D., 4; White, C. D., 1, 6, 7
Holothurians, Escabrosa limestone: Langenheim, R. L., Jr., 2

PALEONTOLOGY *(Continued)*
Hopi Buttes, Cenozoic mollusks: Reagan, A. B., 25
Index fossils, upper Paleozoic: Stoyanow, A. A., 15
Island Mesa, Yavapai Co., Devonian mollusks: Stoyanow, A. A., 14
Jellyfish, Precambrian: Bassler, R. S.; Hinds, N. E. A., 13; Van Gundy, C. E., 3
Jerome area, Redwall limestone: Wooddell, C. E.
Jurassic System: Stoyanow, A. A., 8
———, animal tracks: Brady, L. F., 31
———, correlations: Schuchert, C., 3
———, Kayenta formation: Welles, S. P., 3, 4
———, Navajo sandstone, reptiles: Brady, L. F., 10, 11, 12; Camp, C. L., 6
Kaibab formation: Beus, S. S.; Brady, L. F., 30; Fisher, W. L., 3; Nichol, D.; Wagner, O. E., Jr.
———, Bottomless Pits area, Coconino Co.: Pattison, H. M.
———, fishes: Hussakof, L., 2
———, mollusks: Chronic, H.
———, trilobites: Snow, J. I.
Kanab Valley, Paleozoic: Walcott, C. D., 1, 2
Kayenta formation, age: Welles, S. P., 4
———, reptiles: Welles, S. P., 3
Laguna Salada, Apache Co., pollen analysis: Hevly, R. H., 2
Lehner Mammoth site, mammoth remains: Antevs, E. V., 4; Haury, E. W., 6; Lance, J. F., 9
Leoporidae, southeastern Arizona: Downey, J. S.
Literature, review: Miller, H. W., Jr., 1
Mammals, antilocaprines: Colbert, E. H., 1; Roosevelt, Q.; Skinner, M. F.
———, *Asinus,* Pleistocene: Quinn, J. H.
———, beaver, Pliocene: Stirton, R. A., 2
———, bighorn sheep, Pleistocene: Hibbard, C. W.
———, bison: Blake, W. P., 21; Lucas, F. A., 1
———, camel, Miocene: Wood, P. A., 1
———, *Capybara,* Pleistocene: Lance, J. F., 10
———, fossil localities: Lance, J. F., 10
———, ground sloth: Brady, L. F., 5; Grater, R. K.; Martin, P. S., 1, 2
———, hares, Pleistocene: Dice, L. R.
———, mammoths: Antevs, E. V., 3, 4; Blake, W. P., 26; Haury, E. W., 6, 7; Lance, J. F., 2, 9
——— Miocene: Lance, J. F., 6
———, One-Eleven (111) Ranch area: Wood, P. A., 3
——— Pleistocene, Lake Cochise: Bryan, K., 14
———, Pliocene, Milk Creek, Yavapai Co.: Reed, C. A.
———, Point of Pines: Stein, W. T.
———, porcupine: Allen, J. A.
———, Quarternary, Tucson area: Lance, J. F., 1
———, Rampart Cave: Wilson, R. W.
———, San Pedro Valley: Gidley, J. W., 1, 2
———, Ventana Cave, Pima Co.: Bryan, K., 21
———, Wupatki ruin, Coconino Co.: Lincoln, E. P.
Marine Tertiary: Wilson, E. D., 13
Martin limestone, corals: Stumm, E. C.
McElmo formation, northeastern Arizona: Mook, C. C.
Mesozoic Era: Ward, L. F., 4
———, ammonites: Miller, H. W., Jr., 3
———, floras: Ward, L. F., 6
———, mollusks: Henderson, J.; Robinson, W. I.
Mexican border: Hall, J.

PALEONTOLOGY *(Continued)*
Mexican border, mollusks: Dall, W. H.
Miocene, Arizona, southwestern: Lance, J. F., 6
———, birds: Wetmore, A., 2
———, camel, Wellton, Yuma Co.: Wood, P. A., 1
Mississippian System: Keyes, C. R., 66, 67, 71, 79; Stoyanow, A. A., 16
———, Arizona, southeastern: Armstrong, A. K., 1, 2, 3; Nations, J. D., 2
———, Arizona, southern: Thomas, G. C., 2
———, corals: Easton, W. H.; Gutschick, R. C., 1; Sando, W. J., 1, 2; Stoyanow, A. A., 5
———, crinoids: Bowsher, A. L.
———, Escabrosa limestone: Langenheim, R. L., Jr., 2
———, foraminifera: Skipp, B. A.
———, holothurians: Langenheim, R. L., Jr., 2
———, mollusks: Yochelson, E. L.
———, Paradise formation: Hernon, R. M., 2
———, Redwall limestone: Bowsher, A. L.; Easton, W. H.; Gutschick, R. C., 1; McKee, E. D., 51, 52; Regan, A. B., 5; Sando, W. J., 1; Skipp, B. A.; Woodell, C. E.; Yochelson, E. L.
Moenkopi formation: McKee, E. D., 48, 49
———, animal tracks: Brady, L. F., 9; Peabody, F. E., 4, 6
———, reptiles: Welles, S. P., 1
Mogollon Rim, Cretaceous: Miller, H. W., Jr., 2
Mollusks: Cockerell, T. D. A.; Colton, H. S., 2
———, Buell Park, Apache Co.: Drake, R. J., 1
———, Cenozoic: Hannibal, H.
———, Devonian: Stoyanow, A. A., 14
———, in slag: Brady, L. F., 16
———, Mesozoic: Henderson, J.; Robinson, W. I.
———, Mexican border: Dall, W. H.
———, Mississippian: Yochelson, E. L.
———, Permian: Chronic, H.; Winters, S. S., 2
———, Pleistocene: Reagan, A. B., 25
———, Pliocene: Taylor, D. W.
———, preservation of original colors: McKee, E. D., 32
———, Quarternary, Vernon area, Apache Co.: Drake, R. J., 2
———, Triassic: Reeside, J. B., Jr., 2; Yen, T. C.
Morrison formation, animal tracks: Stokes, W. L., 6
Museum of Northern Arizona, studies at: Colbert, E. H., 6
Naco limestone, fusulinids: Horvath, E. A.; Williams, F.; Zirkle, R. G.
Naco mammoth site, Cochise Co.: Antevs, E. V., 3; Haury, E. W., 4, 5; Lance, J. F., 2
Navajo Country, Pleistocene: Reagan, A. B., 27
Navajo sandstone, reptiles: Brady, L. F., 10, 11, 12; Camp, C. L., 6
One-Eleven (111) Ranch area, mammals: Wood, P. A., 3
Ordovician System: Keyes, C. R., 81
———, conodonts: Ethington, R. L., 2
———, corals: Hill, D.
Ostracods, Cretaceous, Tucson Mts.: Bryant, D. L., 4
Paleoclimate: Gray, J., 4; Laudermilk, J. D., 3; McKee, E. D., 2
Paleozoic Era: Read, C. B., 7; Stoyanow, A. A., 7, 12
———, Kanab Valley: Walcott, C. D., 1, 2
———, late, central Cochise Co.: Gilluly, J., 8
———, late, index fossils: Stoyanow, A. A., 15
Papago Spring Cave, Sonoita: Colbert, E. H., 1; Skinner, M. F.
Paradise formation: Hernon, R. M., 2

PALEONTOLOGY *(Continued)*
Pennsylvanian System, Apache and Navajo Cos.: Lokke, D. H.
———, Arizona, southeastern: Havenor, K. C., 3
———, Aubrey limestone: Reagan, A. B., 3, 4
———, Fort Apache region: Reagan, A. B., 2, 4
———, fusulinids, Naco limestone: Dubin, D. J.; Horvath, E. A.; Sabins, F. F., Jr., 4; Williams, F.; Zirkle, R. G.
Permian System, animal tracks: Brady, L. F., 17, 32; Laudermilk, J. D., 3; Vaughn, P. P., 1
———, arthropods: Carpenter, F. M.
———, Aubrey limestone: Reagan, A. B., 3, 4
———, bryozoan: Condra, G. E., 1, 2
———, cephalopods: Brady, L. F., 26; Miller, A. K., 1, 2; Miller, H. W., Jr., 6; Stoyanow, A. A., 19
———, *Conularia*: McKee, E. D., 9
———, correlation: Read, C. B., 3
———, fishes: David, L. R.; Hussakof, L., 2
———, flora: Laudermilk, J. D., 4; Read, C. B., 7; White, C. D., 1, 2, 6, 7, 8
——— fusulinids: Dubin, D. J.; Horvath, E. A.; Sabins, F. F., Jr., 4; Williams, F.; Zirkle, R. G.
———, Kanab Valley: Walcott, C. D., 1
———, mollusks: Chronic, H.; Winters, S. S., 2
———, nautiloids: Miller, H. W., Jr., 6
———, trilobites: Snow, J. I.
———, vertebrates: Vaughn, P. P., 2
———, worm: Howell, B. F., 1
Pinal Creek, Devonian: Stauffer, C. R., 2
Pleistocene, antilocaprine: Roosevelt, Q.
———, Arizona, northern: Reagan, A. B., 25, 27
———, Arizona, southwestern: Brattstrom, B. H.
———, *Asinus:* Quinn, J. H.
———, bighorn sheep: Hibbard, C. W.
———, *Capybara:* Lance, J. F., 5
———, hares: Dice, L. R.
———, Lake Cochise: Bryan, K., 14
———, vertebrates: Hay, O. P.
Pliocene, Arizona, southwestern: Brattstrom, B.H.
———, Bidahochi formation: Repenning, C. A., 2
———, birds: Wetmore, A., 3
———, mammals: Reed, C. A.; Stirton, R. A., 2
———, mollusks: Taylor, D. W.
Precambrian Systems: Pan-American Geologist, 2
———, jellyfish, Grand Canyon: Bassler, R. S.; Hinds, N. E. A., 13; Van Gundy, C. E., 3
Pre-Carboniferous, Grand Canyon: Walcott, C. D., 2
Quaternary, late, Tucson area: Lance, J. F., 1
———, mammals: Blake, W. P., 20, 21
———, mollusks, Vernon, Apache Co.: Drake, R. J., 2
———, San Pedro Valley: Gidley, J. W., 1, 2
Rampart Cave, birds: Miller, L.
———, flora: Laudermilk, J. D., 1
———, mammals: Martin, P. S., 1, 2; Wilson, R. W.
Redwall limestone: McKee, E. D., 51, 52; Reagan, A. B., 5
———, corals: Easton, W. H.; Gutschick, R. C., 1; Sando, W. J., 1, 2
———, crinoids: Bowsher, A. L.
———, foraminifera: Skipp, B. A.

PALEONTOLOGY *(Continued)*
Redwall limestone, Jerome area: Wooddell, C. E.
———, mollusks: Yochelson, E. L.
Reptiles: Brady, L. F., 22, 25, 28; Brattstrom, B. H.; Camp, C. L., 7; Colbert, E. H., 2, 3, 4, 5; Gilmore, C. W., 1; McKee, E. D., 5; O'Connell, D. T.; Peabody, F. E., 3; Welles, S. P., 5
———, Cenozoic: Brattstrom, B. H.; Gidley, J. W., 1, 2
———, Cretaceous: Miller, H. W., Jr., 5; Moore, R. A., 1
———, Jurassic: Brady, L. F., 10, 11, 12; Camp, C. L., 5, 6; Welles, S. P., 3
———, Triassic: Brown, B., 1, 2; Camp, C. L., 4, 9; Lewis, G. E., 1; Lucas, F. A., 2, 3; Mehl, M. G., 1, 2, 3, 4; Welles, S. P., 1
San Pedro Valley, late Cenozoic vertebrates: Gazin, C. L.; Gidley, J. W., 1, 2; Stirton, R. A., 1, 2
Santa Rita Mts., Devonian: Stauffer, C. R., 1
Sulphur Spring Valley; Cochise culture: Haury, E. W., 7
Supai formation: Winters, S. S., 4
Tertiary System: Stoyanow, A. A., 9
———, flora: Gray, J., 1, 2, 3
———, marine: Wilson, E. D., 13
Triassic System: Bailey, W. F.; McKee, E. D., 10
———, animal tracks: Brady, L. F., 9; Caster, R. E.; Laudermilk, J. D., 3; Peabody, F. E., 2, 4, 6
———, arthropods: Walker, M. V.
———, flora: Daugherty, L. H., 3, 4, 5; Jeffery, E. C.
———, Moenkopi formation: McKee, E. D., 48, 49
———, mollusks: Reeside, J. B., Jr., 2; Yen, T. C.
———, reptiles: Brown, B., 1, 2; Camp, C. L., 2, 3, 4, 9; Lewis, G. E., 1; Lucas, F. A., 2, 3; Mehl, M. G., 1, 2, 3, 4; Welles, S. P., 1
Trilobites, Cambrian: Stoyanow, A. A., 3, 18
———, Permian: Snow, J. I.
Tonto Basin, Cenozoic: Lance, J. F., 12
Tucson area, late Quaternary: Lance, J. F., 1
Tucson Mts., Cretaceous ostracods: Bryant, D. L., 4
Ventana Cave, Pima Co., Quarternary mammals: Bryan, K., 21
Verde formation: Brady, L. F., 29; Twenter, F. R., 4
Vernon, Apache Co., Quarternary mollusks: Drake, R., 2
Walnut Canyon, Permian mollusks: Chronic, H.
Welton, Yuma Co., Miocene mammals: Wood, P. A., 1
Worms: Howell, B. F., 1, 2; McKee, E. D., 3
Wupatki ruin, Coconino Co.: Lincoln, E. P.
Yampai Cliffs, Mohave Co.: Wood, W. H., 1
Yuma Co.: Moodie, R. L.

PALEOTECTONIC MAP *See* MAPS, *Paleotectonic*

PEDIMENTS *See* PHYSIOGRAPHY AND GEOMORPHOLOGY

PEGMATITES
Beryl-bearing, northwestern Arizona: Olson, J. C., 1
Precambrian, Grand Canyon: Campbell, I., 5
Quartz masses: Jahns, R. H., 1
Relation to copper-molybdenum ore: Lutton, R. J., 3
Santa Catalina-Rincon Mts.: Hernon, R. M., 1
Useful minerals: Hess, F. L., 6
White Picacho dist., Maricopa and Yavapai Cos.: Jahns, R. H., 3; Stewart, G. W.
Wickenburg area, lithium-bearing: Jahns, R. H., 2, 3

PENNSYLVANIAN *See* PALEONTOLOGY, Pennsylvanian; STRATIGRAPHY, Pennsylvanian

PERMIAN *See* PALEONTOLOGY, Permian; STRAIGRAPHY, Permian
PETRIFIED FOREST *See* AREAS DESCRIBED, Petrified Forest
PETROLOGY AND PETROGRAPHY
Aggregate for Davis Dam: Rhoades, R. F.
Alkali feldspars in intrusive rocks: Kuellmer, F. J., 1
———, Globe-Miami area: Kuellmer, F. J., 2
Analyses: Wells, R. C., 3
Apache tears, Superior area, Pinal Co.: Moore, H. R.
Ash flow near Superior: Peterson, D. W., 3
Beryl deposit, Baboquivari Mts., Pima Co.: Clark, J. L.
Black Rock, Apache Co.: Yildiz, M.
Boxwork siderite: Trischka, C., 4
Bridge Canyon dam site: Mielenz, R. C.
Buehman Canyon area, Pima Co.: Raabe, R. C.
Bullock Canyon area, Pima Co.: Raabe, R. C.
Caliche: Blake, W. P., 30; Breazeale, J. F.
———, Glen Canyon region, Coconino Co.: Cooley, M. E., 10
Camptonite dike near Boulder (Hoover) Dam: Campbell, I., 8, 10
Cat Mtn. rhyolite, Tucson Mts., Pima Co.: Bickerman, M., 1, 2
Cenozoic sediments, Safford Valley: Mathias, W. F.
Chaotic breccias, Tucson Mts., Pima Co.: Kinnison, J. E., 2
Chinle formation: Cadigan, R. A., 2
Coconino sandstone: Decker, B. L.
Composite dike, Klondyke area: Simons, F. S., 3
Concretions, Precambrian from Grand Canyon: Campbell, I., 3
———, Tucson Mts., Pima Co.: Brown, W. H., 2
Conglomerate dikes: Campbell, M. R., 2; Stewart, C. A., 1
Contact rocks, Abril mine, Cochise Co.: Perry, D. V.
Copper ores: Schwartz, G. M., 1, 3, 5
Cretaceous coals: Pye, W. D., 6
Dacite near Superior and Globe: Peterson, D. W., 2, 4
Devitrification dikes and giant spherulites, Klondyke area: Simons, F. S., 2
Diabase, central Arizona: Anthony, J. W., 5
———, Magma mine, Superior: Sell, J. D., 1
Diorite, silver bearing: Bond, J., 1
Dumortierite: Bowen, N. L.
Dunites and olivine-rich inclusions, basalts: Ross, C. S., 2
Eclogite, Garnet Ridge, northeastern Arizona: Watson, K. D.
Fabrics: Ingerson, F. E.
Ft. Defiance quad., Apache Co.: Allen, J. E.
Fragmental acid intrusive rocks, Ko Vaya Hills and South Comobabi Mts., Pima Co.: Bryner, L., 2
Fractured boulders in conglomerate: Campbell, M. R., 3
Gabbro, Eureka dist., Yavapai Co.: Singewald, J. T., Jr.
General: Blake, W. P., 1; Butler, G. M., 34
Gneiss, Santa Catalina Mts., Pima Co.: DuBois, R. L., 5
Granite xenoliths in diabase: White, J. F.
Gravel, Glen Canyon area: Cooley, M. E., 6
Heavy minerals in sands: Hoffman, V. J.
Igneous rocks, Basin and Range Province: Titley, S. R., 1
———, Carrizo Mtn., Apache Co.: Emery, W. B.
———, western Arizona: Johannsen, A.
Inclusions: Ingerson, F. E.
Intra-canyon lava flow, Grand Canyon: Schenk, E. T., 2
Intrusive rocks, Globe-Miami area: Kuellmer, F. J., 2
———, Tucson Mts., Pima Co.: Mayo, E. B., 4, 8

PETROLOGY AND PETROGRAPHY *(Continued)*
Iron shale analysis, Coon Mtn. (Meteor Crater): Farrington, O. C., 2
Jerome ore deposits: Rice, M.
Kimberlite tuff plugs, northern Arizona: Balk, R., 2
Ko Vaya Hills, Pima Co.: Bryner, L., 1, 2
Lavas, Grand Canyon: Iddings, J. P.
Lensoidal rhyolite near Twin Buttes, Pima Co.: Lutton, R. J., 4
Magnetic rocks: Hanks, H. G.
Mexican boundary: Lord, E. C. E.
Minor elements in igneous rocks, central and northwestern Arizona: Putman, G. W., 1
Molino Basin area, Santa Catalina Mts., Pima Co.: Laughlin, A. W.
Olivine bombs near Globe: Lausen, C., 6
Oracle granite: Banerjee, A. K.; Mayo, E. B., 5
Pantano beds, Pima Co.: Metz, R.
Pegmatites, Precambrian, Grand Canyon: Campbell, I., 5
———, Santa Catalina-Rincon Mts., Pima Co.: Hernon, R. M., 1
Pegmatitic quartz: Jahns, R. H., 1
Petrified Forest: Vokes, H. E.
Pinal schist, Santa Catalina Mts., Pima Co.: Erickson, R. C.
Porous consolidated media: Lehr, J. H.
Porphyry dike, Tombstone area, Cochise Co.: Blake, W. P., 7
Quartz monzonite, Swisshelm Mts.: Diery, H. D.
Red shale near Del Rio, Arizona: Laudermilk, J. D., 2
Ring dikes, San Carlos Indian Reservation: Marlowe, J. I., 2
S. P. Crater, Coconino Co.: Hodges, C. A.
Sandstone, Canyon Diablo area: Buddhue, J. D., 4
———, Chuska Mts., Apache Co.: Wright, H. E., Jr., 1, 4
Santa Catalina gneiss: Blake, W. P., 48
Santa Catalina Mts., Pima Co.: Peirce, F. L.; Pilkington, H. D., 2; Wood, M. M.
Sedimentary rocks, grain-size measurements: Tanner, W. F.
Serpentine pipes, Garnet Ridge, northeastern Arizona: Malde, H. E., 1; Watson, K. D.
Silica and lime deposition: Darton, N. H., 5
Silica outcrops, Bisbee, Cochise Co.: Trischka, C., 2
Silver Bell Mts., Pima Co.: Watson, B. N.
South Comobabi Mts., Pima Co.: Bryner, L., 1, 2
Spheroidal structures in volcanics: Feth, J. H., 3
Springerville area, Apache Co.: Rehkemper, L. J.
Sulfide-bearing monzonite: Schrader, F. C., 9
Sunset Crater, Coconino Co.: Hodges, C. A.
Swisshelm Mts., Cochise Co.: Diery, H. D.
Tombstone dist., Cochise Co.: Rasor, C. A., 1
Travertine, Glen Canyon: Cooley, M. E., 16
Tuba dike, Cameron area: Barrington, J., 2
Tucson Mts., Pima Co.: Guild, F. N., 2
Turkey-track porphyry, southeastern Arizona: Cooper, J. R., 9
Twin Hills, Pima Co.: Cochran, H. M.
Upper Jurassic rocks, central Navajo Reservation: Harshbarger, J. W., 2
Volcanic bombs: Brady, L. F., 18, 19
Welded ash flows: Smith, R. L.
Welded tuffs: Peterson, D. W., 6; Roberts, R. J.
———, Chiricahua Mts., Cochise Co.: Enlows, H. E., 4

PETROLEUM *See* FUELS

PHOTOGEOLOGIC MAPS *See* MAPS, *Photogeologic*

PHYSIOGRAPHY AND GEOMORPHOLOGY *see also* AREAS DESCRIBED
Ajo dist., Pima Co.: Gilluly, J., 1, 2, 3, 4, 5, 11, 13
Alambre Valley: Wargo, J. G., 2
Alluvial fans: Blissenbach, E., 1, 2, 4
Apache Co.: Cooley, M. E., 11
———, central: Akers, J. P., 8, 12
Arid lands: Lewis, D. D.
Arizona: Lance, J. F., 11; Wilson, E. D., 87, 90
———, northeastern: Davis, W. M., 5; Dutton, B. P.; Melton, F. A., 1
———, northern: Darton, N. H., 7; Eardley, A. J., 1; Emory, W. H., 1; Gregory, H. E., 11, 12, 15
———, southeastern: Brand, D. D.
———, southern: Fairbanks, H. W.
———, western: Lee, W. T., 5
Arizona valleys: Smith, G. E. P., 3, 4
Arizona watershed program: Arizona Water Resources Committee
Arroyo cutting: Antevs, E., 2; Brown, W. H., 1; Bryan, K., 12; Wertz, J. B.
Artillery Mts. region, Mohave Co.: Lasky, S. G., 2, 3
Bajadas, Tucson bolson: Visher, S. S.
Basin and Range Province: Davis, W. M., 6, 20; Keyes, C. R., 3, 48; Meinzer, O. E., 3; Sauer, C.
Beacon Hill, Colossal Cave area, Pima Co.: Weidner, M. I.
Bisbee dist., Cochise Co.: Ransome, F. L., 3, 4, 5, 7, 8, 9, 17, 26
Black Mesa Basin area: Cooley, M. E., 3
Bolson region: Tolman, C. F., Jr., 2
Bradshaw Mts. quad., Yavapai Co.: Jaggar, T. A., Jr.
Bright Angel quad., Coconino Co.: Maxson, J. H., 11
Brush fire, Mazatzal Mts.: Sykes, Glenton, G.
Buried channels, Monument Valley: Black, R. A., 2
Cameron quad., Coconino Co.: Akers, J. P., 11
Canyon Country: McKee, E. D., 33
Catalina Mts. cave: Priser, J.
Cave evolution, Marble Gorge: Lange, A. L., 2
Cavern in Copper Queen mine, Bisbee: Hovey, E. O., 2
Cavern in Shattuck mine, Bisbee: Wilson, P. D., 1
Channel shapes, northeastern Arizona: Hadley, R. F.
Channel trenching: Antevs, E., 2; Brown, W. H., 1; Bryan, K., 12; Lewis, D. D.; Swift, T. T.
Channelways: Davis, W. M., 12; Wertz, J. B.
Chiricahua Mts., Cochise Co.: Carr, W. H.; Sauer, C.
Cinder dunes near Cameron: Chenoweth, W. L., 2
Clarkdale quad., Yavapai Co.: Lehner, R. E., 1
Clifton-Morenci dist., Greenlee Co.: Ransome, F. L., 10
Coconino Plateau: Strahler, A. N., 3, 4, 5
Coconino sandstone: Decker, B. L.
Colorado Desert: Barrows, D. P.
Colorado Plateau: Bradley, W. C.; Gregory, H. E., 13; Hunt, C. B., 3; Kennedy, G. C.; Margerie, E., 1; Moore, R. C., 2, 5, 6, 7
Colorado River canyon: Torre Mandrazo, R.
Colorado River Delta: Bateman, A. M., 2; Fox, C. K.; Lougee, R. J.; Sykes, Godfrey G., 1, 2, 3, 4, 5, 6, 7, 8
Colorado River region: Blackwelder, E., 1, 4, 5; Cadell, H. M.; Cooley, M. E., 12; Dellenbaugh, F. S., 1; Gregory, H. E., 14; La Rue, E. C., 1, 2; Lee, W. T., 3, 4; Longwell, C. R., 10; Newberry, J. S.; Pack, F. J.; Powell, J. W., 1, 3, 4, 5, 8, 9; Toula, F.
Colorado River system in the Grand Canyon: Maxson, J. H., 6

PHYSIOGRAPHY AND GEOMORPHOLOGY *(Continued)*

Colossal Cave, Pima Co.: Keyes, C. R., 34
Contrasts, east and west: Davis, W. M., 16
Craters in sedimentary rocks: Niermeyer, J. F.
Dams, natural, Havasu Canyon: Black, D. M.
Desert lands: Blackwelder, E., 2; Keyes, C. R., 28, 29, 30, 31; Silliman, B., Jr., 2; Ward, R. A.
Desert, periodicity: Davis, W. M., 15
Desert varnish: Blake, W. P., 44
Detrital slopes: Blake, W. P., 47
Drainage patterns, southeastern Arizona: Melton, M. A., 1
Dunes, Navajo Country: Hack, J. T., 2
East Kaibab Monocline: Babenroth, D. L.; Strahler, A. N., 2
Empire Peak area, Pima Co.: Mayuga, M. N., 1
Ep-Archean plain: Whitman, A. R.
Erosion, Chinle formation: Colbert, E. H., 7
Erosional cycles, Little Colorado River: Cooley, M. E., 8
Exfoliation in sandstones: Bradley, W. C.
Fossil-tree bridge, Petrified Forest: Osborn, H. F.
Galiuro Mts.: Davis, W. M., 14
General: Bryan, K., 20; Fenneman, N. M., 1, 2, 3; Klinck, R. E.; Penck, A.; Waibel, L.; Wilson, E. D., 5, 6, 19
Gila River to St. George, Utah: Marvine, A. R.
Gila River valley: Lee, W. T., 1
Glaciation: Flint, R. F.; Johnson, D. W., 5; Stone, G. H., 2
———, Ft. Apache region: Reagan, A. B., 10
———, San Francisco Mts., Coconino Co.: Sharp, R. P., 3, 4, 5
———, southern Arizona: Merrill, F. J. H.
———, White Mts., Apache Co.: Melton, M. A., 3
Glen-San Juan Canyon area: Cooley, M. E., 4
Globe area: Peterson, N. P., 15, 19, 20; Ransome, F. L., 2, 6, 14, 15, 17, 25
Grand Canyon region: Burden, D.; Corle, E.; Cueto Rui-Diaz, E.; Darton, N. H., 9, 10, 12; Davis, W. H., 1, 2, 3, 4, 7, 8, 9, 10, 13; Drygalski E.; Dutton, C. E., 1, 2, 3; Ferry, P., 1; Hallock, C.; Hewitt, W.; Hyatt, A.; Johnson, D. W., 3, 11; Keyes, C. R., 13, 59; Lange, A. L., 1; McKee, E. D., 1, 2; Matthes, F. E., 1, 2, 3, 4; Maxson, J. H., 7; Mir Amoros, J.; Moore, R. C., 3, 4, 5, 6, 7; Noble, L. F., 1, 2, 3, 4, 5, 6; Powell, J. W., 2, 5; Robinson, H. H., 2, 3; Salisbury, R. D.
———, Ep-Archean and Ep-Algonkian erosion surfaces: Sharp, R. P., 2
———, lava flows: Keyes, C. R., 91; McKee, E. D., 23; Schenk, E. T., 2
Grand Falls, Coconino Co.: Colton, H. S., 5
Haunted Canyon quad.: Peterson, D. W., 1
Helmet Peak area, Pima dist., Pima Co.: Mayuga, M., 2
Huachuca Mts., east-central, Cochise Co.: Weber, R. H.
Hypotheses: Gilbert, G. K., 9
Ice Cave, Coconino Co.: Stewart, W. O.
Intermont plains: Davis, W. M., 12
Kaibab Plateau: Strahler, A. N., 3, 4, 5, 6, 7
Karst topography, Petrified Forest: Mears, B., Jr., 5
Laccolithic mountain groups: Cross, C. W., 1
Lateral corrasion: Johnson, D. W., 7
Lava dams: Richter, R., 2
Lava flows: Krutch, J. W.
Lees Ferry area, Coconino Co.: Phoenix, D. A., 5
Limestone solution cracks: Colton, H. S., 15
Little Colorado River: Childs, O. E.; Colton, H. S., 14; Cooley, M. E., 7

PHYSIOGRAPHY AND GEOMORPHOLOGY *(Continued)*

Little Colorado Valley: Gregory, H. E., 4
Mazatzal Mts.: Ransome, F. L., 21
Meteorite craters: Magie, W. F.; Spencer, L. J.
Mexican boundary: Emory, W. H., 2, 3
Miami dist., Gila Co.: Ransome, F. L., 17, 25
Mogollon Highlands: Cooley, M. E., 14
Mohave Co., northwestern: Moore, R. T., 3
Montezuma Cave: Lange, A. L., 3
Montezuma's Well: Blake, W. P., 46; Lange, A. L., 3
Mowry Wash, Santa Cruz Co.: Brown, W. H., 1
Natural bridges: Gardiner, F., Jr.; Janssen, R. E.; Miller, J.
Navajo Co.: Cooley, M. E., 1
Navajo-Hopi Indian Reservations: Gregory, H. E., 1, 3, 4, 5, 7, 8, 10; Kiersch, G. A., 8, 9, 14
Oak Creek Canyon region, Coconino Co.: Mears, B., Jr., 2
Oatman dist., Mohave Co.: Ransome, F. L., 29
Painted Desert: Walton, M. S., Jr.
Papago Country: Bryan, K., 1, 4, 10
Papagueria: Tolman, C. F., Jr., 11
Parks and prairies near Flagstaff: Feth, J. H., 9
Peacock Range: Davis, W. M., 17
Pebble covered plains: Blake, W. P., 38
Pedestal rocks: Bryan, K., 9, 11, 15; Leonard, R. J., 1
Pediments: Balchin, W. G. V.; Bryan, K., 2; Davis, W. M., 19; Mammerickx, J.; Morris, F. K.
———, House Rock vicinity: Miller, V. C.
———, Sacaton Mts., Pinal Co.: Howard, A. D., 1, 2
———, San Pedro Valley: Tuan, Yi-Fu, 1
———, southeastern Arizona: Tuan, Yi-fu, 2
Petrified Forest National Monument: Malott, C. A.; Walton, M. S., Jr.
Piping and earth cracks: Heindl, L. A., 10
Plateau Province: Reiche, P., 5
Plateau region: Reagan, A. B., 12; Robinson, H. H., 1
Pleistocene lakes: Meinzer, O. E., 3
Post-glacial history: Smiley, T. L., 4
Precambrian surface: Moss, R. G.
Processes: Keyes, C. R., 5
Processes at high altitudes: Bryan, K., 18
Provinces: Hoover, J. W.
Quaternary valleys: Hack, J. T., 1
Ray area: Ransome, F. L., 17, 25, 28
Red Mtn.: Atwood, W. W., 2
Regolith of the desert: Sykes, Godfrey, G., 9
Rio de Flag: Brady, L. F., 13
Roaring Springs cave: Seagle, E. F.
Rock fans: Johnson, D. W., 9
Rock floors: Davis, W. M., 13; Keyes, C. R., 2
Rock rivers: Bailey, V.
Rock tanks and charcos: Bryan, K., 3
Rock-cut surfaces: Johnson, D. W., 8, 10
Salt River Valley: Lee, W. T., 2
San Francisco Mtn: Atwood, W. W., 1
San Francisco Plateau: Cooley, M. E., 7
San Francisco volcanic field, Coconino Co.: Breed, W. J., 3; Robinson, H. H., 4
San Pedro Valley: Bryan, K., 13; Smith, D. G.; Tuan, Yi-fu, 3

PHYSIOGRAPHY AND GEOMORPHOLOGY *(Continued)*
Santa Catalina Mts.: Davis, W. M., 18
———, bajadas: Tolman, C. F., Jr., 12
Santa Cruz River: Sykes, Godfrey G., 10
Sheet-flood erosion: McGee, W. J., 2
Sheetfloods and streamfloods: Davis, W. M., 21
Shinumo quad., Grand Canyon dist.: Noble, L. F., 1, 3
Sierrita Mts., Pima Co.: Ransome, F. L., 27
Slate Mtn., Flagstaff: Mintz, Y.
Slope angles: Melton, M. A., 2
Soil erosion, Keams Canyon Wash: Berry, W. H.
Stream aggradation: Reagan, A. B., 13; Wertz, J. B., 1, 2
Stream erosion: Maxson, J. H., 3; Wertz, J. B., 1, 2
Stream patterns, Colorado Plateau: Dury, G. H.; Stokes, W. L., 11
Subdivisions of Arizona: Heindl, L. A., 20
Superior area: Ransome, F. L., 20
Tombstone area: Ransome, F. L., 26
Tonto Natural Bridge: Miller, J.
Tuba oasis: Gregory, H. E., 6
Tucson Mts., Pima Co.: Brown, W. H., 3
Tucson quad., Pima Co.: Moore, B. N., 3
Turquoise area: Ransome, F. L., 16, 18
Uinkaret Plateau: Koons, E. D., 2
Uinkaret volcanic field: Koons, E. D., 1
Volcanic rocks, northeastern Arizona: Cooley, M. E., 13
Volcanoes, Navajo-Hopi Indian Country: Williams, H., 1, 2
Walnut Canyon, Coconino Co.: Colton, H. S., 8
West Kaibab fault zone: Strahler, A. N., 7
Wind erosion: Melton, F. A., 2, 3
———, Lees Ferry: Bryan, K., 8
Yuma area: Van Lopik, J. R.
Yuma Desert: Wilson, E. D., 12
Zion Park region: Gregory, H. E., 15

PIPELINE MAP *See* MAPS, *Pipeline*

PLEISTOCENE *See* PALEONTOLOGY, Pleistocene; STRATIGRAPHY, Pleistocene

PLIOCENE *See* PALEONTOLOGY, Pliocene; STRATIGRAPHY, Pliocene

PRECAMBRIAN *See* PALEONTOLOGY, Precambrian; STRATIGRAPHY, Precambrian; STRUCTURAL GEOLOGY, Precambrian

PRODUCTION *See* HISTORY, Production Statistics

QUATERNARY *See* PALEONTOLOGY, Quaternary; STRATIGRAPHY, Quaternary

QUICKSILVER *See* METALLIFEROUS MINERAL COMMODITIES, *Mercury*

RARE EARTHS *See* MINOR ELEMENTS

RED BEDS *See* SEDIMENTATION; STRATIGRAPHY

RIPPLE MARKS *See* SEDIMENTATION, Ripple Marks

ROAD LOGS
Black Canyon Highway: Breed, W. J., 1
Desert watering places, Papago country: Bryan, K., 6, 10
Gallup to Globe: Foster, R. W.
Globe to Flagstaff: Peirce, H. W., 4
Globe to Superior: Peirce, H. W., 3
Southern Arizona: Arizona Geological Society, 1, 2

SEDIMENTATION
Alluvial fans: Blissenbach, E., 1, 2, 4
Cenozoic, Colorado Plateau: Cooley, M. E., 14
Chinle formation: Stewart, J. H., 6
Chuska sandstone: Wright, H. E., Jr., 4
Coconino sandstone: Decker, B. L.; Reiche, P., 4
Colorado Plateau: Poole, F. G., 1, 2, 3; Stokes, W. L., 12
Colorado River Delta: Bateman, A. M., 2; Fox, C. K.; Lougee, R. J.; McKee, E. D., 11, 17; Sykes, Godfrey G., 1, 2, 3, 4, 5, 6, 7, 8
Colorado River system: Cooley, M. E. 12
———, Grand Canyon: McKee, E. D., 16
Cross-lamination: McKee, E. D., 6, 7, 17, 20, 35; Reiche, P., 4
Current crescents: Peabody, F. E., 1
Cycles in carbonate rocks: McKee, E. D., 54
Detrital slopes: Blake, W. P., 47
Eolian varving: Stokes, W. L., 12
Fluvial sandstones: Stokes, W. L., 2
Hermit shale: White, C. D., 7
Hopi Buttes: Hack, J. T., 3
In relation to faulting: Longwell, C. R., 7
Lake Mead: Gould, H. R., 1, 2, 3; Nichols, H. R.; Sherman, I.; Smith, W. O.; Vetter, C. P.
———, surficial sediments: Rolfe, B. N.
Marine, southern Arizona: Pye, W. D., 4
Mesozoic, Colorado Plateau: Cooley, M. E., 14; Poole, F. G., 3
Mississippian: Thomas, G. C., 1
———, southeastern Arizona: Thomas, G. C., 3
Moenkopi formation, current crescents: Peabody, F. E., 1
Paleozoic, late, Colorado Plateau: Poole, F. G., 3
Papago Country: Bryan, K., 4
Pennsylvanian: Havenor, K. C., 1
Permian: Baker, A. A., 1
Primary lineation in fluvial sandstones: Stokes, W. L., 2
Regolith of the desert: Sykes, Godfrey G., 9
Ripple marks: McKee, E. D., 37
Sabino Canyon area, Pima Co.: Miller, J. B.
Safford Basin, Graham Co.: Davidson, E. S., 3
Safford Valley, Graham Co.: Harbour, J.
San Carlos reservoir: Thorp, E. M.
Shinarump conglomerate, northeastern Arizona: McKee, E. D., 46; Stokes, W. L., 7
Small reservoirs, Little Colorado River Basin: Hains, C. F.
Triassic and associated formations, Colorado Plateau: Poole, F. G., 1, 2
Walnut Gulch area, Cochise Co.: Fletcher, J. E.
Willcox Playa, Cochise Co.: Pine, G. L.

SEISMOLOGY *See* GEOPHYSICS AND GEOPHYSICAL PROSPECTING

SILVER *See* METALLIFEROUS MINERAL COMMODITIES, *Silver;* MINES AND MINING DISTRICTS

SOIL SURVEYS
Analyses, portions of Arizona: Loew, O., 2
Benson area: Carpenter, E. J.
Casa Grande area: Poulson, E. N., 2
Gila Valley area, upper: Poulson, E. N., 1
Solomonsville area: Lapham, M. H.
Yuma area: Holmes, J. G.

STRATIGRAPHY

Abrigo limestone: Wiese, J. H.
———, northern Galiuro Mts.: Krieger, M. H., 3, 4
Ajo area, Pima Co.: Dehlinger, M. E.; Gilluly, J., 1, 2, 3, 4, 5, 6, 11, 13
Algonkian strata: Darton, N. H., 19, 20
———, Grand Canyon: Hinds, N. E. A., 1, 12, 14
Amole arkose, Tucson Mts.: Greenstein, G.
Amole dist., Pima Co.: Kinnison, J. E., 1
Amole Mts., Pima Co.: Jenkins, O. P., 2
Andrus Canyon, Mohave Co., upper Paleozoic and lower Mesozoic: Fisher, W. L., 1
Antler mine, Mohave Co.: Romslo, T. M., 2; Wilson, E. D., 51
Apache Co.: Akers, J. P., 8, 12; Cooley, M. E., 11
Apache group: Keyes, C. R., 44, 93
———, Dripping Spring dist.: Neurburg, G. J.
———, Gila and Pinal Cos.: Mead, W. E.
———, southeastern Arizona: Bruhn, H. F.
Apache iron deposits, Navajo Co.: Stewart, L. A., 3
Agua Fria River area: St. Clair, C. S., 2
Agua Verde Hills, Pima Co.: Kerns, J. R.
Aquarius Range, Mohave Co.: Hobbs, S. W.
Aravaipa dist., Graham Co.: Denton, T. C., 3; Ross, C. P., 4; Wilson, E. D., 48, 60
Archean rocks, Grand Canyon: Campbell, I., 1, 2; Maxson, J. H., 4, 5
Archimedian limestones: Keyes, C. R., 73
Arid basins: Lance, J. F., 8
Arizona: Becker, G. F.; Blake, W. P., 35, 39; Blandy, J. F., 3; Butler, B. S., 5, 6, 7; Comstock, T. B., 3; Darton, N. H., 4, 14, 16, 18; Gilbert, G. K., 1, 2, 4, 5; Keyes, C. R., 18, 97; Lance, J. F., 11; Loew, O., 1, 2, 3; Pye, W. D., 1; Stoyanow, A. A., 2; Willis, B., 1; Wilson, E. D., 87, 90
———, central: Ransome, F. L., 1, 24
———, east central: Wengard, S. A., 3
———, northeastern: Bradish, B. B.; Hager, D., 3; Moore, R. C., 1
———, northern: Darton, N. H., 2, 3, 7; Emory, W. H., 1; Gilbert, G. K., 7; Gregory, H. E., 11, 12; Howell, E. E.; McKee, E. D., 44; Marcou, J., 3; Peale, A. C.
———, northwestern: Longwell, C. R., 3; Reeside, J. B., Jr., 1; Snyder, C. T.
———, southeastern: Dumble, E. T., 1; Pye, W. D., 2
———, southern: Cox, E. T.; McKee, E. D., 42; Pye, W. D., 4; Tolman, C. F., Jr., 2
———, western: Lee, W. T., 5
Arizona Revolution: Hinds, N. E. A., 11
Artillery Mts. region, Mohave Co.: Lasky, S. G., 1, 2, 3; Sanford, R. S.; Wilson, E. D., 62
Asbestos deposits: Sampson, E., 1; Shride, A. F., 1; Stewart, L. A., 2, 4, 5
Aubrey Cliffs, Toroweap formation: Belden, W. A.
Aubrey Valley, northwestern Arizona: Blissenbach, E., 3
Aubreyan limestones: Keyes, C. R., 32, 84
Baboquivari Mts., Pima Co.: Clark, J. L.
Bagdad area, Yavapai Co.: Anderson, C. A., 4, 7, 9; Butler, B. S., 12
Banner dist., Gila Co.: Ross, C. P., 5; Wilson, E. D., 68
Barite deposits: Stewart, L. A., 6
Basin and Range Province, Tertiary: Gray, J., 1
Basin Ranges, Precambrian: Wilson, E. D., 24
Beacon Hill-Colossal Cave area, Pima Co.: Weidner, M. I.
Bear Creek Canyon: Maise, L. R.
Belmont-Queen Creek dist., Pinal Co.: Harshman, E. N.

STRATIGRAPHY *(Continued)*
Bidahochi formation: Haff, J. C., 1; Lance, J. F., 3; Repenning, C. A., 2
Bill Williams River valley: Wolcott, H. N., 5
Bisbee area, Cochise Co.: Bonillas, Y. S.; De Wilde, E. J., 1, 2; Hogue, W. G., 2; Little, J. M.; Mitchell, G. J., 1, 2, 3; Mulchay, R. B.; Notman, A., 1; Ransome, F. L., 3, 4, 5, 7, 8, 9, 17, 26; Rove, O. N., 1, 2; Tenney, J. B., 1, 2, 8; Tovote, W. L., 4; Trischka, C., 2, 4, 5, 6, 7
———, Cretaceous: Bain, G. W., 1
———, Naco limestone: Keyes, C. R., 103
Black Canyon schist belt, Bradshaw Mts., Precambrian: Jerome, S. E., 1
Black Mesa, Navajo and Apache Cos.: Akers, J. P., 2
———, Cow Springs sandstone: Harshbarger, J. W., 4
———, Cretaceous: Merrin, S.; Page, H. G., 1; Reagan, A. B., 18, 26; Reeside, J. B., Jr., 3; Repenning, C. A., 3; Williams, G. A.
———, Devonian: Turner, D. S., 1
———, Jurassic: Harshbarger, J. W., 1
———, Moenkopi and Chinle formations: Akers, J. P., 1
———, Paleozoic: Elston, W. E.
———, Permian: Peirce, H. W., 2
———, stratigraphic names: Turner, D. S., 2
Black Mesa, Yavapai Co.: Hughes, P. W., 1
Black Mts., Mohave Co.: Schrader, F. C., 1, 3, 11, 12
Black Prince limestone: Nations, J. D., 1, 2
Bolsa formation, northern Galiuro Mts.: Krieger, M. H., 3, 4
———, Papago Indian Reservation: Heindl, L. A., 32
Bonita Creek area, Graham Co.: Heindl, L. A., 17, 22
Boriana dist., Mohave Co.: Hobbs, S. W.
Boulder Canyon, Mohave Co.: U.S. Bureau of Reclamation, 2
Boulder (Hoover) Dam site: Berkey, C. P., 2
Boulder Reservoir floor: Longwell, C. R., 6
Boundary Butte area, Apache Co.: Sheffer, B. D.
Bradshaw Mts. area: Jaggar, T. A., Jr.; Jerome, S. E., 1; Lindgren, W., 16
Bridge Canyon dam site: Mielenz, R. C.
Bright Angel quad.: Maxson, J. H., 8, 11
Buckskin Mts., Yuma Co.: Blanchard, R. C.
California mine area, Pima Co.: Gillingham, T. E.
Cambrian System: Keyes, C. R., 33, 36; Stoyanow, A. A., 3; Wheeler, H. E., 1
———, Abrigo formation: Krieger, M. H., 3, 4; Wiese, J. H.
———, basal contacts: Hinds, N. E. A., 5
———, basal sandstone: Krieger, M. H., 2
———, Bolsa formation: Heindl, L. A., 32; Krieger, M. H., 3, 4
———, correlations: Walcott, C. D., 5, 9, 12
———, Dragoon quartzite: Keyes, C. R., 83, 96
———, El Paso formation: Dickinson, R. G., 2
———, Four Corners area: Cooper, J. C., 1, 2
———, Grand Canyon: Keyes, C. R., 99; McKee, E. D., 28; Schenk, E. T., 3; Schuchert, C., 2; Wheeler, R. B.
———, lower limit: Longwell, C. R., 14
———, southeastern Arizona: Dickinson, R. G., 1; Stoyanow, A. A., 18
———, Yampai Cliffs, Mohave Co.: Wood, W. H., 1, 2
Cambrian-Algonkian unconformity: Hinds, N. E. A., 4
Cameron area, Coconino Co.: Akers, J. P., 6, 11; Chenoweth, W. L., 4; Gregg, C. C.; Hinckley, D. N., 1
Campo Bonito area, Pinal Co.: Ludden, R. W.
Canada del Oro, Santa Catalina Mts.: Wallace, R. M., 1
Cane Wash, Monument Valley: Hunt, C. B., 1

STRATIGRAPHY *(Continued)*
Canelo Hills, Santa Cruz Co.: Feth, J. H., 1, 2
Canyon Country: McKee, E. D., 33
Canyon de Chelly, cross-bedded sandstone: McKee, E. D., 6
Carboniferous strata: Keyes, C. R., 45, 98
———, correlation: Williams, H. S., 1
———, Galiuro Mts.: Webber, B. N., 1
———, Grand Canyon: Schuchert, C., 1
Carmel formation: Wright, J. C.
Carrizo area, Apache Co.: Chenoweth, W. L., 1
Carrizo drainage basin, Apache Co.: Smith, H. L.
Carrizo Mts., Apache Co.: Jones, D. J.; Strobell, J. D., Jr., 1, 2, 3
Carrizo Valley, Apache Co.: Underwood, J. R.
Casa Grande dist., Pinal Co.: Tenney, J. B., 9
Castle Dome (Miami), Gila Co.: Peterson, N. P., 8, 10, 11, 12
Castle Dome dist., Yuma Co.: Wilson, E. D., 70
Cenozoic strata, Bidahochi formation: Haff, J. C., 1; Lance, J. F., 3; Repenning, C. A., 2
Cenozoic Systems: Heindl, L. A., 29
———, Cane Wash, Monument Valley: Hunt, C. B., 1
———, Chetoh Country: Howell, P. W., 2
———, Colorado Plateau: Hunt, C. B., 3
———, Dry Mtn. area, Graham Co.: Clay, D. W.
———, Escudilla Mtn. area, Apache Co.: Wrucke, C. T.
———, fossil locations: Lance, J. F., 10
———, Gila conglomerate: Heindl, L. A., 28
———, Gila River drainage basin, alluvial deposits: Heindl, L. A., 7, 11, 13
———, Hindu Canyon, Mohave Co.: Gray, R. S., 1, 2
———, Jerome region, Yavapai Co.: Lehner, R. E., 2
———, Lone Pine reservoir, Navajo Co.: Kiersch, G. A., 7
———, Mamoth area, Pinal Co.: Heindl, L. A., 12, 24, 30
———, Navajo Country: Reagan, A. B., 22, 27
———, Navajo and Apache Cos.: Cooley, M. E., 11
———, Oak Creek Canyon area: Mears, B., Jr., 1
———, Papago Indian Reservation: Heindl, L. A., 19
———, Prescott quad., Yavapai Co.: Krieger, M. H., 1
———, Safford Basin, Graham Co.: Davidson, E. S., 2; Marlowe, J. I., 3
———, Safford Valley: Van Horn, W. L., 1, 2
———, Santa Catalina Mts., southern foothills: Voelger, K.
———, Sycamore Canyon, Yavapai and Coconino Cos.: Price, W. E., Jr., 3
———, Tonto Basin, Gila Co.: Lance, J. F., 12
———, Upper Verde Valley: Mahard, R. H.
———, Vernon area, Apache Co.: Drake, R. J., 2
———, Walnut Grove Basin, Yavapai Co.: Hook, D. L.; Plafker, L.
———, Wellton-Mohawk area, Yuma Co.: Metzger, D. G., 2
———, Yavapai Co., south-central: St. Clair, C. S., 1
Cerbat Range, Mohave Co.: Schrader, F. C., 1, 3, 11, 12
Cerro Colorado dist., Pima Co.: Jones, R. D.
Cherry Creek dist., Yavapai Co.: Reid, J. A., 1, 2
Chetoh Country, Cenozoic: Howell, P. W., 2
Chinle formation: Caster, R. E.; Evensen, C. G., 3; Isachsen, Y. W., 2; Keyes, C. R., 52, 89, 100; Stewart, J. H., 6; Vander Hoff, V. L.; Wilson, R. L., 2
———, Black Mesa: Akers, J. P., 1
———, Cameron and Leupp quads., Coconino Co.: Akers, J. P., 6
———, Cameron and St. Johns area: Gregg, C. C.
———, Colorado Plateau: Cadigan, R. A., 2; Stewart, J. H., 4

STRATIGRAPHY *(Continued)*
Chinle formation, Little Colorado River area: Cooley, M. E., 1
———, Mesa Redondo member: Cooley, M. E., 2
———, Paria Plateau: Akers, J. P., 4
———, St. Johns area: Robertson, R. S.
Chinle-Shinarump beds, Leupp-Holbrook area: Smith, R. S., Jr.
Chino Valley area, Yavapai Co.: Hughes, P. W., 2, 3
Chiricahua Mts., Cochise Co.: Mayo, E. B., 6; Raydon, G. T.; Sabins, F. F., Jr., 1, 2; Zirkle, R. G.
———, welded tuffs: Enlows, H. E., 4
Chiu Chuischu area, Papago Indian Reservation: Yost, C. B., Jr.
Chloride quad., Mohave Co.: Thomas, B. E., 4
Christmas mine, Gila Co.: Eastlick, J. T.; Peterson, N. P., 5, 17
Christmas quad., Gila Co.: Willden, C. R., 1, 2
Chuska Mts. area: Harshbarger, J. W., 6; Lowell, J. D., 1; Wright, H. E., Jr., 1, 3
Chuska sandstone: Wright, H. E., Jr., 4
Cienega Amarilla area, Apache Co.: O'Brien, B. R.
Cienega Gap, Pima Co., Tertiary: Brennan, D. J., 2, 3
Cienega Valley, Pima Co.: Brennan, D. J., 1
Clarkdale quad., Yavapai Co.: Lehner, R. E., 1
Cleveland mine area, Gila Co.: Simons, W. W., 1
Clifton-Morenci dist., Greenlee Co.: Butler, B. S., 11; Lindgren, W., 2, 7; Loel, W.; Ransome, F. L., 10; Reber, L. E., Jr., 1; Tovote, W. L., 3
Coal fields: Andrews, D. A., 2
Cobabi dist., Pima Co.: MacKallor, J. A.
Cochise Co.: Gilluly, J., 7, 8; LeMone, D. V.
Cochise dist., Cochise Co.: Franke, R. P.
Cochise Head quad., Cochise Co.: Sabins, F. F., Jr., 3
Coconino plateau: Strahler, A. N., 3, 4, 5
Coconino sandstone: McKee, E. D., 4, 26; Reiche, P., 4
Coconino Plateau: Butler, B. S., 3; Fischer, R. P., 1; Gilbert, G. K., 6; Gregory, H. E., 13; Hunt, C. B., 3; Kerr, P. F., 5; Longwell, C. R., 2; Moore, R. C., 2, 5, 6
———, Chinle formation: Cadigan, R. A., 2; Stewart, J. H., 4
———, Dakota group: Craig, L. C., 3; Young, R. G., 1
———, facies changes: McKee, E. D., 36
———, grain-size distribution: Cadigan, R. A., 1
———, Jurassic: Rosenzweig, A.; Smith, C. T.
———, late Paleozoic-Mesozoic: Poole, F. G., 3
———, Moenkopi formation: Stewart, J. H., 3
———, Morrison and related formations: Craig, L. C., 1, 2; Stokes, W. L., 1
———, Permian: Baars, D. L., 1, 2; Baker, A. A., 6
———, Precambrian: Case, J. E.
———, Pre-Moenkopi unconformity: Dake, C. L.
———, sandstone bodies: Stokes, W. L., 8
———, southwest margin: Gutschick, R. C., 4
———, Triassic: Poole, F. G., 1, 2; Rosenzweig, A.; Stewart, J. H., 2
———, uranium deposits: Finch, W. I., 1, 3; Payne, A. L.; Shawe, D. R.; Stokes, W. L., 5; Wright, R. J., 3
Colorado River area: Jones, E. L., Jr., 3; La Rue, E. C., 1, 2; Lee, W. T., 3, 4; Longwell, C. R., 10; Newberry, J. S.; Powell, J. W., 1, 3, 4, 5, 8, 9; Schott, A., 1; Toula, F.
Colorado River Basin: Harker, A.; Maddock, T.; Pack, F. J.; Willis, B., 2
Colorado River Delta: McKee, E. D., 11, 17
Comanche strata: Keyes, C. R., 49
Commonwealth mine, Pearce, Cochise Co.: Smith, L. A.

STRATIGRAPHY *(Continued)*
Concha limestone: Bryant, D. L., 7; Keefer, W. R.
Congress mine, Yavapai Co.: Staunton, W. F., 3
Copper Basin dist., Yavapai Co.: Johnston, W. P., 1, 2
Copper Butte mine, Pinal Co.: Phelps, H. D.; Wilson, E. D., 44
Copper Cities copper deposits, Globe-Miami dist., Gila Co.: Peterson, N. P., 14
Copper Creek dist., Pinal Co.: Butler, B. S., 15; Kuhn, T. H., 1, 2, 3
Copper deposits: Butler, B. S., 14; Tenney, J. B., 10
Copper Hill area, Winkelman: Evenson, J.
Copper mine-Preston Mesa area, Coconino Co.: McClymonds, N. E., 6
Correlation, methods: Keyes, C. R., 24
Correlation, named geologic units: Wilmarth, M. G., 1
Courtland-Gleeson region, Cochise Co.: Wilson, E. D., 4
Cove Mesa, Apache Co., Salt Wash sandstone: Jones, D. J.
Cow Springs sandstone, Black Mesa: Harshbarger, J. W., 4
Coyote Mts., Pima Co.: Kurtz, W. L.; Wargo, J. G., 3
Coyote-Quinlan Mts., Pima Co.: Wargo, J. G., 1
Cretaceous System: Bissell, H. J., 1; Cobban, W. A.; Fergusson, W. B.; Keyes, C. R., 51; Kottlowski, F. E., 3; Lee, W. T., 6; Reagan, A. B., 18, 19, 20; Reeside, J. B., Jr., 4
——— Bisbee area: Bain, G. W., 1
———, Black Mesa, Navajo and Apache Cos.: Merrin, S.; Page, H. G., 1; Reagan, A. B., 18, 26; Reeside, J. B., Jr., 3; Repenning, C. A., 3; Williams, G. A.
———, Carrizo drainage basin, Apache Co.: Smith, H. L.
———, Empire Mts., Pima Co.: Moore, R. A., 1, 2
———, Four Corners area: Read, C. B., 4
———, lower: Stoyanow, A. A., 10, 17; Ward, L. F., 1
———, Mogollon Rim: Miller, H. W., Jr., 2
———, northwestern Arizona: Van de Graaff, F. R.
———, San Juan Basin: Silver, C., 2
———, Tucson Mts.: Bennett, P. J.; Bryant, D. L., 3, 4; Colby, R. E.
———, upper: Gill, J. R.; Pike, W. S., Jr.; Van de Graaff, F. R.
———, Volcanic rocks; Richard, K. E., 3
Cretaceous-Tertiary, Fresnal Canyon, Baboquivari Mts.: Fair, C. L., 3
———, southeastern Arizona: Courtright, J. H.
Cross-stratification, terminology: McKee, E. D., 47
Cunningham Pass dist., Yuma Co.: Tovote, W. L., 11
Cuprite mine area, Pima Co.: Browne, J. F.
Dakota group: Craig, L. C., 3; Young, R. G., 1
Davis Dam area: U.S. Bureau of Reclamation, 3
Deer Creek coal field: Walcott, C. D., 3
DeChelly sandstone: Peirce, H. W., 5, 6
Defiance Monocline, Jurassic: Wright, H. E., Jr., 2
Defiance Uplift, Apache Co.: Hatfield, K. G.
Dendora area, Maricopa Co.: Johnson, P. W., 4
Devonian System: Ethington, R. L., 1; Keyes, C. R., 35, 102; Stoyanow, A. A., 4
———, bioherms: Huddle, J. W., 1
———, Black Mesa Basin: Turner, D. S., 1
———, central Arizona: Huddle, J. W., 4
———, Christmas quad., Gila Co.: Willden, C. R., 1, 2
———, Cochise Co.: LeMone, D. V.
———, correlation: Williams, H. S., 1
———, Four Corners area: Cooper, J. C., 1, 2
———, Island Mesa, Yavapai Co.: Stoyanow, A. A., 14
———, Ouray limestone: Keyes, C. R., 82
———, Pima Co.: LeMone, D. V.

STRATIGRAPHY *(Continued)*
Devonian System, Pinal Creek: Stauffer, C. R., 2
———, Santa Cruz Co.: LeMone, D. V.
———, Santa Rita Mts.: Stauffer, C. R., 1, 3
———, southeastern Arizona: Epis, R. C., 1; Pye, W. D., 3; Reid, R. R.
———, Swisshelm formation: Epis, R. C., 2
———, unconformity: Conrad, R. D.; Keyes, C. R., 22
———, Yampai Cliffs, Mohave Co.: Wood, W. H., 1
Diamond Butte quad., Gila Co.: Gastil, R. G., 4
Diamond Rim area, Gila and Navajo Cos.: Titley, S. R., 2
Doney Park-Black Bill Park area: Feth, J. H., 10
Dos Cabezas area, Cochise Co.: Jones, S. M.; Shields, J. C., Jr.
Dos Cabezas Mts., Cochise Co.: Sabins, F. F., Jr., 1, 2; Sarle, C. J.
Douglas Basin, Cochise Co.: Coates, D. R., 7
Dragoon Mts., Cochise Co.: Cederstrom, D. J., 1, 2; Gilluly, J., 9; Wilson, E. D., 65
Dragoon quad., Cochise Co.: Cooper, J. R., 3, 6
Dragoon quartzite: Keyes, C. R., 83, 96
Dripping Spring Basin: Coates, D. R., 8
Dripping Spring dist., Apache group: Neurberg, G. J.
Dripping Spring quartzite: Granger, H. C., 1, 3; Mead, W. E.
Dry Mtn. area, Graham Co.: Clay, D. W.
East Kaibab monocline: Babenroth, D. L.; Strahler, A. N., 2
Eastern Great Basin, Permo-Pennsylvanian strata: Bissell, H. J., 2
Echo Cliffs region, Glen Canyon group: Callahan, J. T., 1
El Paso formation: Dickinson, R. G., 2; Kirk, E.
El Tiro mine, Silver Bell, Pima Co.: Shoemaker, A. H., 1
Elgin area, Cochise Co.: MacKay, D. K.
Eloy dist., Pinal Co.: Smith, G. E. P., 6
Emerald Isle copper deposit: Thomas, B. E., 3
Empire dist., Pima Co.: Wilson, E. D., 67
Empire Mts., Pima Co.: Alberding, H.; Galbraith, F. W., 4, 5, 7, 11; Moore, R. A., 1, 2; Wilson, R. A.
Empire Peak area, Pima Co.: Mayuga, M. N., 1
Eocene, Ft. Apache region: Reagan, A. B., 10
Ep-Archean interval: Keyes, C. R., 86
Escabrosa limestone: Keyes, C. R., 71
———, Galiuro Mts.: Thomssen, R. W., 1
Escudilla Mtn. area, Apache Co., Cenozoic and Paleozoic: Wrucke, C. T.
Esperanza mine, Pima Co.: Schmitt, H. A., 6
Flagstaff area, Coconino Co.: Akers, J. P., 9
Fluorspar deposits: Wilson, E. D., 63
Fort Apache Indian Reservation: Burchard, E. F., 1; Winters, S. S., 3
Fort Apache limestone: Frazier, R. H.; Gerrard, T. A., 1, 2
Fort Apache region: Reagan, A. B., 2, 8, 9, 10, 14, 28
Fort Defiance quad.: Allen, J. E.
Fort McDowell area, Maricopa Co.: McDonald, H. R., 1, 2
Four Corners area, Cambrian: Cooper, J. C., 2
———, Cretaceous: Read, C. B., 4
———, Devonian: Cooper, J. C., 2
———, Mississippian: Cooper, J. C., 2; Picard, M. D., 4
———, Pennsylvanian: Picard, M. D., 1, 3; Turnbow, D. R.; Wengerd, S. A., 1
———, Permian: Scott, G. L.; Turnbow, D. R.
———, Rico strata: Bailey, J. S.
Fresnal Canyon, Baboquivari Mts., Cretaceous-Tertiary: Fair, C. L., 3
Fresnal Peak area, Baboquivari Mts.: Donald, P. G.

STRATIGRAPHY *(Continued)*
Galiuro Mts.: Blake, W. P., 32
———, Abrigo and Bolsa formations: Krieger, M. H., 3, 4
———, Carboniferous: Webber, B. N., 1
———, Escabrosa limestone: Thomssen, R. W., 1
———, Troy quartzite: Krieger, M. H., 3, 4
Geologic cross-sections, Arizona: Moore, R. T., 5; Wilson, E. D., 91
Geologic names: Wilmarth, M. G., 2; Wilson, D.
Gila Bend area, Maricopa Co.: Johnson, P. W., 4
Gila Bend Indian Reservation: Heindl, L. A., 21, 31
Gila conglomerate: Gilbert, G. K., 4; Heindl, L. A., 3, 16, 28; Knechtel, M. M., 2
Gila River drainage basin, upper: Heindl, L. A., 7, 11, 13
Gila River Indian Reservation; Maricopa and Pinal Cos.: Wilson, E. D., 93
Gila River region: Knechtel, M. M., 3; Lippincott, J. B.; Marcou, J., 4; Ross, C. P., 1, 2, 3
Gila River to St. George, Utah: Marvine, A. R.
Gila Valley: Lee, W. T., 1; Schwennesen, A. T., 2
Glen Canyon area, sandstone: Talmage, J. E.
Glen Canyon Dam site area: Irwin, W. H.; Lasson, G. D.; Phoenix, D. A., 3
Glen Canyon group: Callahan, J. T., 1; Lewis, G. E., 2
Globe area, Gila Co.: Peterson, N. P., 15, 19, 20; Ransome, F. L., 2, 6, 14, 15, 17; Sivyer, L. D.; Tolman, C. F., Jr., 8; Tovote, W. L., 8
Globe-Miami dist., Gila Co.: Peterson, N. P., 9, 10, 11, 16
Glove mine, Santa Cruz Co.: Olson, H. J.
Gold Road area, Oatman dist., Mohave Co.: Tovote, W. L., 1
Grand Canyon: Blandy, J. F., 4; Darton, N. H., 6, 7, 9, 10, 12; Dutton, C. E., 1, 2, 3; Frech, F., 1, 2; Keyes, C. R., 20, 43; Matthes, F. E., 1, 2, 3, 4; Moore, R. C., 3, 4, 7; Noble, L. F., 1, 2, 3, 4, 5, 6; Salisbury, R. D.
———, Algonkian: Hinds, N. E. A., 1, 7, 9, 12, 13, 14
———, Archean: Campbell, I., 1, 2; Maxson, J. H., 2, 5
———, Aubreyan limestones: Keyes, C. R., 32
———, Cambrian: Keyes, C. R., 99; McKee, E. D., 28; Schenk, E. T., 3; Schuchert, C., 2; Wheeler, R. B.
———, Carboniferous: Schuchert, C., 1
———, Coconino sandstone: McKee, E. D., 26
———, Paleozoic: McKee, E. D., 12, 13, 14, 18
———, Permian: Carpenter, F. M.; Keyes, C. R., 17; McKee, E. D., 13; White, C. D., 1, 6, 7, 8
———, Precambrian: Alf, R. M.; Campbell, I., 6, 7; Keyes, C. R., 91, 95, 99; Sharp, R. P., 2; Van Gundy, C. E., 1, 2, 5; Walcott, C. D., 10, 11; White, C. D., 3
———, Precarboniferous: Walcott, C. D., 2
———, Redwall limestone: Keyes, C. R., 92
———, south rim: Metzger, D. G., 5, 6
———, Triassic: McKee, E. D., 7
———, Yaquian series: Keyes, C. R., 94
Grand Canyon formational title: Keyes, C. R., 70
Grand Canyon region: Keyes, C. R., 62; Ohern, D. W.; Powell, J. W., 2, 6
Grand Gulch dist., Mohave Co.: Hill, J. M., 6
Grand Wash Cliffs, Mohave Co.: Longwell, C. R., 1, 4; Schrader, F. C., 1, 3, 11, 12
Great Basin, Pliocene: Axelrod, D. I.
Harquahala Plains area, Maricopa and Yuma Cos.: Metzger, D. G., 3
Harshaw dist., Santa Cruz Co.: Kartchner, W. E.
Haunted Canyon quad.: Peterson, D. W., 1
Headgate Rock, Parker area: Strahorn, A. T.

STRATIGRAPHY *(Continued)*
Helmet Peak area, Pima Co.: Mayuga, M. N., 2; Studebaker, I. G.
Helvetia dist., Pima Co.: Creasey, S. C., 1; Dunham, M. S.; Heyman, A. M.; Johnson, V. H., 1, 2; Michel, F. A., Jr.
Hilltop mine, Cochise Co.: Brittain, R. L.; Papke, K. G.
Hiltano Camp, Empire Mts., Pima Co.: Feiss, J. W.
Hilton Ranch area, Pima Co.: Marvin, T. C.
Hindu Canyon, Mohave Co., Cenozoic: Gray, R. S., 1, 2
Holbrook anticline: Bahr, C. W.
Holbrook area, Navajo Co.: Hager, D., 1, 2; Harrell, M. A.
Holbrook-Leupp area, Chinle-Shinarump beds: Smith, R. S., Jr.
Hopi Buttes: Hack, J. T., 3
———, volcanic field: Reagan, A. B., 11
Hopi Country, Quarternary: Richmond, G. M.
House Rock Spring, NE quad., Coconino Co.: Wells, J. D., 1
House Rock Valley area, Coconino Co.: Wells, J. D., 3
Huachuca Mts., Cochise Co.: Alexis, C. O., 2; Weber, R. H.; Wilson, E. D., 66
Hualapai Indian Reservation: Koons, E. D., 3; Twenter, F. R., 1
Hunts Mesa, Monument Valley: Chester, J. W.
Hurricane Fault region, Mohave Co.: Gardner, L. S., 1, 2; Huntington, E., 1, 2; Lovejoy, E. M. P., 1, 2
Indiana mine area, Pima Co.: Ruff, A. W.
Intermontane valleys: Harshbarger, J. W., 15
Iron King mine, Yavapai Co.: Creasey, S. C., 4, 5; Mills, H. F., 1, 2, 3, 4
Island Mesa, Yavapai Co., Devonian: Stoyanow, A. A., 14
Isopach studies: McKee, E. D., 39
Jackrabbit area, Pinal Co.: Hammer, D. F., 1
Jerome dist., Yavapai Co.: Anderson, C. A., 10; Fearing, J. L., Jr., 2; Lehner, R. E., 2; Lindgren, W., 16, 17; Provot, F. A.; Staunton, W. F., 1
———, Redwall limestone: Wooddell, C. E.
———, Precambrian: Lausen, C., 8; Reber, L. E., Jr., 2, 3
Johnson Camp, Cochise Co.: Cooper, J. R., 1, 2; Heineman, R. E. S., 1
Jurassic System: Hoover, W. B.; Keyes, C. R., 57, 64
———, Black Mesa: Harshbarger, J. W., 1
———, central Navajo Reservation: Harshbarger, J. W., 2
———, Colorado Plateau: Rosenzweig, A.; Smith, C. T.
———, correlations: Averitt, P., 1; Baker, A. A., 3, 4, 7; Schuchert, C., 3
———, Defiance monocline: Wright, H. E., Jr., 2
———, Glen Canyon group: Lewis, G. E., 2
———, Navajo Country: Harshbarger, J. W., 3, 9
———, Navajo sandstone: Brady, L. F., 10, 11, 12
———, northwestern Arizona: Stokes, W. L., 10
———, uranium deposits: Dodd, P. H.
Jurassic-Cretaceous interval, climatic character: Leopold, L. B.
Kaibab formation: Brady, L. F., 27, 33; Fisher, W. L., 3; McKee, E. D., 15; Wagner, O. E., Jr.
———, Marble Platform: Bollin, E. M., 1
———, Sycamore Canyon, Yavapai and Coconino Cos.: Price, W. E., Jr., 4
———, Walnut Canyon: Chronic, H.
Kaibab Plateau: Lunt, H. F.; Strahler, A. N., 3, 4, 5, 6, 7
Kaibeto Plateau: Wanek, A. A.
Kanab Valley, Paleozoic: Walcott, C. D., 1
Katherine dist., Mohave Co.: Lausen, C., 9, 10, 12
Kayenta formation, age: Welles, S. P., 4
Kayenta and Moenave formations, Vermilion Cliffs region: Wilson, R. F., 2
Keystone area, Cochise Co.: Romslo, T. M., 3

STRATIGRAPHY *(Continued)*
Kingman area, Mohave Co., volcanic rocks: Piper, A. M., 2
Kirkland Creek dam site: Eckel, E. B., 3
Klondyke quad., Graham and Pinal Cos.: Simons, F. S., 5
Ko Vaya Hills, Pima Co.: Bryner, L., 1
Kofa Mts., Yuma Co.: Jones, E. L., Jr., 2
Laccolithic Mtn. groups: Cross, C. W., 1
Lake Cochise: Bryan, K., 14
Lake deposits: Feth, J. H., 13
Lake Mead area: Longwell, C. R., 15, 16; Thomas, H. E., 2
Lake Quiburis: Blake, W. P., 33
Lead Mtn. area, Pima Co.: Alexis, C. O., 1
Lees Ferry-Glen Canyon dam area: Phoenix, D. A., 3, 5
Leupp quad., Coconino Co.: Irwin, J. H., 1
———, Moenkopi and Chinle formations: Akers, J. P., 6
Leupp-Holbrook area, Chinle-Shinarump beds: Smith, R. S., Jr.
Lewis shales: Keyes, C. R., 54
Little Colorado River area: Cooley, M. E., 1; Gregory, H. E., 4; Ward, L. F., 5
Little Dragoon Mts., Cochise Co.: Enlows, H. E., 1, 2
Lode gold deposits: Wilson, E. D., 17, 18, 34
Lone Pine reservoir, Navajo Co.: Kiersch, G. A., 7; Reiche, P., 1
Lukachukai dist.: King, J. W., 1, 2; Masters, J. A., 2
Luke area, Maricopa Co.: Stulik, R. S.
Magma mine, Superior, Pinal Co.: Browning, W. C.; Ettlinger, I. A., 2; Michell, W. D.; Webster, R. N.
Mammoth area, Pinal Co.: Creasey, S. C., 3; Peterson, N. P., 1, 2, 3
———, Cenozoic: Heindl, L. A., 12, 24, 30
Manganese deposits: Jones, E. L., Jr., 4
Marble Platform, Kaibab formation: Bollin, E. M., 1
Margaret Wash section, Mogul fault: Jinks, J. E.
Mary G mine area, Pima Co.: Davis, R. E., 1
Mazatzal Mts., Gila and Maricopa Cos.: Faick, J. N.; Ransome, F. L., 21
Mazatzal quartzite: Keyes, C. R., 88; Wilson, E. D., 2, 3, 20
McElmo formation: Heaton, R. L.; Mook, C. C.
McMullen Valley area, Maricopa, Yavapai, and Yuma Cos.: Kam, W., 2
Mercury dists.: Lausen, C., 4
Mesa Redondo member, Chinle formation: Cooley, M. E., 2
Mesa Verde strata: Keyes, C. R., 58
Mesozoic Systems: Ward, L. F., 4
———, Andrus and Parashant Canyons, Mohave Co.: Fisher, W. L., 1
———, Colorado Plateau: Poole, F. G., 3
———, distribution and thickness: Ver Wiebe, W. A., 2
———, Echo Cliffs region: Callahan, J. T., 1
———, Navajo and Carmel formations: Wright, J. C.
———, northeastern Arizona: Heaton, R. L.
———, nomenclature, Navajo Country: Repenning, C. A., 4
Meteor Crater: Longwell, C. R., 5; Shoemaker, E. M., 5
Mexican boundary: Emory, W. H., 2, 3; Hall, J.; Parry, C. C., 1; Schott, A., 2
Miami dist., Gila Co.: Ransome, F. L., 17, 25
Miami-Inspiration mine area: Reed, E. F.; Rubly, G. R.; Tolman, C. F., Jr., 5
Milk Creek, Yavapai Co., Pliocene: Reed, C. A.
Mineral Creek dist., Pinal Co.: Gowing, F. A.
Mineral Hill area, Pima Co.: Eckel, E. B., 2
Mineta Ridge area, Pima and Cochise Cos.: Chew, R. T., 3rd, 1, 2, 5
Mingus Mtn. quad., Yavapai Co.: Creasey, S. C., 2
Miocene: Twenter, F. R., 2

STRATIGRAPHY *(Continued)*
Miocene, Cienega Gap, Pima Co.: Brennan, D. J., 2
———, turkey-track porphyry: Cooper, J. R., 9
———, Wellton, Yuma Co.: Wood, P. A., 1
Mission mine, Pima Co.: Richard, K. E., 2
Mississippian System: Keyes, C. R., 46; Stoyanow, A. A., 16; Thomas, G. C., 1
———, Black Prince limestone: Nations, J. D., 1, 2
———, central Arizona: Huddle, J. W., 4
———, central Cochise Co.: Gilluly, J., 8
———, Four Corners area: Cooper, J. C., 1, 2; Picard, M. D., 4
———, Galiuro Mts.: Thomssen, R. W., 1
———, Jerome area: Wooddell, C. E.
———, northern Arizona: Sando, W. J., 2
———, northwestern Arizona: Langenheim, R. L., Jr., 3
———, Paradise formation: Hernon, R. M., 2
———, Redwall limestone: Bowsher, A. L.; Easton, W. H.; Gutschick, R. C., 1, 2, 3, 4; McKee, E. D., 51, 53, 56; Sando, W. J., 2
———, southeastern Arizona: Armstrong, A. K., 1, 2, 3; Thomas, G. C., 3
———, southern Arizona: Thomas, G. C., 2
Modoc limestone: Keyes, C. R., 39
Moenave formation: Vermilion Cliffs region: Wilson, R. F., 2
Moenkopi formation: Brady, L. F., 8; McKee, E. D., 34, 48, 49; Peabody, F. E., 1
———, Black Mesa: Akers, J. P., 1
———, Cameron and Leupp quads., Coconino Co.: Akers, J. P., 6
———, Colorado Plateau: Stewart, J. H., 3; Wilson, R. F., 1
———, Sycamore Canyon, Yavapai and Coconino Cos.: Price, W. E., Jr., 2
Moenkopi Plateau: Wanek, A. A.
Moenkopi-Shinarump hiatus, Monument Valley: Gray, I. B.
Mogollon Rim, Coconino Co.: Silver, C., 3; Twenter, F. R., 6
———, Cretaceous: Miller, H. W., Jr., 2
———, Pennsylvanian: Kottlowski, F. E., 4
———, Supai formation: Jackson, R. L., 1; McGoon, D. O., Jr.
Mohave Co.: Moore, R. T., 3; Schrader, F. C., 11, 12; Tovote, W. L., 2
Mohawk zinc prospect, Pima Co.: Wilson, E. D., 45
Montana mine area, Empire Mts., Pima Co.: Sopp, G. P.
Montana mine, Ruby, Santa Cruz Co.: Fowler, G. M., 1, 2
Montosa Canyon area, Santa Cruz Co.: Sulik, J. F.
Montosa-Cottonwood Canyon area, Santa Cruz Co.: Anthony, J. W., 2
Monument Valley area, Apache and Navajo Cos.: Baker, A. A., 5; Grundy, W. D., 2; Mitcham, T. W., 1; Wantland, D., 2; Witkind, I. J., 2, 17, 20
———, isopach mapping: Witkind, I. J., 18
———, Moenkopi-Shinarump hiatus: Gray, I. B.
———, Shinarump conglomerate: Witkind, I. J., 1, 3, 8
Morenci-Metcalf dist., Greenlee Co.: Butler, B. S., 1
Morrison formation, Salt Wash sandstone: Mullens, T. E.
Morrison and related formations: Craig, L. C., 1, 2; Stokes, W. L., 1
Mountain Maid ore body, Bisbee, Cochise Co.: Peng, Chi-jui.
Mountain Queen area, Swisshelm Mts., Cochise Co.: Loring, W. B.
Mowry mine, Santa Cruz Co.: Prout, J. W.; Smith, G. E.
Muav limestone, Yampai Cliffs, Mohave Co.: Wood, W. H., 2
Mustang Mts., Santa Cruz Co.: Bryant, D. L., 1
Naco limestone: Keyes, C. R., 103; Zirkle, R. G.
Nankoweap group, Grand Canyon: Van Gundy, C. E., 2, 5
Navajo Co., Cenozoic: Cooley, M. E., 11
Navajo Country: Harshbarger, J. W., 5; Reagan, A. B., 21
———, Cenozoic: Reagan, A. B., 22, 27

STRATIGRAPHY *(Continued)*
Navajo Country, Jurassic: Harshbarger, J. W., 2, 3, 9
———, stratigraphic nomenclature: Repenning, C. A., 4
———, Tertiary: Repenning, C. A., 5
Navajo sandstone: Brady, L. F., 10, 11, 12; Keyes, C. R., 56; McClymonds, N. E., 6; Wright, J. C.
Navajo-Hopi Indian Reservations: Gregory, H. E., 1, 3, 4, 5, 7, 8, 10; Kiersch, G. A., 8, 9, 14; Mayo, E. B., 1
Nokai Mesa: Grundy, W. D., 1
Nomenclature chart, northern Arizona: Bradish, B. B.
North Toh-Atin field, Apache Co.: Vaughan, R. H.
Oak Creek Canyon area, Cenozoic: Mears, B., Jr., 1
———, Paleozoic: McKee, E. D., 27
Oatman dist., Mohave Co.: Lausen, C., 9, 10, 12; Ransome, F. L., 29
Old Dominion mine, Globe, Gila Co.: Beckett, P. G.; Lausen, C., 1; Shoemaker, A. H., 2
Old Hat dist., Pima Co.: Peterson, N. P., 4
One-Eleven (111) Ranch area, Graham Co.: Seff, P., 1, 2
Oracle vicinity, Pinal Co.: Heindl, L. A., 8, 9
Ordovician System: Dickinson, R. G., 1
———, El Paso limestone: Kirk, E.
Ouray limestone: Keyes, C. R., 82
Owl Head dist., Pinal Co.: Barter, C. F.
Painted Desert: Walton, M. S., Jr.; Wanek, A. A.
Paleontological stratigraphy: Stoyanow, A. A., 11
Paleozoic Systems: Epis, R. C., 3; Heaton, R. L.; Huddle, J. W., 3; Kottlowski, F. E., 3; McKee, E. D., 24, 45; McNair, A. H., 1; Ransome, F. L., 11, 22, 24; Stoyanow, A. A., 7, 15; Wilson, E. D., 21
———, Andrus and Parashant Canyons, Mohave Co.: Fisher, W. L., 1
———, Black Mesa region: Elston, W. E.
———, central Cochise Co.: Gilluly, J., 8
———, Colorado Plateau: Poole, F. G., 3
———, distribution and thickness: Ver Wiebe, W. A., 1
———, Escudilla Mtn., area, Apache Co.: Wrucke, C. T.
———, Grand Canyon: McKee, E. D., 12, 13, 14, 18
———, Kanab Valley: Walcott, C. D., 1
———, Papago Indian Reservation: McClymonds, N. E., 4
———, seaways: Blake, W. P., 29; McKee, E. D., 22, 30
———, Tucson Mts.: Bryant, D. L., 3
———, Waterman Mts., Pima Co.: McClymonds, N. E., 3
Pantano formation: Brennan, D. J., 2
Pantano Hill area, Pima Co.: Sears, D., 2nd
Papago Country: Bryan, K., 1, 4, 10
Papago Indian Reservation: Heindl, L. A., 19, 32; McClymonds, N. E., 4
Papagueria: Tolman, C. F., Jr., 11
Paradise formation: Hernon, R. M., 2
Paradise Valley, Maricopa Co.: McDonald, H. R., 3; Meinzer, O. E., 2
Paradox Basin, salt anticlines: Jones, R. W., 1
———, fold and fault belt: Four Corners Geological Society
Paradox Member, Four Corners region: Picard, M. D., 3
Parashant Canyon, Mohave Co.: Fisher, W. L., 1
Paria Plateau: Akers, J. P., 4; Lawson, A. C.
Patagonia area, Santa Cruz Co.: Feth, J. H., 12
Patagonia Mts., Santa Cruz Co.: Baker, R. C.; Schrader, F. C., 4, 7, 8, 14
Paymaster Mine, Pima Co.: Nye, T. S.
Payson dist., Gila Co.: Lausen, C., 2

STRATIGRAPHY *(Continued)*
Pedregosa Mts., Cochise Co.: Epis, R. C., 4
Peloncillo Mts., Cochise Co.: Gillerman, E.; Quaide, W. L.
Peña Blanca Canyon, Santa Cruz Co.: Nelson, F. J.
Pennsylvanian System: Brill, K. G., Jr., 1, 2; Fisher, W. L., 2; Havenor, K. C. 1, 3; Keyes, C. R., 76; Kottlowski, F. E., 1, 2; Wanless, H. R., 1, 2
———, Black Prince limestone: Nations, J. D., 1, 2
——— central Cochise Co.: Gilluly, J., 8
———, eastern Great Basin: Bissell, H. J., 2
———, Four Corners region: Picard, M. D., 1, 3; Turnbow, D. R.; Wengerd, S. A., 1
———, Mogollon Rim area: Kottlowski, F. E., 4
———, northwestern Arizona: Bissell, H. J., 3
———, paleogeography: Havenor, K. C., 2
Pennsylvanian-Permian facies: Jackson, R. L., 3
Permian System: Brill, K. G., Jr., 1, 2; Bryant, D. L., 5; Darton, N. H., 17; Fisher, W. L., 2; Keyes, C. R., 37; Laudermilk, J. D., 3; McKee, E. D., 8, 19; Read, C. B., 3, 5, 6
———, Aubrey Cliffs, Mohave Co.: Belden, W. A.
———, Black Mesa, Yavapai Co.: Hughes, P. W., 1
———, Black Mesa Basin, Apache and Navajo Cos.: Peirce, H. W., 2
———, central Cochise Co.: Gilluly, J., 8
———, Chino Valley, Yavapai Co.: Hughes, P. W., 2, 3
———, Coconino sandstone: McKee, E. D., 4; Reiche, P., 4
———, Colorado Plateau: Baars, D. L., 1, 2; Baker, A. A., 6
———, Concha limestone: Bryant, D. L., 7; Keefer, W. R.
———, correlations: Baker, A. A., 1, 2; Bass, N. W.
———, DeChelly sandstone: Peirce, H. W., 5, 6
———, eastern Arizona: Winters, S. S., 1, 4
———, eastern Great Basin: Bissell, H. J., 2
———, Fort Apache Indian Reservation: Winters, S. S., 3
———, Fort Apache limestone: Frazier, R. H.; Gerrard, T. A., 1, 2
———, Four Corners area: Scott, G. L.; Turnbow, D. R.
———, Grand Canyon: Carpenter, F. M.; Keyes, C. R., 17; McKee, E. D., 13
———, Kaibab limestone: Brady, L. F., 27, 33; Fisher, W. L., 3; McKee, E. D., 15; Wagner, O. E., Jr.
———, Kanab Valley: Walcott, C. D., 1
———, Lone Pine reservoir, Navajo Co.: Kiersch, G. A., 7
———, Marble Platform: Bollin, E. M., 1
———, marker zones: Bryant, D. L., 6
———, northwestern Arizona: Bissell, H. J., 3
———, Rainvalley formation: Bryant, D. L., 7; Keefer, W. R.
———, San Juan Basin: Read, C. B., 2
———, Sycamore Canyon, Coconino and Yavapai Cos.: Price, W. E., Jr., 4
———, Walnut Canyon, Coconino Co.: Chronic, H.
Permo-Triassic, northwestern Arizona: Shimer, H. W., 2
Petrified Forest: Walton, M. S., Jr.; Ward, L. F., 2, 3
Phoenix area, Maricopa Co.: Davis, A. P., 1
Phoenix Mts., Maricopa Co.: Schrader, F. C., 15
Pima Co., Devonian: LeMone, D. V.
Pima dist., Pima Co.: Cooper, J. R., 8; MacKenzie, F. D., 1; Park, C. F., Jr., 1; Waller, H. E., Jr.; Wilson, E. D., 59
Pima mine, Pima Co.: Heinrichs, W. E., Jr., 1; Journeay, J. A.; Thurmond, R. E., 1, 2, 3, 4
Pinal Creek, Gila Co.: Hazen, G. E.
———, Devonian: Stauffer, C. R., 2

STRATIGRAPHY *(Continued)*
Pinedale area, Navajo Co.: Veatch, A. C.
Pinta Dome, Apache Co.: Masters, J. A., 4
Planet area, Yuma Co.: Cummings, J. B., 2; Wilson, E. D., 46
Pleistocene, Grand Canyon: Hinds, N. E. A., 8
———, Cochise: Bryan, K., 14
———, San Pedro Valley: Smith, D. G.
Pleistocene-Recent boundary: Hunt, C. B., 2
Pliocene: Twenter, F. R., 2
———, Bidahochi formation: Repenning, C. A., 2
———, Great Basin: Axelrod, D. I.
———, Lake Quiburis: Blake, W. P., 33
———, Milk Creek, Yavapai Co.: Reed, C. A.
———, Prescott area, Yavapai Co.: Bryant, D. L., 2
———, Verde formation: Brady, L. F., 29
Point of Pines, Graham Co.: Heindl, L. A., 14
Post-glacial history: Smiley, T. L., 4
Potts Canyon, Superior area, Pinal Co.: Wardwell, H. R.
Precambrian: Darton, N. H., 19, 20; Hinds, N. E. A., 6, 14, 15; Keyes, C. R., 68, 69; Lance, J. F., 4, 7; Mathewson, D. E.; Ransome, F. L., 11, 24; Reber, S. J.; Van Hise, C. R., 1, 2; Wilson, E. D., 20, 24
———, Bagdad area: Anderson, C. A., 4
———, Black Canyon schist belt, Bradshaw Mts.: Jerome, S. E., 1
———, Colorado Plateau: Case, J. E.
———, Dragoon quad.: Cooper, J. R., 3
———, Ep-Archean and Ep-Algonkian intervals: Hinds, N. E. A., 2; Keyes, C. R., 86
———, Ep-Archean plain: Whitman, A. R.
———, erosion surfaces, Grand Canyon: Sharp, R. P., 2
———, Grand Canyon: Hinds, N. E. A., 1, 13; Keyes, C. R., 99; Ransome, F. L., 12; Van Gundy, C. E., 1, 2, 5
———, Jerome dist.: Fearing, J. L., Jr., 2; Lausen, C., 8; Reber, L. E., Jr., 2, 3
———, lava flows: Keyes, C. R., 91
———, Mazatzal quartzite: Wilson, E. D., 2, 3, 20
———, Mingus Mtn. quad.: Creasey, S. C., 2
———, Papago Indian Reservation: McClymonds, N. E., 4
———, peneplanations: Keyes, C. R., 95
———, Uncompahgran time title: Keyes, C. R., 77
Precambrian, Older: Wilson, E. D., 20, 24
———, Bagdad area: Anderson, C. A., 8
———, Diamond Butte quad., Gila Co.: Gastil, R. G., 4
———, Grand Canyon: Campbell, I., 1, 2, 6, 7; Maxson, J. H., 1, 2, 4, 5, 8
———, Tonto Basin: Gastil, R. G., 3
Precambrian, Younger: Alf, R. M.; Gastil, R. G., 2; Keyes, C. R., 74, 75; Ross, C. P., 7
———, Dripping Spring dist.: Neurburg, G. J.
———, Dripping Spring quartzite: Granger, H. C., 1, 3
———, Grand Canyon: Walcott, C. D., 10, 11
———, northern Galiuro Mts.: Krieger, M. H., 3, 4
———, Papago Indian Reservation: Heindl, L. A., 32
———, Pinal and Gila Cos.: Mead, W. E.
———, Santa Catalina Mts., Pima Co.: Bruhn, H. F.
———, southeastern Arizona: Bruhn, H. F.
———, southern Arizona: Shride, A. F., 2, 3
———, Unkar group: White, C. D., 3
Pre-Carboniferous, Grand Canyon: Walcott, C. D., 2

STRATIGRAPHY *(Continued)*
Pre-Coconino: McNair, A. H., 2
Pre-Moenkopi unconformity, Colorado Plateau: Dake, C. L.
Prescott area, Yavapai Co., Cenozoic: Bryant, D. L., 2; Krieger, M. H., 1
Putnam Wash area, Pinal Co.: Hillebrand, J. R., 1
Quartzsite area, Yuma Co.: Jones, E. L., Jr., 1
Quaternary System, Hopi Country: Richmond, G. M.
———, Meteor Crater: Shoemaker, E. M., 5
———, Tucson area: Lance, J. F., 1
———, in valleys of northern Arizona: Hack, J. T., 1
Quijotoa Mtns., Pima Co.: Gebhardt, R. C.
Rainbow Valley-Waterman Wash area, Maricopa Co.: Wolcott, H. N., 3, 4
Rainvalley formation: Bryant, D. L., 7; Keefer, W. R.
Ranegras Plain area, Yuma Co.: Metzger, D. G., 1
Ray area, Pinal Co.: Clarke, O. M., Jr., 1; Loel, W.; Ransome, F. L., 25, 28; Tolman, C. F., Jr., 4
———, Gila and Whitetail conglomerate: Heindl, L. A., 16
Ray to Superior: Wilson, E. D., 72
Reconnaissance, U.S. Pacific Railroad exploration: Antisell, T.
Recreation red beds, Tucson Mts.: Colby, R. E.
Red beds, bleaching of: Keller, W. D., 1
Red Lake area, Navajo Indian Reservation: Akers, J. P., 3, 5, 10
Red Rock quad., Pinal Co.: Feth, J. H., 3, 4
Redwall limestone: Bowsher, A. L.; Easton, W. H.; Gutschick, R. C., 1, 2, 3, 4; Keyes, C. R., 21, 92; McKee, E. D., 51, 52, 53, 56; Sando, W. J., 2; Wooddell, C. E.
Rico strata, Four Corners region: Bailey, J. S.
Rillito Creek, Pima Co.: Maddox, G. E.
Rillito Creek-Tanque Verde Wash area ,Tucson: Streitz, R.
Rillito Valley: Smith, G. E. P., 1
Rincon Mts., southwestern foothills: Layton, D. W.
Rosemont camp, Pima Co.: Popoff, C.; Thomas, W. L.
Ruby Star Ranch area, Pima Co.: Thacpaw, S. C.
Ruin Basin, Gila Co.: Bejnar, W.
Sabino Canyon area, Pima Co.: Miller, J. B.
Saddle Mtn. dist., Pinal Co.: Ross, C. P., 5
Safford area, Graham Co.: Cook, A.
Safford Basin, Graham Co.: Davidson, E. S., 1, 2, 3; Marlowe, J. I., 1, 3
Safford Valley, Cenozoic: Fair, C. L., 1; Harbour, J.; Hollander, J. T.; Van Horn, W. L., 1, 2
Saguaro National Monument area, Pima Co.: McColly, R. A.
St. George mine area, Cochise Co.: Romslo, T. M., 3
St. Johns area, Apache Co.: Green, T. E., Jr.; Robertson, R. S.
St. Johns-Cameron area, Triassic: Gregg, C. C.
St. Michaeis area, Apache Co.: DuBois, R. L., 3
Salt anticlines, Paradox Basin: Jones, R. W., 1
Salt Anticline region, Triassic: Stewart, J. H., 5
Salt River Valley area: Davis, A. P., 2; Lee, W. T., 2; McDonald, H. R., 4
Salt Wash sandstone: Jones, D. J.; Mullens, T. E.; Stokes, W. L., 5
San Carlos Valley: Schwennesen, A. T., 2
San Francisco volcanic field, Coconino Co.: Loel, W.; Robinson, H. H., 4
San Juan Basin: Read, C. B., 2; Silver, C., 2
San Juan oil field: Woodruff, E. G.
San Manuel mine area, Pinal Co.: Pelletier, J. D.; Schwartz, G. M., 9, 16; Steele, H. J., 1, 2; Wilson, E. D., 50, 76, 86
San Pedro Valley: Bryan, K., 12, 19; Marcou, J., 2; Smith, D. G.

STRATIGRAPHY *(Continued)*
San Simon Basin, Cochise and Graham Cos.: White, N. D., 1
San Simon Creek, Graham Co.: Knechtel, M. M., 3; Schwennesen, A. T., 1
San Xavier Indian Reservation: Heindl, L. A., 15, 27
San Xavier mine, Pima Co.: Wilson, C. A.
Santa Catalina Mts.: Bromfield, C. S., 1, 2; DuBois, R. L., 4; Peirce, F. L.; Tolman, C. F., Jr., 12
———, Apache group: Bruhn, H. F.
———, east flank: Pilkington, H. D., 2
———, southern foothills: Voelger, K.
Santa Cruz Basin: Kister, L. R., 1
Santa Cruz Co., Devonian: LeMone, D. V.
———, volcanic rocks: Taylor, O. J.
Santa Cruz Valley: Coulson, O. B.
Santa Rita limestone: Keyes, C. R., 67
Santa Rita Mts., Devonian: Stauffer, C. R., 1, 3
Santa Rita and Patagonia Mts.: Schrader, F. C., 4, 7, 8, 14
Sedimentary basins of Arizona: McKee, E. D., 40
Segi Mesas: Cooley, M. E., 9
Seven-Dash Ranch area, Cochise Co.: Cook, F. S.
Seventy-Nine mine, Gila Co.: Kiersch, G. A., 1, 2, 3
Shinarump conglomerate: Evensen, C. G., 1, 3; Gregory, H. E., 2; Grundy, W. D., 1; Isachsen, Y. W., 2; Keyes, C. R., 53; Lawson, A. C.; McKee, E. D., 46; Stokes, W. L., 7; Witkind, I. J., 1, 3, 8; Wood, H. B., 1
Shiprock quad., Apache Co.: O'Sullivan, R. B., 2
Sierrita Mts. area, Pima Co.: Lacy, W. C., 1; Ransome, F. L., 27
Silurian System: Keyes, C. R., 42, 78; Pye, W. D., 3
Silver and Eureka dists., Yuma Co.: Wilson, E. D., 69
Silver Bell area, Pima Co.: Richard, K. E., 1; Stewart, C. A., 2; Tolman, C. F., Jr., 6
Silver King area, Superior, Pinal Co.: Galbraith, F. W., 1
Slate Mts., Pinal Co.: Hogue, W. G., 1
South Comobabi Mts., Pima Co.: Bryner, L., 1
Southern Pacific lines: Darton, N. H., 21
Springerville area, Apache Co.: Rehkemper, L. J.
Springerville-St. Johns area, Apache Co.: Sirrine, G. K.
Stanley dist., Graham Co.: Ross, C. P., 4
Stratigraphic names: Kiersch, G. A., 4; Pye, W. D., 5
Sub-Aubreyan: Keyes, C. R., 104
Sullivan mine, Cochise Co.: Wilson, E. D., 49
Sulphur Spring Valley: Meinzer, O. E., 1
Sunset Crater, Coconino Co.: Smiley, T. L., 2
Sunshine mine area, Sierrita Mts., Pima Co.: Higdon, C. E.
Supai formation: Hughes, P. W., 1, 2, 3; Jackson, R. L., 1, 2, 3; Keyes, C. R., 37, 65, 72; McGoon, D. O., Jr.; Winters S. S., 3, 4
Superior area, Pinal Co.: Hammer, D. F., 2; Ransome, F. L., 20; Short, M. N., 3; Steele, H. J., 3; Wilson, E. D., 61
Sweetwater Drive area, Tucson Mts.: Coulson, O. B.
Swisshelm dist., Cochise Co.: Galbraith, F. W., 9
Swisshelm formation: Epis, R. C., 2
Swisshelm Mts., Cochise Co.: Epis, R. C., 4; Mulchay, R. B.
Sycamore Canyon, Yavapai and Coconino Cos.: Price, W. E., Jr., 1, 2, 3, 4
Sycamore Ridge, Pima Co.: Jones, W. R.
Tennessee-Schuylkill mine area: Garrett, S. K.
Tertiary System: Bissell, H. J., 1; Gray, J., 2; Wood, P. A., 2
———, Basin and Range Province: Gray, J., 1

STRATIGRAPHY *(Continued)*
Tertiary System, Cienega Gap area, Pima Co.: Brennan, D. J., 3
———, Chuska Mts. area: Wright, H. E., Jr., 1, 3, 4
———, lake sediments, southwestern Yavapai Co.: Reyner, M. L.
———, marine: Wilson, E. D., 13
———, Mineta Ridge area, Pima and Cochise Cos.: Chew, R. T., 3d, 1, 2, 5
———, Navajo Country: Repenning, C. A., 5
———, Yavapai Co.: St. Clair, C., 3
Tertiary-Cretaceous, Fresnal Canyon, Baboquivari Mts.: Fair, C. L., 3
———, volcanic rocks, southern Arizona: Richard, K. E., 3
Time-stratigraphic concept: Wheeler, H. E., 2
Todilto limestone: Keyes, C. R., 60
Tohachi shales: Keyes, C. R., 87
Tohatchi formation: Wright, H. E., Jr., 3
Tombstone area, Cochise Co.: Blake, W. P., 8; Butler, B. S., 8, 9, 13, 16; Church, J. A., 1, 2; Needham, A. B.; Ransome, F. L., 26; Tenney, J. B., 11
Tonto Basin, Cenozoic: Lance, J. F., 12
———, Older Precambrian: Gastil, R. G., 3
Tonto group, Grand Canyon: Wheeler, R. B.
Tonto sandstone: Gilbert, G. K., 3
Toroweap formation: Belden, W. A.; McKee, E. D., 15
Tortilla Mts.: Schwartz, R. J.
Triassic System: Bailey, W. F.; Brady, L. F., 8; Camp, C. L., 8; Cooley, M. E., 5; Cross, C. W., 2; Evensen, C. G., 1, 3; Gregory H. E., 2; Isachsen, Y. W., 2; Keyes, C. R., 53, 89, 100; Laudermilk, J. D., 3; McKee, E. D., 10, 46, 48, 49; Peabody, F. E., 1; Vander Hoff, V. L.; Wilson, R. L., 2
———, Apache and Navajo Cos.: Cooley, M. E., 2
———, Black Mesa area: Akers, J. P., 1
———, Cameron and Leupp quads.: Akers, J. P., 6
———, Cameron-St. Johns area: Gregg, C. C.
———, Colorado Plateau: Cadigan, R. A., 2; Finch, W. I., 3; Poole, F. G., 1, 2; Rosenzweig, A.; Stewart, J. H., 1, 2, 3, 4, 6; Wilson, R. F., 1; Wood, H. B., 1
———, correlations: Averitt, P., 1
———, Glen Canyon group: Lewis, G. E., 2
———, Grand Canyon: McKee, E. D., 7
———, Leupp-Holbrook area: Smith, R. S., Jr.
———, Little Colorado River area: Cooley, M. E., 1
———, Monument Valley: Witkind, I. J., 1, 3, 8
———, northwestern Arizona: Stokes, W. L., 10
———, Paria Plateau: Akers, J. P., 4
———, Petrified Forest National Monument: Caster, R. E.; Daugherty, L. H., 3
———, St. Johns area: Robertson, R. S.
———, Salt Anticline region: Stewart, J. H., 5
———, Sycamore Canyon, Yavapai and Coconino Cos.: Price, W. E., Jr., 2
———, Vermilion Cliffs region, Coconino Co.: Wilson, R. F., 2
Troy quartzite, northern Galiuro Mts.: Krieger, M. H., 3, 4
Tucson Mts., Pima Co.: Brown, W. H., 3; Coulson, O. B.; Jenkins, O. P., 2; McCoy, S., Jr.; Whitney, R. L.
———, Cretaceous: Bennett, P. J.; Bryant, D. L., 3, 4; Colby, R. E.; Greenstein, G.
———, Paleozoic: Bryant, D. L., 3
Tucson quad.: Moore, B. N., 3
Tumamoc Hills, Tucson Mts.: Tolman, C. F., Jr., 1
Tungsten deposits: Wilson, E. D., 32
Turquoise area, Cochise Co.: Ransome, F. L., 16, 18
Twin Buttes dist., Pima Co.: Brown, R. L.; Burroughs, R. L.; Cummings, J. B., 3; Gordon, E. R.; Houser, F. N.

STRATIGRAPHY *(Continued)*
Twin Peaks area, Pima Co: Britt, T. L.
Uinkaret Plateau: Koons, E. D., 2
Uncompahgran and Beltian deposits: Hinds, N. E. A., 3
Unconformities: Conrad, R. D.; Keyes, C. R., 90
United Verde mine, Jerome: Hansen, M. G., 2
Unkar group, Grand Canyon: Van Gundy, C. E., 1
Uranium deposits: Twenhofel, W. S.
Vanar quad., Cochise Co.: Sabins, F. F., Jr., 3
Vekol Mts., Pinal Co.: Carpenter, R. H., 1
Ventana Cave, Pima Co.: Bryan, K., 21; Haury, E. W., 2, 3
Verde formation: Brady, L. F., 29
Verde Valley, Maricopa and Yavapai Cos.: McDonald, H. R., 1, 2, 5; Mahard, R. H.; Twenter, F. R., 5, 6
Vermilion Cliffs region, Kayenta and Moenave formations: Wilson, R. F., 2
Vernon area, Apache Co., Cenozoic: Drake, R. J., 2
Volcanic rocks, southeastern Arizona: Wargo, J. G., 4
Walker Canyon, Santa Cruz Co.: Nelson, F. J.
Wallapai dist., Mohave Co.: Dings, M. G.; Thomas, B. E., 1, 2, 4
Walnut Canyon, Coconino Co.: Shimer, H. W., 1
———, Permian: Chronic, H.
Walnut Grove Basin, Yavapai Co.: Hook, D. L.; Plafker, L.
Washington Camp, Pima Co.: Crosby, W. O.
Waterman Mts., Pima Co.: McClymonds, N. E., 1, 2, 3, 5
Waterman Wash-Rainbow Valley area: Wolcott, H. N., 3, 4
Wellton, Yuma Co., Miocene: Wood, P. A., 1
Wellton-Mohawk area, Yuma Co., Cenozoic: Metzger, D. G., 2
West Kaibab fault zone: Strahler, A. N., 7
Whetstone Mts., Cochise and Pima Cos.: Burnette, C. R.; Graybeal, F. T.; Tyrell, W. W., Jr.
White Canyon dist.: Grundy, W. D., 2
White Mesa dist., Coconino Co.: Hill, J. M., 5; Read, C. B., 1
White Picacho dist., Maricopa and Yavapai Cos.: Stewart, G. W.
Whitetail conglomerate: Heindl, L. A., 16
Wickenburg area, Maricopa and Yavapai Cos.: Metzger, O. H.
Williams River dam site: Eckel, E. B., 3
Yampai Cliffs, Mohave Co., Cambrian and Devonian: Wood, W. H., 1, 2
Yavapai Co., Cenozoic: St. Clair, C. S., 1
———, Redwall limestone: Gutschick, R. C., 2, 4
Yuma Co., southern: Wilson, E. D., 15
Zinc and lead deposits: Wilson, E. D., 58
Zion Park region: Gregory, H. E., 15

STRUCTURAL GEOLOGY
Agua Fria River area: St. Clair, C. S., 2
Agua Verde Hills, Pima Co.: Kerns, J. R.
Ajo area, Pima Co.: Dehlinger, M. E., Gilluly, J., 1, 2, 3, 4, 5, 11, 13
Amole dist., Pima Co.: Kinnison, J. E. 1
Amole Mts., Pima Co.: Jenkins, O. P., 2
Antler mine, Mohave Co.: Romslo, T. M., 2; Wilson, E. D., 51
Apache Co.: Cooley, M. E., 11; Roe, H.
———, central: Akers, J. P., 8, 12
Apache iron deposits, Navajo Co.: Stewart, L. A., 3
Aquarius Range, Mohave Co.: Hobbs, S. W.
Aravaipa dist., Graham Co.: Ross, C. P., 4; Wilson, E. D., 48, 60
Aravaipa zinc-lead deposit, Graham Co.: Denton, T. C., 3
Arid basins: Lance, J. F., 8

Arizona: Becker, G. F.; Billings, M. P.; Blake, W. P., 35, 39; Blandy, J. F., 3; Butler, B. S., 5, 6, 7, 10; Comstock, T. B., 3, 5; Darton, N. H., 4, 14, 16, 18, 22; Eardley, A. J., 2; Gilbert, G. K., 1, 2, 4, 5; King, P. B., 1; Lance, J. F., 11; Loew, O., 1, 2, 3; Pye, W. D., 1; Tovote, W. L., 10, 12; Wilson, E. D., 56, 87, 90
———, central: Ransome, F. L., 1
———, east-central: Wengerd, S. A., 3
———, northern: Darton, N. H., 2, 3, 7; Eardley, A. J., 1; Emory, W. H., 1; Gilbert, G. K., 7; Gregory, H. E., 11, 12; Howell, E. E.; McKee, E. D., 44; Marcou, J., 3
———, northwestern: Longwell, C. R., 3; Stokes, W. L., 9
———, southeastern: Bissett, D. H.; Dumble, E. T., 1; Jones, R. W., 2; Mathewson, D. E.
———, southern: Cox, E. T.; Lutton, R. J., 1; McKee, E. D., 42; Tolman, C. F., Jr., 2, 3
———, western: Lee, W. T., 5
Arizonan Revolution: Hinds, N. E. A., 11
Artillery Mtn. region: Lasky, S. G., 1, 2, 3; Wilson, E. D., 62
Asbestos deposits: Sampson, E., 1; Shride, A. F., 1; Stewart, L. A., 2, 4, 5
Baboquivari Mts., Pima Co.: Clark, J. L.
Bagdad area, Yavapai Co.: Anderson, C. A., 5, 7, 9; Butler, B. S., 12
Banner dist., Gila Co.: Ross, C. P., 5; Wilson, E. D., 68
Barite deposits: Stewart, L. A., 6
Basal Cambrian contacts: Hinds, N. E. A., 5
Basin and Range Province: Keyes, C. R., 1, 12; Longwell, C. R., 9, 11, 12; Moody, J. D.; Nolan, T. B., 2; Osmond, J. C.; Spurr, J. E., 1; Wilson, E. D., 24, 82
———, Jerome area: Ransome, F. L., 31
Basin Range hypothesis: Keyes, C. R., 48
Beacon Hill-Colossal Cave, Pima Co.: Weidner, M. I.
Bear Creek Canyon, eastern Arizona: Maise, C. R.
Belmont-Queen Creek dist., Pinal Co.: Harshman, E. N.
Bill Williams Mtn., Coconino Co.: Balk, R., 1
Bill Williams River valley: Wolcott, H. N., 5
Bisbee dist., Cochise Co.: Bonillas, Y. S.; DeWilde, E. J., 1, 2; Hogue, W. G., 2; Kantner, W. H.; Lavender, H. M.; Little, J. M.; Mitchell, G. J., 1, 2, 3; Notman, A., 1; Ransome, F. L., 3, 4, 5, 7, 8, 9, 17, 26; Rove, O. N., 1, 2; Tenney, J. B., 1, 2, 8; Tovote, W. L., 4; Trischka, C., 2, 4, 5, 6, 7; Wisser, E. H., 1
Black Canyon schist belt, Bradshaw Mts.: Jerome, S. E., 1
Black Hills, Yavapai Co.: Creasey, S. C., 6
Black Mesa Basin region: Akers, J. P., 2; Doeringsfeld, W. W.; Elston, W. E.; Kelley, V. C., 5
———, Jurassic rocks: Harshbarger, J. W., 1
———, Permian rocks: Peirce, H. W., 2
Black Mts., Mohave Co.: Schrader, F. C., 1, 3, 11, 12
Black Rock, Apache Co.: Yildiz, M.
Bonita Creek, Graham Co.: Heindl, L. A., 17, 22
Boriana area, Mohave Co.: Hobbs, S. W.
Boulder Canyon, Mohave Co.: U.S. Bureau of Reclamation, 2
Boulder (Hoover) Dam site: Berkey, C. T., 2
Boulder Reservoir floor: Longwell, C. R., 6
Boundary Butte area, Apache Co.: Sheffer, B. D.
Bradshaw Mts. quad.: Jaggar, T. A., Jr.; Lindgren, W., 16

STRUCTURAL GEOLOGY *(Continued)*
Breccia and pebble columns: Bryner, L., 3
Breccia pipes, Bagdad area, Yavapai Co.: Anderson, C. A., 9
———, Cameron area: Barrington, J., 1; Kerr, P. F., 6; McBirney, A., 2
———, Colorado Plateau: Kerr, P. F., 6
———, Copper Basin dist., Yavapai Co.: Johnston, W. P., 1, 2
———, Copper Creek area, Pinal Co.: Kuhn, T. H., 3
Bright Angel quad., Coconino Co.: Maxson, J. H., 1, 8, 10, 11; Noble, L. F., 5
Buckskin Mts., Yuma Co.: Blanchard, R. C.
Bullock Canyon-Buehman Canyon, Santa Catalina Mts.: Raabe, R. C.
Bunker Hill dist., Pinal Co.: Kuhn, T. H., 4
California mine area, Pima Co.: Gillingham, T. E.
Cambrian-Algonkian unconformity: Hinds, N. E. A., 4
Cambrian slide breccia, Grand Canyon: Sharp, R. P., 1
Cameron area, Coconino Co.: Akers, J. P., 6, 11; Barrington, J., 3; Chenoweth, W. L., 4; Hinckley, D. N., 1
———, Quaternary: Reiche, P., 2
Campo Bonito area, Oracle: Ludden, R. W.
Canada del Oro, Santa Catalina Mts.: Wallace, R. M., 1
Canelo Hills, Santa Cruz Co.: Feth, J. H., 1, 2
Canyon Creek fault, Navajo Co.: Finnell, T. L., 2
Carrizo Mts. area, Apache Co.: Chenoweth, W. L., 1; Emery, W. B.; Strobell, J. D., Jr., 2, 3
Carrizo Valley, Apache Co.: Underwood, J. R.
Casa Grande dist., Pinal Co.: Tenney, J. B., 9
Castle Dome (Miami), Gila Co.: Peterson, N. P., 8, 10, 11, 12
Castle Dome dist., Yuma Co.: Wilson, E. D., 70
Cenozoic: Heindl, L. A., 29
———, Colorado Plateau: Hunt, C. B., 3
———, Mammoth area, Pinal Co.: Heindl, L. A., 30
———, Wellton-Mohawk area, Yuma Co.: Metzger, D. G., 2
Cenozoic fossil localities: Lance, J. F., 10
Cerbat Range, Mohave Co.: Schrader, F. C., 1, 3, 11, 12
Cerro Colorado dist., Pima Co.: Jones, R. D.
Chaotic breccias, Tucson Mts.: Kinnison, J. E., 2
Cherry Creek dist., Yavapai Co.: Reid, J. A., 1, 2
Chetoh Country: Howell, P. W., 2
Childs-Aldwinkle mine, Copper Creek dist., Pinal Co.: Butler, B. S., 15; Kuhn, T. H., 1
Chinle formation, uranium deposits: Isachsen, Y. W., 2
Chiricahua Mts., Cochise Co.: Enlows, H. E., 3, 4; Sabins, F. F., Jr., 1
———, northeastern: Raydon, G. T.
———, northern: Mayo, E. B., 6
Chiu Chuischu area, Papago Indian Reservation: Yost, C. B., Jr.
Chloride area, Mohave Co.: Thomas, B. E., 4
Christmas mine area, Gila Co.: Eastlick, J. T.; Peterson, N. P., 5, 17
Chuska Mts., Navajo Indian Reservation: Appledorn, C. R.; Harshbarger, J. W., 6
Chuska sandstone: Wright, H. E., Jr., 4
Cienega Amarilla area, Apache Co.: O'Brien, B. R.
Cienega Gap, Pima Co.: Brennan, D. J., 2, 3
Cienega Valley, Pima Co.: Brennan, D. J., 1
Clarkdale quad., Yavapai Co.: Lehner, R. E., 1
Cleveland mine area, Gila Co.: Simmons, W. W., 1
Clifton-Morenci dist., Greenlee Co.: Butler, B. S., 11; Lindgren, W., 2, 7; Loel, W.; Ransome, F. L., 10; Reber, L. E., Jr., 1; Tovote, W. L., 3

STRUCTURAL GEOLOGY *(Continued)*
Cobabi dist., Pima Co.: MacKallor, J. A.
Cochise dist., Cochise Co.: Franke, R. P.
Cochise Head quad., Cochise Co.: Sabins, F. F., Jr., 3
Collapsed structures, Cameron area, Coconino Co.: Barrington, J., 3
———, Riverview mine, Coconino Co.: Chenoweth, W. L., 3
Colorado Plateau province: Butler, B. S., 3; Gilbert, G. K., 6; Gregory, H. E., 13; Kelley, V. C., 3, 4; Kennedy, G. C.; Longwell, C. R., 2; Luedke, R. G.; Margerie, E., 1; Moody, J. D.; Moore, R. C., 2, 5, 6, 7
———, copper veins: Fischer, R. P., 1
———, fracture systems: Kelley, V. C., 6
———, monoclines: Kelley, V. C., 2
———, Pennsylvanian paleotectonics: Fetzner, R. W.
———, post-orogenic uplift: Mackin, J. H.
———, Precambrian: Case, J. E.
———, pre-Moenkopi unconformity: Dake, C. L.
———, uranium deposits: Finch, W. I., 3; Kelley, V. C., 3, 4; Payne, A. L.; Shawe, D. R.; Shoemaker, E. M., 3; Stokes, W. L., 5; Wood, H. B., 1; Wright, R. J., 3
Colorado River basin: Harker, A.; Maddock, T.; Pack, F. J.; Willis, B., 2
Colorado River region: Jones, E. L., Jr., 3; La Rue, E. C., 1, 2; Lee, W. T., 3, 4; Longwell, C. R., 10; Maxson, J. H., 6; Newberry, J. S.; Powell, J. W., 1, 3, 4, 5, 8, 9; Schott, A., 1; Toula, F.
Commonwealth mine, Pearce, Cochise Co.: Smith, L. A.
Congress mine, Yavapai Co.: Staunton, W. F., 3
Contention mine area, Twin Buttes, Pima Co.: Houser, F. N.
Copper Basin dist., Yavapai Co.: Johnston, W. P., 1, 2
Copper Butte mine, Mineral Creek dist., Pinal Co.: Phelps, H. D.; Wilson, E. D., 44
Copper Cities copper deposits, Globe-Miami dist.: Peterson, N. P., 14
Copper deposits: Butler, B. S., 14; Tenney, J. B., 10
Copper Hill area, Winkleman: Evenson, J.
Copper mine-Preston Mesa area, Coconino Co.: McClymonds, N. E., 6
Cordilleran structure: Butler, B. S., 17; Wisser, E. H., 2
Courtland-Gleeson region, Cochise Co.: Wilson, E. D., 4
Coyote Mts., Pima Co.: Kurtz, W. L.; Wargo, J. G., 1, 3
Cretaceous-Tertiary: Courtright, J. H.
Cunningham Pass dist., Yuma Co.: Tovote, W. L., 11
Cuprite mine area, Pima Co.: Browne, J. F.
Davis Dam area: U.S. Bureau of Reclamation, 3
Deer Creek coal field: Walcott, C. D., 3
Defiance Uplift, Apache Co.: Hatfield, K. G.
Deformation by explosions: Boon, J. D., 2, 3
Deming axis, southeastern Arizona: Turner, G. L.
Dendora area, Maricopa Co.: Johnson, P. W., 4
Desert ranges: Keyes, C. R., 4
Diamond Butte quad., Gila Co.: Gastil, R. G., 4
Diamond Rim area, Gila and Navajo Cos.: Titley, S. R., 2
Diatremes, Hopi Buttes area: Callahan, J. T., 2; Laidley, R. A.; Shoemaker, E. M., 9
———, Navajo-Hopi Reservations: Lowell, J. D., 2; Shoemaker, E. M., 2, 4
———, San Carlos Indian Reservation: Marlowe, J. I., 2
Dives and Gold Ridge groups, Dos Cabezas, Cochise Co.: Shields, J. C., Jr.
Doney Park-Black Bill Park area: Feth, J. H., 10
Dos Cabezas Mts., Cochise Co.: Sabins, F. F., Jr., 1; Sarle, C. J.
Douglas Basin: Coates, D. R., 7

STRUCTURAL GEOLOGY *(Continued)*

Dragoon Mts., Cochise Co.: Cederstrom, D. J., 1, 2; Gilluly, J., 9; Wilson, E. D., 65
Dragoon quad., Cochise Co.: Cooper, J. R., 6
Dripping Spring Basin, Gila and Pinal Cos.: Coates, D. R., 8
Dripping Spring quartzite, Gila and Pinal Cos.: Granger, H. C., 1; Mead, W. E.
Earth fissures, Casa Grande area: Pashley, E. F., Jr., 1
———, southern Arizona: Leonard, R. J., 2; Robinson, G. M.
East Kaibab monocline: Babenroth, D. L.; Strahler, A. N., 2
El Picacho: Keyes, C. R., 47
El Tiro Mine, Silver Bell, Pima Co.: Shoemaker, A. H., 1
Emerald Isle copper deposit: Thomas, B. E., 3
Empire dist., Pima Co.: Wilson, E. D., 67
Empire Mts., Pima Co.: Alberding, H.; Balk, R., 1; Galbraith, F. W., 4, 5, 7, 11; Wilson, R. A.
Empire Peak area, Pima Co.: Mayuga, M. N., 1
Emplacement of volcanic necks: McBirney, A. R., 1
Ep-Archean and Ep-Algonkian erosion surfaces: Sharp, R. P., 2
Ep-Archean and Ep-Algonkian intervals: Hinds, N. E. A., 2
Esperanza mine, Pima dist., Pima Co.: Schmitt, H. A., 6
Eustatic shifts in Pennsylvanian sea level: Wanless, H. R., 1
False fault scarps: Keyes, C. R., 15
Fault breccia, Colossal Cave area, Pima Co.: Acker, C. J.
———, Miami mine, Gila Co.: White, C. H.
Faulting: Willis, B., 3
———, Flagstaff area: Akers, J. P., 9
———, Oak Creek Canyon: Mears, B., Jr., 3, 4
Faulting and ore deposition: Spurr, J. E., 2
Fluorspar deposits: Wilson, E. D., 63
Folded rocks, relations of ore deposits to: Newhouse, W. H., 1; Wilson, E. D., 11
Fort Apache region: Reagan, A. B., 2, 8
Fort Defiance quad.: Allen, J. E.
Fossil Creek area, Twenter, F. R., 3
Fracture cleavage, relict: Stark, J. T.
Fracture pattern, San Manuel mine: Wilson, E. D., 76, 86
Fracture systems: Kelley, V. C., 6
Fresnal Peak area, Baboquivari Mts., Pima Co.: Donald, P. G.
Galiuro Mts.: Blake, W. P., 32
Geologic cross-sections, Arizona: Moore, R. T., 5; Wilson, E. D., 91
Gila Bend area, Maricopa Co.: Johnson, P. W., 4
Gila Bend Indian Reservation, Maricopa Co.: Heindl, L. A., 21, 31
Gila conglomerate: Heindl, L. A., 3; Knechtel, M. M., 2
Gila River area: Lippincott, J. B.; Ross, C. P., 1, 2, 3
Gila River Indian Reservation, Maricopa and Pinal Cos.: Wilson, E. D., 93
Gila River Valley: Lee, W. T., 1; Marcou, J., 2
———, Graham Co.: Knechtel, M. M., 3; Schwennesen, A. T., 2
Gila River to St. George, Utah: Marvine, A. R.
Glen Canyon Dam site: Irwin, W. H.; Lasson, G. D.
Globe area, Gila Co.: Peterson, N. P., 15, 19; Ransome, F. L., 2, 6, 14, 15, 17, 25; Sivyer, L. D.; Tolman, C. F., Jr., 8; Tovote, W. L., 8
———, Madera diorite: Balk, R., 1
Globe-Miami dist., Gila Co.: Peterson, N. P., 9, 10, 11, 16
Glove mine, Santa Cruz Co.: Olson, H. J.
Gold Road area, Oatman dist., Mohave Co.: Tovote, W. L., 1
Golden Gate Mtn., Pima Co.: Assadi, S. M.
Graben, Grand Canyon: Johnson, D. W., 12

STRUCTURAL GEOLOGY *(Continued)*

Grand Canyon: Darton, N. H., 6, 9, 10, 12; Matthes, F. E., 1, 2, 3, 4; Moore, R. C., 3, 4, 5, 6, 7; Noble, L. F., 1, 2, 3, 4, 5, 6; Van Gundy, C. E., 4; Walcott, C. D., 7, 10, 11
———, Precambrian: Campbell, I., 2; Maxson, J. H., 4; Van Gundy, C. E., 1, 2, 5
Grand Canyon region: Dutton, C. E., 1, 2, 3; Keyes, C. R., 59; Metzger, D. G., 5, 6; Ohern, D. W.; Powell, J. W., 2, 4; Salisbury, R. D.
Grand Gulch dist., Mohave Co.: Hill, J. M., 6
Grand Wash Cliffs, Mohave Co.: Longwell, C. R., 1, 4; Schrader, F. C., 1, 3, 11, 12
Granite Gorge, western Grand Canyon: Noble, L. F., 4
Great Basin: Keyes, C. R., 38
Ground movement, United Verde mine, Yavapai Co.: Mills, C. E., 2
Harquahala Plains, Maricopa and Yuma Cos.: Metzger, D. G., 3
Harshaw dist., Santa Cruz Co.: Kartchner, W. E.
Haunted Canyon quad.: Peterson, D. W., 1
Headgate Rock, Parker area: Strahorn, A. T.
Helmet Peak area, Pima Co.: Mayuga, M. N., 2; Studebaker, I. G.
Helvetia dist., Pima Co.: Creasey, S. C., 1; Johnson, V. H., 1, 2
———, Blue Jay mine area: Dunham, M. S.
———, King mine area: Michel, F. A., Jr.
———, Peach-Elgin deposit: Heyman, A. M.
High dams: Ransome, F. L., 33
Hilltop mine, Cochise Co.: Brittain, R. L.; Papke, K. G.
Hiltano Camp, Empire Mts., Pima Co.: Feiss, J. W.
Hilton Ranch, Pima Co.: Marvin, T. C.
Hindu Canyon, Mohave Co.: Gray, R. S., 1, 2
Holbrook anticlines: Bahr, C. W.
Holbrook area, Navajo Co.: Hager, D., 1, 2; Harrell, M. A.
Hopi Buttes: Lowell, J. D., 2
House Rock Spring, NE quad., Coconino Co.: Wells, J. D., 1
House Rock Valley area, Coconino Co.: Wells, J. D., 3
Huachuca Mts., Cochise Co.: Alexis, C. O., 2; Weber, R. H.; Wilson, E. D., 66
Hualapai (Haulpai) Indian Reservation: Koons, E. D., 3; Twenter, F. R., 1
Hunts Mesa, Monument Valley: Chester, J. W.
Hurricane fault, Mohave Co.: Gardner, L. S., 1, 2; Huntington, E., 1, 2; Lovejoy, E. M. P., 1, 2; Moody, J. D.
Impact experiments: Charters, A. C.; Shoemaker, E. M., 6, 7, 8, 10
Indiana mine area, Pima Co.: Ruff, A. W.
Intermontane valleys: Harshbarger, J. W., 15
Intrusions, Tucson Mts.: Mayo, E. B., 4, 8
Iron King mine, Humboldt, Yavapai Co.: Creasey, S. C., 4, 5; Mills, H. F., 1, 2, 3, 4
Jackrabbit area, Pinal Co.: Hammer, D. F., 1
Jerome area, Yavapai Co.: Anderson, C. A., 10; Fearing, J. L., Jr., 2; Lehner, R. E., 2; Lindgren, W., 16, 17; Provote, F. A.; Reber, L. E., Jr., 2, 3; Staunton, W. F., 1
Johnson Camp area, Cochise Co.: Cooper, J. R., 1; Heineman, R. E. S., 1
Jointing, Comb Ridge-Navajo Mtn. area: Hodgson, R. A.
Jurassic System, paleotectonic maps: McKee, E. D., 50
Kaibab Plateau: Lunt, H. F.; Strahler, A. N., 3, 6, 7
Kaibeto Plateau: Wanek, A. A.
Katherine dist., Mohave Co.: Lausen, C., 9, 10, 12
Keystone mine area, Cochise dist., Cochise Co.: Romslo, T. M., 3
Kingman area, volcanic rocks: Piper, A. M., 2
Kirkland Creek dam site: Eckel, E. B., 3
Klene structure, Elgin vicinity: MacKay, D. K.

STRUCTURAL GEOLOGY *(Continued)*

Klondyke quad., Graham and Pinal Cos.: Simons, F. S., 5
Ko Vaya Hills, Pima Co.: Bryner, L., 1
Kofa Mts., Yuma Co.: Jones, E. L., Jr., 2
Laccolithic mtn. groups: Cross, C. W., 1
Lake deposits: Feth, J. H., 13
Lake Mead area: Longwell, C. R., 15, 16; Raphael, J. M.; Thomas, H. E., 2
Landslides, Colorado Plateau: Hinds, N. E. A., 10
———, Vermilion and Echo Cliffs: Strahler, A. N., 1
Lead Mtn. area, Pima Co.: Alexis, C. O., 1
Lees Ferry: Bryan, K., 5, 7; Phoenix, D. A., 5
Lees Ferry-Glen Canyon dam area: Phoenix, D. A., 3
Leupp quad., Coconino Co.: Akers, J. P., 6; Irwin, J. H., 1, 2
Lineament tectonics, relation to ore districts: Mayo, E. B., 3
Lithium-bearing pegmatites, Wickenburg: Jahns, R. H., 2, 3
Little Colorado Valley: Gregory, H. E., 4; Ward, L. F., 5
Little Dragoon Mts., Cochise Co.: Enlows, H. E., 1, 2
Lode gold deposits: Wilson, E. D., 17, 18, 34
Lone Pine reservoir, Navajo Co.: Kiersch, G. A., 7; Reiche, P., 1
Low-angle normal faults: Longwell, C. R., 9
Lukachukai dist.: King, J. W., 1, 2
Lukachukai Mts.: Masters, J. A., 2
Luke area, Maricopa Co.: Stulik, R. S.
Magma mine, Superior, Pinal Co.: Browning, W. C.; Ettlinger, I. A., 2; Michell, W. D.; Short, M. N., 3, 4; Webster, R. N.
Mammoth area, Pinal Co.: Creasey, S. C., 3; Heindl, L. A., 24; Peterson, N. P., 1, 2, 3
Manganese deposits: Jones, E. L., Jr., 4
Margaret Wash section, Mogul Fault: Jinks, J. E.
Mary G mine area, Pima Co.: Davis, R. E., 1
Mazatzal Mts.: Faick, J. N., 1; Ransome, F. L., 21
Mazatzal Revolution: Anderson, C. A., 8, 10; Wilson, E. D., 20, 21, 24
Megabreccia: Longwell, C. R., 13
Mercury deposits: Lausen, C., 4
Metalliferous deposits: Schmitt, H. A., 2
Meteor Crater: Longwell, C. R., 5; Shoemaker, E. M., 5
———, experiment on Kaibab limestone: Shoemaker, E. M., 8
Meteoritic craters: Boon, J. D., 1
Mexican boundary: Emory, W. H., 2, 3; Hall, J.; Parry, C. C., 1; Schott, A., 2
Miami dist., Gila Co.: Ransome, F. L., 17, 25
Miami-Inspiration dist. Gila Co.: Rubly, G. R.
Miami-Inspiration mine, Gila Co.: Reed, E. F.; Tolman, C. F., Jr., 5
Mineral Creek dist., Pinal Co.: Gowing, F. A.
Mineral Hill area, Pima Co.: Eckel, E. B., 2; MacKenzie, F. D., 1
Mine rock, physical properties: Windes, S. L.
Mineta Ridge area, Pima and Cochise Cos.: Chew, R. T., 3rd, 1, 2
Mingus Mtn. quad., Yavapai Co.: Creasey, S. C., 2
Mining districts, relation to regional tectonics: Jerome, S. E., 2
Miocene: Twenter, F. R., 2
Mission mine, Pima Co.: Richard, K. E., 2
Mississippian rocks, Four Corners region: Picard, M. D., 4
Moenkopi Plateau: Wanek, A. A.
Moenkopi-Shinarump hiatus, Monument Valley: Gray, I. B.
Mogollon Rim, Coconino Co.: Silver, C., 3; Twenter, F. R., 6
Mohave Co.: Schrader, F. C., 11, 12; Tovote, W. L., 2
———, northwestern: Moore, R. T., 3

STRUCTURAL GEOLOGY *(Continued)*

Mohave Co., western: Diment, W. H.
Mohawk zinc prospect, Pima Co.: Wilson, E. D., 45
Monoclines, Colorado Plateau: Kelley, V. C., 2
Montana mine area, Empire Mts., Pima Co.: Sopp, G. P.
Montana mine, Ruby, Santa Cruz Co.: Fowler, G. M., 1, 2
Montosa Canyon area, Santa Cruz Co.: Sulik, J. F.
Montosa-Cottonwood Canyon area, Santa Cruz Co.: Anthony, J. W., 2
Monument No. 2 mine, Apache Co.: Finnell, T. L., 1
Monument Valley area, Apache and Navajo Cos.: Baker, A. A., 5; Grundy, W. D., 2; Mitcham, T. W., 1; Witkind, I. J., 2, 8, 17, 20
Morenci-Metcalf dist., Greenlee Co.: Butler, B. S., 1
Mountain building, distribution of: Gilluly, J., 12
Mountain Queen area, Swisshelm Mts., Cochise Co.: Loring, W. B.
Mountain Maid ore body, Bisbee: Peng, Chi-jui.
Mowry mine, Santa Cruz Co.: Prout, J. W.; Smith, G. E.
Mustang Mts., Santa Cruz Co.: Bryant, D. L., 1
Navajo Country: Harshbarger, J. W., 5
Navajo County: Cooley, M. E., 11
Navajo Indian Reservation, upper Jurassic rocks: Harshbarger, J. W., 2
Navajo-Hopi Indian Reservations: Balk, R., 1; Gregory, H. E., 1, 3, 4, 5, 7, 8, 10; Kiersch, G. A., 8, 9, 14; Mayo, E. B., 1
Nokai Mesa: Grundy, W. D., 1
North Toh-Atin field, Apache Co.: Vaughan, R. H.
Oak Creek Canyon, Cenozoic: Mears, B., Jr., 1
Oatman dist., Mohave Co.: Bollinger, E. E.; Lausen, C., 9, 10, 12; Ransome, F. L., 29
Octave mine: Wilson, E. D., 22
Old Dominion mine, Gila Co.: Beckett, P. G.; Lausen, C., 1; Shoemaker, A. H., 2
Old Hat dist., Pima Co.: Peterson, N. P., 4
Oracle granite: Banerjee, A. K.; Mayo, E. B., 5
Oracle vicinity, Pinal Co.: Heindl, L. A., 8
Ore deposits, relation to folded rocks: Newhouse, W. H., 1; Wilson, E. D., 11
Ore districts: Billingsley, P., 4
Owl Head dist., Pinal Co.: Barter, C. F.
Painted Desert: Wanek, A. A.
Paleozoic System: Keyes, C. R., 41
Pantano Hill area, Pima Co.: Sears, D., 2d
Papago Country: Bryan, K., 1, 4, 10
Papago Indian Reservation: Heindl, L. A., 19
Papagueria: Tolman, C. F., Jr., 11
Paradise Valley, Maricopa Co.: McDonald, H. R., 3; Meinzer, O. E., 2
Paradox Basin fold and fault belt: Four Corners Geological Society
Patagonia area: Feth, J. H., 12
Patagonia Mts.: Baker, R. C.
Paymaster mine: Nye, T. S.
Payson dist.: Lausen, C., 2
Pedregosa Mts., Cochise Co.: Epis, R. C., 4
Peloncillo Mts.: Gillerman, E.; Quaide, W. L.
Peña Blanca and Walker Canyons, Santa Cruz Co.: Nelson, F. J.
Pennsylvanian System: Havenor, K. C., 3; Picard, M. D., 1, 3
———, eustatic shifts in sea level: Wanless, H. R., 1
———, paleogeography: Havenor, K. C., 2
———, paleotectonics, Colorado Plateau: Fetzner, R. W.
Phoenix Mts., Maricopa Co.: Schrader, F. C., 15

STRUCTURAL GEOLOGY *(Continued)*
Pima dist., Pima Co.: Cooper, J. R., 8; MacKenzie, F. D., 1; Park, C. F., Jr., 1; Waller, H. E., Jr.; Wilson, E. D., 59
Pima mine, Pima Co.: Heinrichs, W. E., Jr., 1; Journeay, J. A.; Thurmond, R. E., 1, 2, 3, 4
Pinal Creek area, Gila Co.: Hazen, G. E.
Pinedale area, Navajo Co.: Veatch, A. C.
Pinta Dome, Apache Co.: Masters, J. A., 4
Piping and earth cracks: Heindl, L. A., 10
Planet area, Yuma Co.: Cummings, J. B., 2; Wilson, E. D., 46
Pleistocene: Smith, D. G.
Pliocene: Twenter, F. R., 2
Point of Pines, Graham Co.: Heindl, L. A., 14
Polygonal cracking in granite: Leonard, R. J., 3
Pontotoc mine area, Santa Catalina Mts., Pima Co.: Medhi, P. K.
Post-glacial history: Smiley, T. L., 4
Post-orogenic uplift, Colorado Plateau: Mackin, J. H.
Potts Canyon, Superior area, Pinal Co.: Wardwell, H. R.
Precambrian: Case, J. E.; Fearing, J. L., Jr., 1, 2; Hinds, N. E. A., 1, 6, 7, 9, 12, 14; Osterwald, F. W.; Ransome F. L., 12; Van Hise, C. R., 1, 2; Walcott, C. D., 7
———, Older: Anderson, C. A., 8, 10; Campbell, I., 2, 5, 7; Gastil, R. G., 4; Keyes, C. R., 40; Lindgren W., 17; Maxson, J. H., 4; Wilson, E. D., 20, 21, 24
———, Younger: Shride, A. F., 2, 3; Van Gundy, C. E., 1, 2, 5
Pre-Moenkopi unconformity, Colorado Plateau: Dake, C. L.
Prescott quad., Yavapai Co.: Krieger, M. H., 1
Putnam Wash area, Pinal Co.: Hillebrand, J. R., 1
Quartzsite area, Yuma Co.: Jones, E. L., Jr., 1
Quaternary, Cameron area: Reiche, P., 2
Quijotoa Mts., Pima Co.: Gebhardt, R. C.
Quinlan Mts., Pima Co.: Wargo, J. G., 1
Radioactive deposits: U.S. Atomic Energy Commission
Rainbow Valley-Waterman Wash area, Maricopa Co.: Wolcott, H. N., 4
Ranegras Plain area, Yuma Co.: Metzger, D. G., 1
Ray area, Pinal Co.: Clarke, O. M., Jr., 1; Loel, W.; Ransome, F. L., 25, 28; Tolman, C. F., Jr., 4
Ray to Superior: Wilson, E. D., 72
Reconnaissance, U.S. Pacific Railroad exploration: Antisell, T.
Recreation red beds, Tucson Mts.: Colby, R. E.
Red Lake area, Navajo Indian Reservation: Akers, J. P., 3, 5, 10
Red Rock quad., Pinal Co.: Feth, J. H., 4
Redwall limestone: McKee, E. D., 53
Regional correlations: Billingsley, P., 2, 3
Rillito Creek, northwestern part: Maddox, G. E.
Rincon Mts., southwestern foothills: Layton, D. W.
Ring dikes, San Carlos Indian Reservation: Marlowe, J. I., 2
Riverview mine, Coconino Co.: Chenoweth, W. L., 3
Rock fissure, northern Arizona: Gilbert, G. K., 8
Roll orebodies, Colorado Plateau: Shawe, D. R.
Rosemont camp, Pima Co.: Popoff, C.; Thomas, W. L.
Ruby Star Ranch area, Pima Co.: Thacpaw, S. C.
Ruin Basin, Gila Co.: Bejnar, W.
Saddle Mtn. dist., Pinal Co.: Ross, C. P., 5
Safford area, Graham Co.: Cook, A.
Safford Basin, Graham Co.: Davidson, E. S., 1, 3

STRUCTURAL GEOLOGY *(Continued)*
Safford Peak area, Tucson Mts.: Imswiler, J. B.
Safford Valley: Fair, C. L., 1; Hollander, J. T.
Saginaw Hill area, Tucson Mts.: Kinnison, J. E., 3
Saguaro National Monument area, Pima Co.: McColly, R. A.
St. George mine area, Cochise dist., Cochise Co.: Romslo, T. M., 3
St. Johns area, Apache Co.: Green, T. E., Jr.
St. Michaels area, Apache Co.: DuBois, R. L., 3
Salt anticline, Paradox Basin: Jones, R. W.; Neff, A. W.
Salt River Valley area: Davis, A. P., 2; Lee, W. T., 2; McDonald, H. R., 4
San Carlos Valley: Schwennesen, A. T., 2
San Francisco volcanic field, Coconino Co.: Balk, R., 1; Breed, W. J., 3; Colton, H. S., 18; Loel, W.; Robinson, H. H., 4
San Juan Basin: Kelley, V. C., 1
San Juan oil field: Woodruff, E. G.
San Manuel mine area, Pinal Co.: Dale, V. B., 4; Pelletier, J. D.; Schwartz, G. M., 9, 11, 16; Steele, H. J., 1, 2; Wilson, E. D., 50; Wilson, L. K.
San Pedro Valley: Bryan, K., 13, 19; Marcou, J., 2; Smith, D. G.; Tuan, Yi-Fu, 3
San Simon Creek, Graham Co.: Knechtel, M. M., 3
San Simon Valley: Schwennesen, A. T., 1
San Xavier Indian Reservation, Pima Co.: Heindl, L. A., 15, 27
San Xavier mine, Pima Co.: Irvin, G. W.; Wilson, C. A.
Santa Catalina foothills fault: Fair, C. L., 2
Santa Catalina gneiss: Blake, W. P., 48; DuBois, R. L., 5
Santa Catalina Mts.: Bromfield, C. S., 2; Dubois, R. L., 4; McCullough, E. J., Jr.; Pashley, E. F., Jr., 2; Peirce, F. L.; Peterson, R. C.; Tolman, C. F., Jr., 12
———, east flank: Pilkington, H. D., 2
———, northern portion: Wallace, R. M., 2
———, Pinal schist: Erickson, R. C.
———, southern foothills: Voelger, K.
Santa Cruz Valley: Coulson, O. B.
Santa Rita and Patagonia Mts.: Schrader, F. C., 4, 5, 6, 7, 8, 14
Sedimentation in relation to faulting: Longwell, C. R., 7
Segi Mesas: Cooley, M. E., 9
Seven-Dash Ranch area, Cochise Co.: Cook, F. S.
Seventy-nine mine, Gila Co.: Kiersch, G. A., 1, 2, 3
Shinarump conglomerate, Colorado Plateau: Wood, H. B., 1
Shinumo quad., Coconino Co.: Noble, L. F., 1, 3
Shiprock quad., Apache Co.: O'Sullivan, R. B., 2
Sierra Ancha region, Gila Co.: Williams, F. J.
Sierrita Mts., Pima Co.: Ransome, F. L., 27
———, eastern flank: Lacy, W. C., 1
Silicia plugs, Cameron area, Coconino Co.: Barrington, J., 3
Silver and Eureka dists., Yuma Co.: Wilson, E. D., 69
Silver Bell area, Pima Co.: Richard, K. E., 1; Stewart, C. A., 2; Tolman, C. F., Jr., 6; Watson, B. N.
Silver King area, Superior, Pinal Co.: Galbraith, F. W., 1
Slate Mtn., Coconino Co.: Mintz, Y.
Slate Mts., Pinal Co.: Hogue, W. G., 1
South Comobabi Mts., Pima Co.: Bryner, L., 1
Southern Pacific lines: Darton, N. H., 21
Springerville-St. Johns area, Apache Co.: Sirrine, G. K.
Structural subdivisions: Heindl, L. A., 20
Subsidence, Bisbee: Kantner, W. H.; Trischka, C., 6; Wisser, E. H., 1
———, San Manuel: Griswold, G. B.; McLehaney, J. D., Jr.
———, Tucson area: Platt, W. S.

STRUCTURAL GEOLOGY *(Continued)*

Subsidence, United Verde mine, Jerome: Mills, C. E., 2
Sullivan mine, Cochise Co.: Wilson, E. D., 49
Sulphur Spring Valley: Meinzer, O. E., 1
Sunshine mine area, Sierrita Mts., Pima Co.: Higdon, C. E.
Supai formation, eastern Arizona: Winters, S. S., 4
Superior area, Pinal Co.: Hammer, D. F., 2; Ransome, F. L., 20; Short, M. N., 3, 4; Steele, H. J., 3; Wilson, E. D., 61
Sweetwater Drive area, Tucson Mts.: Coulson, O. B.
Swisshelm dist., Cochise Co.: Galbraith, F. W., 9
Swisshelm Mts., Cochise Co.: Epis, R. C., 4
Sycamore Ridge, Pima Co.: Jones, W. R.
Tectonic evolution: Gilluly, J., 14
Tectonic maps: King, P. B., 2; Longwell, C. R., 8
Tectonic position of ore dists.: Billingsley, P., 1
Tectonic theory: Longwell, C. R., 12
Tennessee-Schuylkill mine: Garrett, S. K.
Tertiary-Cretaceous volcanic rocks, southeastern Arizona: Richard, K. E., 3
Tertiary lake sediments, southwestern Yavapai Co.: Reyner, M. L.
Tertiary orogeny: Ransome, F. L., 23
Texas lineament: Moody, J. D.
Thrust faulting, Colossal Cave area, Pima Co.: Acker, C. J.
———, Dragoon Mts., Cochise Co.: Gilluly, J., 9
Tombstone area, Cochise Co.: Blake, W. P., 8; Butler, B. S., 8, 9, 13, 16; Church, J. A., 1, 2; Gilluly, J., 10; Lakes, A., 2; Needham, A. B.; Ransome, F. L., 26; Tenney, J. B., 11
Toreva block: Reiche, P., 3
Tornado-Tam O'Shanter area, Dripping Spring Mts.: Kiersch, G. A., 5
Tortilla Mts., Pinal Co.: Schwartz, R. J.
Transverse structures, southern Arizona: Lutton, R. J., 2
Triassic uplift, northeastern Arizona: McKee, E. D., 55
Tucson Mts., Pima Co.: Assadi, S. M.; Brown, W. H., 3; Coulson, O. B.; Greenstein, G.; Jenkins, O. P., 2; Mayo, E. B., 9
———, northeastern portion: Whitney, R. L.
———, Sedimentary Hills area: Bennett, P. J.
Tucson Mtn. Chaos: Kinnison, J. E., 2; McCoy, S., Jr.; Mayo, E. B., 10
Tucson quad., Pima Co.: Moore, B. N., 3
Tumamoc Hills, Tucson Mts.: Tolman, C. F., Jr., 1
Tungsten deposits: Wilson, E. D., 32
Turquoise dist., Cochise Co.: Ransome, F. L., 16, 18
Twin Buttes dist., Pima Co.: Brown, R. L.; Cummings, J. B., 3; Gordon, E. R.
———, Foy Ridge area: Burroughs, R. L.
Twin Peaks area, Pima Co.: Britt, T. L.
Uinkaret volcanic field: Koons, E. D., 1
Unconformities: Keyes, C. R., 90
United Verde mine, Jerome: Hansen, M. G., 2
Uranium deposits: Twenhofel, W. S.
———, Colorado Plateau: Finch, W. I., 3; Kelley, V. C., 3, 4; Payne, A. L.; Shoemaker, E. M., 3; Stokes, W. L., 5; Wright, R. J., 3
Vanar quad., Cochise Co.: Sabins, F. F., Jr., 3
Vekol Mts., Pinal Co.: Carpenter, R. H., 1
Ventana Cave, Pima Co.: Bryan, K., 21
Verde fault: Ransome, F. L., 37
Verde River lake beds: Jenkins, O. P., 3
Verde Valley, Maricopa and Yavapai Cos.: McDonald, H. R., 1, 2; Twenter, F. R., 5, 6

STRUCTURAL GEOLOGY *(Continued)*
Walker and Peña Blanca Canyons, Santa Cruz Co.: Nelson, F. J.
Wallapai dist., Mohave Co.: Dings, M. G.; Thomas, B. E., 1, 2, 4
Walnut Grove Basin, Yavapai Co.: Hook, D. L.
Washington camp, Pima Co.: Crosby, W. O.
Waterman Mts., Pima Co.: McClymonds,, N. E., 1, 2, 5
West Kaibab fault zone: Strahler, A. N., 7
Whetstone Mts., Cochise and Pima Cos.: Tyrell, W. W., Jr.
———, Middle Canyon area: Burnette, C. R.
White Canyon dist., Navajo and Apache Cos.: Grundy, W. D., 2
White Mesa dist., Coconino Co.: Hill, J. M., 5; Read, C. B., 1
White Picacho dist., Maricopa and Yavapai Cos.: Stewart, G. W.
Wickenburg area, Maricopa and Yavapai Cos.: Metzger, O. H.
Williams River, dam site: Eckel, E. B., 3
Wrench-fault tectonics: Moody, J. D.
Yuma Co., southern: Wilson, E. D., 15
Zion Park region: Gregory, H. E., 15

TECTONICS *See* STRUCTURAL GEOLOGY

TECTONIC MAPS *See* MAPS, *Tectonic*

TERTIARY *See* PALEONTOLOGY, Tertiary; STRATIGRAPHY, Tertiary; STRUCTURAL GEOLOGY, Tertiary

THERMAL SPRINGS
Clifton, Greenlee Co.: Everit, R. S.; Lindgren, W., 7
General: Stearns, N. D.
Indian Hot Springs, Graham Co.: Knechtel, M. M., 1, 3
Radium Hot Springs, Yuma Co.: Wilson, E. D., 15
Aqua Caliente, Maricopa Co.: Ross, C. P., 3
Quitobaquito, Pima Co.: Bryan, K., 10

THORIUM *See* METALLIFEROUS MINERAL COMMODITIES, *Thorium*

THRUST FAULTING *See* STRUCTURAL GEOLOGY

TRIASSIC *See* PALEONTOLOGY, Triassic; STRATIGRAPHY, Triassic

TUNGSTEN *See* METALLIFEROUS MINERAL COMMODITIES, *Tungsten*

URANIUM *See* METALLIFEROUS MINERAL COMMODITIES, *Uranium*

VALLEYS *See* AREAS DESCRIBED; PHYSIOGRAPHY AND GEOMORPHOLOGY

VANADIUM *See* METALLIFEROUS MINERAL COMMODITIES, *Vanadium*

VOLCANISM AND VOLCANIC ROCKS *See also* IGNEOUS ROCKS
Age, Plateau region: Reagan, A. B., 1
Anasma or "squeeze-ups,": Colton, H. S., 3, 4, 9
Arizona, northern: Balk, R., 2; Brady, L. F., 23
———, southeastern: Gastil, R. G., 2; Wargo, J. G., 4
Central Cochise Co.: Gilluly, J., 7
Chiricahua Mts., Cochise Co.: Enlows, H. E., 3, 4
Chuska Mts., Navajo Indian Reservation: Appledorn, C. R.
Cinder cones: Colton, H. S., 12, 13, 18
Cinder dunes, near Cameron, Coconino Co.: Chenoweth, W. L., 2
Dacite ash flows near Superior and Globe: Peterson, D. W., 4
Emplacement of volcanic necks: McBirney, A. R., 1
Explosion craters vs. meteor craters: Barringer, D. M., 5
Fossil Creek area: Twenter, F. R., 3
Gas bubble in lava flow: Brady, L. F., 23
Grand Canyon: Schenk, E. T., 2
Hopi Buttes: Hack, J. T., 3; Laidley, R. A.
Intra-canyon lava flow, Grand Canyon: Schenk, E. T., 2

VOLCANISM AND VOLCANIC ROCKS *(Continued)*
Kimberlite tuff plugs, northern Arizona: Balk, R., 2
Lava-covered tertiary forest: Damon, P. E., 11
Merriam Crater lava flow: Brady, L. F., 23
Mogollon Rim: Sabels, B. E., 4
Navajo-Hopi country: Williams, H., 1, 2
Peña Blanca and Walker Canyons, Santa Cruz Co.: Nelson, F. J.
Plateau region: Reagan, A. B., 1
Pliocene, Navajo-Hopi country: Williams, H., 2
Precambrian, southeastern Arizona: Gastil, R. G., 2
Robinson Crater: Colton, H. S., 6
S. P. Crater, Coconino Co.: Hodges, C. A.
San Francisco Mts., volcanic field, Coconino Co.: Colton, H. S., 10, 12; Johnson, D. W., 2; Loel, W.; Robinson, H. H., 4; Sabels, B. E., 1, 2, 3
Slate Mtn., Flagstaff: Mintz, Y.
Sunset Crater, Coconino Co.: Colton, H. S., 1, 13, 16, 17; Hodges, C. A.; Smiley, T. L., 2
Tucson Mts., Pima Co.: Mayo, E. B., 9
Uinkaret volcanic field, Mohave Co.: Koons, E. D., 1
Volcanic bombs: Brady, L. F., 18, 19

WELL AND DRILL-HOLE DATA
Big Sandy Valley, Mohave Co.: Morrison, R. B., 2, 3
Duncan-Virden Valley, Greenlee Co.: Morrison, R. B., 5
Exploratory deep wells, to January 1951: Heindl, L. A., 1
———, to May 1953: Johnson, P. W., 2
———, to June 1957: Johnson, P. W., 7
General deep borings: Darton, N. H., 1
Navajo Indian Reservation: Akers, J. P., 7; Harshbarger, J. W., 13
Papago Indian Reservation: Heindl, L. A., 18, 23
Queen Creek area, Maricopa and Pinal Cos.: Babcock, H. M., 2; Skibitzke, H. E., 1
Safford Valley, Graham Co.: Morrison, R. B., 4
Southern Arizona valleys: Johnson, P. W., 8
Sulphur Springs Valley: Douglas, J., 5
Wellton-Mohawk area, Yuma Co.: Babcock, H. M., 8

WATER SUPPLY *See* GROUND WATER AND WATER SUPPLY

ZINC *See* METALLIFEROUS MINERAL COMMODITIES, *Zinc;* MINES AND MINING DISTRICTS

ARIZONA BUREAU OF MINES

J. D. FORRESTER, Director

G. R. FANSETT, Mining Engineer Emeritus
S. B. KEITH, Geologist
R. T. MOORE, Geologist
R. T. O'HAIRE, Assistant Mineralogist
H. W. PEIRCE, Associate Geologist
G. H. ROSEVEARE, Metallurgist
F. L. STUBBS, Associate Mining Engineer

SERVICES AVAILABLE FROM ARIZONA BUREAU OF MINES THE UNIVERSITY OF ARIZONA, TUCSON, ARIZONA

The ARIZONA BUREAU OF MINES was created and placed under the authority of the Arizona Board of Regents in 1915 by an act of the State legislature. The Bureau is directly charged with developing, maintaining, and disseminating to the people of Arizona information relating to geology, mining, metallurgy, and earth sciences generally. The Bureau's primary functions, therefore, are scientific investigation and public service activities comparable to those conducted by geological survey agencies and mineral experiment stations in other states. These primary functions are achieved through the following continuing programs:

1. Prepare and publish bulletins and circulars containing authoritative information on a wide range of topics of interest to prospectors, miners, and others concerned with the development of Arizona's mineral resources and industries. The bulletins are distributed free of charge to residents and at cost to nonresidents of Arizona upon request.

2. Classify mineral and rock specimens. Besides identifying rocks and giving the composition of minerals, the Bureau makes qualititative tests for important elements and answers inquiries concerning the probable market for and the economic value of material similar to samples submitted. This service is furnished free of charge providing the specimens originate within the State of Arizona; a charge of $1 per specimen is made for samples submitted from outside the State. Spectrographic analyses and detailed microscopic determinations are furnished at established rates, a schedule of which will be submitted on request.

3. Conduct laboratory and pilot-plant metallurgical testing of mineral substances in cooperation with industries and individual mine operators in the State. Such tests are conducted on the basis of nominal charges to compensate for wear and depreciation of equipment needed in the experimentation.

4. Make geologic investigations and compile geologic maps and reports. Geologic maps of each county, on a scale of 1:375,000, have been issued and geologic reports on numerous mining districts have been made available as bulletins. In addition to maps and reports on counties and mining districts, comprehensive studies of basic problems in the geology of Arizona are being carried out in order that the maximum benefits may be derived by the people of the State by having a more complete knowledge of its geologic setting.

5. Maintain a working file of statistical records of mineral production in Arizona.

6. Develop well-log storage facilities and a library of data pertaining to oil and water wells drilled in Arizona.

7. Conduct state-wide commodity studies as to modes of occurrence and potential industrial value of various mineral materials.

8. Collect and file items relating to Arizona mines and minerals that appear in Arizona newspapers and in many technical periodicals.

The basic philosophy which obtains in the operation of the Arizona Bureau of Mines is that of providing for the people of Arizona educational services in the earth sciences which cannot be readily secured elsewhere, and furnishing advice and service about mineral occurrences which cannot be obtained conveniently from commercial sources.

An inquiry addressed to: Director, Arizona Bureau of Mines, University of Arizona, Tucson, AZ 85721, will bring a prompt response if further information is desired about the services which are available.

2 - 6/68AL30/2520