

Selected Bibliography
of Andalusite, Kyanite
Sillimanite, Dumortierite
Topaz, and Pyrophyllite
in the United States

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Selected Bibliography of Andalusite, Kyanite Sillimanite, Dumortierite Topaz, and Pyrophyllite in the United States

By AGNES B. GRAMETBAUR

CONTRIBUTIONS TO BIBLIOGRAPHY OF MINERAL
RESOURCES

G E O L O G I C A L S U R V E Y B U L L E T I N 1 0 1 9 - N

*Contains references, to December 31,
1958, on geology, mineral synthesis,
geographic occurrence, and technology
and uses*



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ILLUSTRATION

PLATE 6. Map of the United States showing the location of major deposits of the kyanite group of minerals and pyrophyllite.....In pocket

CONTRIBUTIONS TO BIBLIOGRAPHY OF MINERAL RESOURCES

SELECTED BIBLIOGRAPHY OF ANDALUSITE, KYANITE SILLIMANITE, DUMORTIERITE, TOPAZ, AND PYROPHYLLITE IN THE UNITED STATES

By AGNES B. GRAMETBAUR

ABSTRACT

The bibliography is a compilation of 566 references on the kyanite, or sillimanite, group of minerals and pyrophyllite to December 31, 1958. The publications are listed alphabetically by author (or authors) with full title and publication data. A brief description of the occurrence of the minerals in the United States and their uses precedes the bibliography.

The index is arranged alphabetically by mineral. Under each mineral the index is further subdivided by geographic areas (State and county) and by subjects, which include general, geology, mineral synthesis, occurrence (geographic), and technology and uses.

A complete list of periodicals and serials examined and a map of the United States, showing the location of major deposits of the kyanite group of minerals and pyrophyllite, are included.

INTRODUCTION

Among the nonclay high-alumina minerals that are most suitable for refractory materials are those of the kyanite group, also called the sillimanite group. These minerals include andalusite, kyanite, and sillimanite, which have the same chemical composition ($\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$) but different crystallographic, physical, and optical properties; and dumortierite ($8\text{Al}_2\text{O}_3 \cdot \text{B}_2\text{O}_3 \cdot 6\text{SiO}_2 \cdot \text{H}_2\text{O}$) and topaz ($[\text{Al}(\text{F},\text{OH})]_2\text{SiO}_4$), which are closely allied in composition and thermal behavior.

All these minerals disassociate upon heating to high temperatures to form mullite ($3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$) and free silica. Kyanite alters at the lowest temperature, $1,100^\circ$ to $1,480^\circ\text{C}$, sillimanite at the highest, $1,550^\circ$ to $1,650^\circ\text{C}$, andalusite at $1,350^\circ$ to $1,450^\circ\text{C}$, dumortierite at $<1,000^\circ$ to $1,250^\circ\text{C}$, and topaz at $<1,000^\circ$ to $1,480^\circ\text{C}$ (Riddle and Foster, 1949, p. 897). Mullite is the only form of silica and alumina that is stable at high temperatures. Pure mullite, which is chemi-

ally inert and stable to about 1,810°C, is an important refractory. The compound derives its name from the Island of Mull, Scotland, where the only natural occurrence of the mineral is known.

The ability of the kyanite group of minerals to form mullite upon firing accounts for their importance as raw materials for the manufacture of high-alumina refractories and ceramic articles. Although they represent a small percentage of the total tonnage of refractories used in the United States, mullite refractories are especially important because they maintain their strength to high temperatures, they have a low rate of thermal expansion and can withstand the effects of rapid temperature changes, and they are resistant to the corrosive action of certain fluxing agents.

All the minerals of the kyanite group have been used for refractory manufacture; kyanite, however, has been most widely used because it is more abundant and more commonly occurs in minable deposits than the other minerals. At present only kyanite is being mined in the United States, and production is expanding rapidly. Although most of the kyanite consumed is used in the refractory industry, its use in the manufacture of heavy-duty nonrefractory ceramics has increased in recent years.

Because domestic kyanite is produced as a fine-grained flotation concentrate that does not bond well, it is unsuitable by itself for making refractory bricks. Massive lump kyanite, designated strategic-grade kyanite, was formerly imported from India, Kenya, and the Union of South Africa for this purpose. In recent years, however, processes have been developed for making synthetic mullite from domestic raw materials. Synthetic mullite, made by fusing or sintering aluminous and siliceous mixtures of appropriate composition, is as good as mullite made from imported strategic-grade kyanite. Materials used in the manufacture of synthetic mullite include low-iron siliceous bauxite, domestic kyanite concentrate and high-alumina clay mixtures, alumina and silica mixtures, and diasporic clay.

Mullite is also a constituent of ceramic materials made from hydrous aluminum silicates, such as pyrophyllite ($\text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$) and kaolinite ($\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$), that contain less alumina than the minerals of the kyanite group. Ceramic articles made from these two minerals have relatively lower refractory properties than materials made from the kyanite group; nevertheless, they form an important branch of the ceramic and refractory industries. Although not a member of the kyanite group, pyrophyllite is included in this bibliography on the basis of similar occurrence and related uses.

About 90 percent of the mullitic material consumed in the United States is used as refractory linings for metallurgical or glass furnaces.

About 50 percent of the mullite refractories are used in the metallurgical industry and 40 percent in the glass industry. The remaining 10 percent is used chiefly in the ceramic industry in manufacturing such articles as kiln furniture, heavy-duty electrical and chemical porcelain, and spark plugs (Gunsallus, 1956).

OCCURRENCE OF ALUMINUM SILICATE MINERALS

ANDALUSITE

Andalusite is characteristically formed in alumina-rich slates and schists by the contact-metamorphic action of large igneous intrusions. In some places it is found in granitic rocks, gneisses, and mica schists. It also occurs as lenses and pockets in pegmatites and as replacement bodies produced by hydrothermal solutions. It commonly occurs as long prismatic crystals with nearly square cross section.

Although andalusite has been found in 24 States, commercial deposits are rare. The only deposits that have been mined are near Mocalno, on the west slope of the White Mountains, Mono County, Calif., and near Hawthorne, Mineral County, Nev.

KYANITE

Kyanite generally occurs as disseminated crystals in schists, quartzites, or gneisses produced by regional metamorphism, but locally it may form coarsely crystalline massive segregations in these rocks. It typically forms long-bladed crystals, often of large size, or coarse interlocking bladed or radiating fibrous aggregates.

Kyanite has been reported from 24 States. Most deposits are of the disseminated type; no minable massive deposits are known. The most important deposits are in the Piedmont belt of crystalline rocks extending from Virginia to Alabama. They occur at Baker Mountain, Prince Edward County, and Willis Mountain, Buckingham County, in Virginia, and at Henry Knob, near Clover, York County, S.C. These are the only deposits now producing kyanite in the United States.

Kyanite and sillimanite are important constituents of the heavy mineral concentrations in some of the beach and dune sands of Florida which are now being exploited for titanium and zircon. Eventually they may be recovered as byproducts.

SILLIMANITE

Sillimanite occurs in schists, gneisses, slates, and hornfels, and is generally formed at high temperatures under conditions of regional or contact metamorphism. In schists it forms long disseminated pris-

matic crystals or radiating fibrous or columnar masses, which may be rather coarse. It occurs less commonly in granites and pegmatites and in lenses, stringers, and nodules near pegmatites.

Sillimanite has been found in 26 States but has been produced only in very small amount in North Carolina (Stuckey, 1937, p. 75). The most promising occurrences are in the Southeastern States, particularly in North and South Carolina and Georgia.

DUMORTIERITE

Dumortierite occurs most commonly in pegmatites that cut aluminous rocks, such as sericite schists or cordierite and corundum gneisses. It also occurs as replacement bodies in association with highly aluminous rocks and as an accessory mineral in granite. Dumortierite commonly occurs as acicular needles or thin blades in fibrous to columnar aggregates; distinct crystals are rare.

Dumortierite has been found in eight States. The deposit in Humboldt Queen Canyon, near Oreana, Pershing County, Nev., however, is the only known commercial deposit in the world. Dumortierite was mined there for about 20 years and was used in the production of spark-plug insulators. Except for a small production of dumortierite in 1949, the mine has been idle since 1945.

TOPAZ

Topaz, like dumortierite, is characteristically a pneumatolytic mineral that is commonly found in veins and cavities in granites and rhyolites or in veins or pegmatites in the contact zones of schists and gneisses surrounding granitic intrusions. It also occurs with other high-alumina minerals, such as pyrophyllite, andalusite, kyanite, and diaspore, in silicified zones in volcanic rocks. In the largest known occurrence of this type, at the Brewer mine, near Jefferson, Chesterfield County, S.C., massive fine-grained topaz is in an irregular silicified zone (carrying gold and pyrite) that has replaced a rhyolitic breccia. The Brewer deposit, which contains the only large topaz reserves known in the United States, was mined during World War II but is no longer producing. Other occurrences of topaz are in California, Colorado, Missouri, North Carolina, and Virginia.

PYROPHYLLITE

Pyrophyllite also is found in metamorphic rocks. It occurs as foliated or compact masses and less commonly as radial fibrous aggregates in irregular, lenticular, or bedded deposits. It is believed to be formed by hydrothermal alteration or metasomatic replacement of

volcanic rocks, such as andesites, rhyolites, and silicic tuffs and breccias; and metamorphic rocks, such as slates and schists.

Pyrophyllite occurrences are known in nine States. The principal production in the United States comes from a belt in the central Piedmont which extends from North and South Carolina to Graves Mountain, Ga. The most important deposits are in Moore, Montgomery, Randolph, Alamance, Orange, and Granville Counties, N.C. North Carolina ranks first in quantity of pyrophyllite produced, followed by California.

EXPLANATION OF BIBLIOGRAPHY AND INDEX

The papers listed in the bibliography were selected from the bibliographic references that follow the chapters "Sillimanite Group," "Pyrophyllite," and "Refractories," respectively, in the first and second editions of "Industrial Minerals and Rocks," published by the American Institute of Mining and Metallurgical Engineers, and from the "Bibliography of North American Geology" to 1956. Articles published from 1957 to December 31, 1958, were obtained from the United States Geological Survey Library in Washington, D.C. A complete list of serials and periodicals included is given on pages 979-983.

The references in the bibliography are listed alphabetically by author (or authors) with full title and publication data.

The index is arranged alphabetically by mineral. Under each mineral the index is further subdivided by geographic areas (State and county) and by subjects, which include general, geology, mineral synthesis, occurrence (geographic), and technology and uses. If no geographic area is given, the subject entries are listed under the mineral before the State entries.

The subject "geology" includes crystallography, chemical and physical properties, chemical analyses, X-ray data, and the formation and geologic occurrence of the minerals. A specific paper may deal with one, several, or all of these subdivisions of "geology."

Under the subject "mineral synthesis" are listed several papers describing laboratory experiments whose primary purpose was to determine the conditions under which the minerals involved are formed in nature.

The author appreciates the help of V. R. Wilmarth and Cleaves L. Rogers, of the Geological Survey, in planning the bibliography and index and the cooperation of the staff of the Geological Survey Library in making the bibliographic material available.

The map of the United States (pl. 6) showing the location of major deposits of the kyanite group of minerals and pyrophyllite is based

on work by Gilbert H. Espenshade, also of the Survey. Additional data for the map were furnished by the United States Bureau of Mines, the California Department of Natural Resources, Division of Mines, the Idaho Bureau of Mines and Geology, the New Mexico State Bureau of Mines and Mineral Resources, the Nevada Bureau of Mines, the North Carolina Department of Conservation and Development, Division of Mineral Resources, and the Geological Survey of Wisconsin.

PERIODICALS AND SERIALS

<i>Abbreviation</i>	<i>Publication</i>
Acad. Nat. Sci. Philadelphia Proc.; Spec. Pub.	Proceedings of the Academy of Natural Sciences of Philadelphia; Special Publication. Philadelphia, Pa.
Alabama Acad. Sci. Jour.-----	The Journal of the Alabama Academy of Science. Alabama College, Montevallo, Ala.
Alabama Geol. Survey Bull.-----	Geological Survey of Alabama, Bulletin. University, Ala.
Am. Acad. Arts and Sci. Proc.-----	Proceedings of the American Academy of Arts and Sciences. Boston, Mass.
Am. Assoc. Petroleum Geologists Bull.	Bulletin of the American Association of Petroleum Geologists. Tulsa, Okla.
Am. Ceramic Soc. Bull.; Jour.-----	American Ceramic Society Bulletin; Journal. Columbus, Ohio.
Am. Geologist.-----	The American Geologist. Minneapolis, Minn.
Am. Geophys. Union Trans.-----	Transactions of the American Geophysical Union. Washington.
Am. Inst. Mining Metall. Engineers Contr.; Tech. Pub.; Trans.; Year Book.	American Institute of Mining and Metallurgical Engineers Contribution; Technical Publications, Transactions; Year Book. New York.
Am. Jour. Sci.-----	American Journal of Science. New Haven, Conn.
Am. Mineralogist.-----	The American Mineralogist. Washington.
Am. Petroleum Inst. Proj.; Prelim. Rept.	American Petroleum Institute Project, Preliminary Report. Columbia University, New York.
Am. Philos. Soc. Proc.-----	Proceedings of the American Philosophical Society. Philadelphia, Pa.
Am. Soc. Testing Materials Proc.-----	American Society for Testing Materials, Proceedings. Philadelphia, Pa.
Annotated Bibliography Econ. Geology.	Annotated Bibliography of Economic Geology. Urbana, Ill.
Arizona Bur. Mines Bull.-----	Arizona Bureau of Mines, Bulletin. Tucson, Ariz.
Brick & Clay Rec.-----	Brick & Clay Record. Chicago, Ill.
California Dept. Education Bull.-----	Bulletin of the California State Department of Education. Sacramento, Calif.
California Div. Mines Bull.; Div. Mines and Mining Bull., Mineral Inf. Service, Mining in California, Spec. Rept.	State of California, Department of Natural Resources, Division of Mines, Bulletin; Division of Mines and Mining Bulletin, Mineral Information Service, Mining in California, Special Report. San Francisco, Calif.

<i>Abbreviation</i>	<i>Publication</i>
California Jour. Mines and Geology.	California Journal of Mines and Geology. San Francisco, Calif.
California Mining Bur. Bull.; Mining in California; Rept. State Mineralogist.	California State Mining Bureau, Bulletin; Mining in California; Report of the State Mineralogist. San Francisco, Calif.
California Univ. Pubs., Dept. Geol. Sci. Bull.	University of California Publications, Bulletin of the Department of Geological Sciences. University of California Press, Berkeley, Calif.
California Univ. Pubs. Math. Phys. Sci.	Publications of the University of California at Los Angeles in Mathematical and Physical Sciences. University of California Press, Berkeley, Calif.
Cement, Mill, & Quarry-----	Chicago, Ill.
Ceramic Abs-----	Ceramic Abstracts. American Ceramic Society, Columbus, Ohio.
Ceramic Age-----	Newark, N.J.
Ceramic Industry-----	Chicago, Ill.
Ceramist-----	The Ceramist. Newark, N.J.
Colorado Geol. Survey Bull-----	Colorado Geological Survey, Bulletin. Boulder, Colo.
Colorado School Mines Quart-----	Quarterly of the Colorado School of Mines. Golden, Colo.
Colorado-Wyoming Acad. Sci. Jour.	The Journal of the Colorado-Wyoming Academy of Science. Bibliographic Center, Denver Public Library, Colo.
Commonwealth-----	The Commonwealth. Virginia State Chamber of Commerce, Richmond, Va.
Connecticut Geol. Nat. History Survey Misc. Ser.; Quad. Rept.	State Geological and Natural History Survey of Connecticut, Miscellaneous Series; Quadrangle Report. Hartford, Conn.
Dissert. Abs-----	Dissertation Abstracts. University Microfilms, Ann Arbor, Mich.
Econ. Geology-----	Economic Geology. Urbana, Ill.
Elisha Mitchell Sci. Soc. Jour-----	Journal of the Elisha Mitchell Scientific Society. Chapel Hill, N.C.
Eng. Mining Jour-----	Engineering and Mining Journal. New York.
Eng. Mining Jour.-Press-----	Engineering and Mining Journal-Press. New York.
Florida Geol. Survey Ann. Rept.; Bull.	Florida State Geological Survey, Annual Report. Bulletin. Tallahassee, Fla.
Forestry-Geol. Rev-----	Forestry-Geological Review, Department of Forestry and Geological Development. Atlanta, Ga.
Geol. Soc. America Bull.; Mem.; Proc.	Bulletin of the Geological Society of America; Memoir; Proceedings. New York.
Georgia Div. Geology Inf. Circ-----	Georgia Department of Forestry and Geological Development, Division of Geology, Information Circular. Atlanta, Ga.

<i>Abbreviation</i>	<i>Publication</i>
Georgia Geol. Survey Bull.; Georgia Mineral Newsletter.	Geological Survey of Georgia, Department of Forestry and Geological Development, Bulletin; Georgia State Division of Conservation, Department of Mines, Mining and Geology, The Geological Survey Bulletin; Georgia Mineral Newsletter. Atlanta, Ga.
Glass Industry-----	The Glass Industry. New York.
Idaho Bur. Mines and Geology Inf. Leaflet; Pamph.	Idaho Bureau of Mines and Geology Information Leaflet; Pamphlet. Moscow, Idaho.
Jour. Geology-----	The Journal of Geology. Chicago, Ill.
Jour. Sed. Petrology-----	Journal of Sedimentary Petrology. Tulsa, Okla.
Maine Geol. Survey Bull.; Rept. State Geologist.	Bulletin, Maine Geological Survey, Department of Development of Industry and Commerce; Report of the State Geologist. Augusta, Maine.
Manufacturers Rec-----	Manufacturers Record. Baltimore, Md.
Massachusetts Dept. Public Works [and] U.S. Geol. Survey, Coop. Geol. Proj. Inf. Circ.	Commonwealth of Massachusetts, Department of Public Works [and] U.S. Department of the Interior Geological Survey, Cooperative Geologic Project, Information Circular. Boston, Mass.
Michigan Geol. and Biol. Survey Pub. (Geol. Ser.).	Michigan Geological and Biological Survey Publication (Geological Series). Lansing, Mich.
Mineralog. Soc. Utah News Bull---	News Bulletin of the Mineralogical Society of Utah. Salt Lake City, Utah.
Mineralogist-----	The Mineralogist. Portland, Ore.
Mining and Metallurgy-----	New York.
Mining Eng-----	Mining Engineering. New York.
Mining Sci. Press-----	Mining and Scientific Press. San Francisco, Calif.
Missouri Bur. Geology and Mines State Geologist Bienn. Rept.	Missouri Bureau of Geology and Mines, Biennial Report of the State Geologist. Rolla, Mo.
Montana Acad. Sci. Proc-----	Proceedings of the Montana Academy of Sciences. Missoula, Mont.
Montana Bur. Mines and Geology Mem.; Misc. Contr.	State of Montana, Bureau of Mines and Geology, Memoir; Miscellaneous Contribution. Butte, Mont.
Natl. Acad. Sci.-Natl. Research Council, Minerals and Metals Advisory Board Rept.	National Academy of Sciences-National Research Council, Minerals and Metals Advisory Board Report. Washington.
Nevada Univ. Bull.; Geology and Mining Ser.	University of Nevada Bulletin (Bulletin of Nevada State Bureau of Mines and Mackay School of Mines); Geology and Mining Series. Reno, Nev.
New England Naturalist-----	The New England Naturalist. Boston, Mass.
New Hampshire State Plan. Devel. Comm. Mineral Resource Survey.	New Hampshire Mineral Resource Survey, New Hampshire State Planning and Development Commission. Concord, N.H.

<i>Abbreviation</i>	<i>Publication</i>
New Jersey Dept. Conserv. Econ. Devel., Geol. Ser. Bull.	State of New Jersey Department of Conservation and Economic Development, Geologic Series Bulletin. Trenton, N.J.
New Mexico Bur. Mines and Mineral Resources Bull.	New Mexico Bureau of Mines and Mineral Resources Bulletin. Socorro, N. Mex.
New Mexico Univ. Bull., Geol. Ser.	Bulletin of the University of New Mexico, Geological Series. Albuquerque, N. Mex.
New York Acad. Sci. Trans.-----	Transactions of the New York Academy of Sciences. New York.
New York State Mus. Bull.; New York State Mus. and Sci. Service Bull.	New York State Museum Bulletin; New York State Museum and Science Service Bulletin. University of the State of New York, Albany, N.Y.
North Carolina Dept. Conserv. Devel. Bull., Econ. Paper; Div. Mineral Resources Bull., Econ. Paper, Educ. Ser., Inf. Circ.	North Carolina Department of Conservation and Development Bulletin, Economic Paper; Division of Mineral Resources Bulletin, Economic Paper, Educational Series, Information Circular. Raleigh, N.C.
North Carolina Geol. Econ. Survey Bull.; Econ. Paper.	North Carolina Geological and Economic Survey Bulletin; Economic Paper. Raleigh, N.C.
North Carolina Geol. Survey Econ. Paper.	North Carolina Geological Survey Economic Paper. Raleigh, N.C.
North Carolina State Coll. Agriculture and Engineering, Eng. Expt. Sta. Bull.; Dept. Eng. Research Bull.	North Carolina State College of Agriculture and Engineering of the University of North Carolina, Bulletin, Engineering Experiment Station; Department of Engineering Research Bulletin. Raleigh, N.C.
North Carolina State Coll. Rec.----	North Carolina State College Record. Raleigh, N.C.
Ohio State Univ. Studies, Eng. Expt. Sta. Circ.	Ohio State University Studies, Engineering Experiment Station Circular. Columbus, Ohio.
Pit and Quarry-----	Chicago, Ill.
Raw Materials Survey Resource Rept.	Raw Materials Survey, Resource Report. Portland, Oreg.
Rocks and Minerals-----	Peekskill, N.Y.
South Carolina Geol. Survey, ser. 4, Bull.	South Carolina Geological Survey, series 4, Bulletin. Columbia, S.C.
South Carolina Research, Plan. Devel. Board Bull.	South Carolina Research, Planning and Development Board Bulletin. Columbia, S.C.
South Dakota School Mines Bull.---	South Dakota School of Mines, Bulletin, Departments of Geology and Mineralogy. Rapid City, S. Dak.
Stanford Univ. Abs. Dissert.-----	Stanford University, Abstracts of Dissertations for the Degrees of Doctor of Philosophy and Doctor of Education. Stanford University, Calif.

<i>Abbreviation</i>	<i>Publication</i>
U.S. Bur. Mines Bull.; Inf. Circ.; Minerals Yearbook, preprint; Rept. Inv.	United States Bureau of Mines Bulletin; Information Circular; Minerals Yearbook, preprint; Report of Investigations. Washington.
U.S. Geol. Survey Bull.; Geol. Atlas, Folio; Mineral Inv. Field Studies Map; Mineral Resources U.S.; Missouri River Basin Studies; Prof. Paper.	United States Geological Survey Bulletin; Geological Atlas, Folio; Mineral Investigations Field Studies Map; Mineral Resources of the United States; Missouri River Basin Studies; Professional Paper. Washington.
U.S. Natl. Mus. Proc-----	Proceedings of the United States National Museum. Washington.
U.S. Tariff Comm., Industrial Materials Ser. Rept.	United States Tariff Commission, Industrial Materials Series Report. Washington.
Utah Acad. Sci. Proc-----	Proceedings of the Utah Academy of Sciences, Arts and Letters. Salt Lake City, Utah.
Vermont Geol. Survey Bull-----	Vermont Geological Survey Bulletin. Vermont Development Commission, Montpelier, Vt.
Vermont Geol. Survey State Geologist Rept.	Vermont Geological Survey, Report of the State Geologist. Burlington, Vt.
Virginia Div. Mineral Resources Bull.	Commonwealth of Virginia, Virginia Division of Mineral Resources, Bulletin. Charlottesville, Va.
Virginia Geol. Survey Bull.; Repr. Ser.	Commonwealth of Virginia, Virginia Geological Survey, Bulletin; Reprint Series. University, Va.
Virginia Polytech. Inst., Eng. Expt. Sta. Ser. Bull.; Mineral Industries Jour.	Virginia Polytechnic Institute, Engineering Experiment Station Series Bulletin; Mineral Industries Journal. Blacksburg, Va.
Virginia Univ. Pubs., Philos. Soc. Bull., Sci. Ser.	University of Virginia Publications, Bulletin of the Philosophical Society, Scientific Series. Charlottesville, Va.
Washington Acad. Sci. Jour-----	Journal of the Washington Academy of Sciences. Washington.
Washington Div. Mines and Geology Bull.	State of Washington, Department of Conservation and Development, Division of Mines and Geology, Bulletin. Olympia, Wash.
Washington Univ. Pubs. in Geology.	University of Washington Publications in Geology. Seattle, Wash.
Wyoming Geol. Survey Bull-----	The Geological Survey of Wyoming, Bulletin. Laramie, Wyo.

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General :

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American Ceramic Society, Inc.
1950

Espenshade and Potter 1959

Greig 1925

Kerr 1937

Peck 1933

Riddle and Foster 1949

Snedden 1945

U.S. Bureau of Mines 1932-33

Watkins and others 1952

Williamson 1949

Winston 1944

Geology :

Clarke, F. W. 1908

Ford 1932

Funk 1940a

Goldsmith 1953

Hawes 1878

Heinrich 1952

Insley 1933

Ladoo and Myers 1951

Norton, F. H. 1949

Norton, J. T. 1925a

Roy 1954

Roy and Osborn 1952a, c, 1954

Sosman 1933

Taylor 1933

Mineral synthesis :

Clark and others 1957

Kennedy 1954, 1955

Roy 1954

Roy and Osborn 1952a, 1954

Schulling 1958

Yoder 1952

Technology and uses :

Broadhurst and Councill 1953

Newton 1944

Roy and Osborn 1952b

Tyler and Heuer 1937

Alabama.

Occurrence : Pallister 1955a, b

Arizona.

Geology, Yuma County : Wilson, E. D.
1929

Occurrence :

Gila County :

Galbraith 1947

Wilson, E. D., and others 1953

Mohave County :

Galbraith 1947

Wilson, E. D., and others 1953

Andalusite—Continued

Arizona—Continued

Occurrence—Continued

Pinal County : Galbraith 1947

Yavapai County :

Galbraith 1947

Wilson, E. D., and others 1953

Yuma County :

Funk 1940a

Galbraith 1947

Wilson, E. D. 1929

Wilson, E. D., and others 1953

California.

General, Mono County :

Jeffery 1943

Jeffery and Woodhouse 1931

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Kerr 1937

Ladoo and Myers 1951

McLenegan 1956

Melhase 1925

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Riddle and Foster 1949

Sampson and Tucker 1931

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Woodhouse 1936

Wright 1950a, 1957a

Geology :

Butte County : Hietanen 1951

Fresno County :

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MacDonald and Merriam 1938

Madera County : Keller and others
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Clarke, F. W. 1908

Rose 1957

Mono County :

Adler 1950

Dunn 1933

Foster 1947

Knopf 1917

Lemmon 1937

Riddle and Peck 1935

Woodhouse 1951

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Larsen 1948

Murdoch 1936

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San Diego County :

Merriam 1946

Schaller 1905

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Occurrence:

- Murdoch and Webb 1956
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 Pabst 1938
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 Sampson and Tucker 1931
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 Funk 1940a, b
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 Erwin 1934
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 Kellar and others 1952
 Murdoch and Webb 1952, 1956
 Pabst 1938
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 Wright 1957a
 Mariposa County:
 Bowen and Gray 1957
 Clarke, F. W. 1908
 Eakle 1922
 Funk 1940a
 Pabst 1938
 Rose 1957
 Mono County:
 Adler 1950
 California Division of Mines, Staff
 1952
 Clark and others 1957
 Clarke, F. W. 1908
 Dunn 1933
 Eakle 1922
 Ford 1932
 Foster 1947
 Foster and others 1952
 Funk 1940a
 Insley 1933
 Jeffery 1943
 Jeffery and Woodhouse 1931
 Jenkins and others 1954
 Jensen 1943
 Kerr 1932, 1937
 Knopf 1917
 Ladoo and Myers 1951
 Lemmon 1937
 McLenagan 1956
 McVay and Wilson 1943
 Melhase 1925
 Murdoch and Webb 1952, 1956
 Pabst 1938
 Peck 1924, 1925
 Petar 1930
 Riddle and Foster 1949

Andalusite—Continued

California—Continued

Occurrence—Continued

- Mono County—Continued
 Riddle and Peck 1935
 Sampson and Tucker 1931
 Smith, R. W. 1932
 Snedden 1945
 Tyler and Heuer 1949
 Watkins 1932
 Winston 1944
 Woodhouse 1936, 1951
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 Nevada County:
 Eakle 1922
 Pabst 1938
 Sampson and Tucker 1931
 Orange County: Larsen 1948
 Riverside County:
 Eakle 1922
 Funk 1940a
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 Larsen 1948
 Murdoch 1936
 Pabst 1938
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 Webb 1939, 1943
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 Sacramento County:
 Allen 1940
 Pabst 1938
 San Diego County:
 Jahns and Wright 1951
 Merriam 1946
 Murdoch and Webb 1952, 1956
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 Schaller 1905
 Wright 1957a
 Tulare County: Pabst 1938
 Technology and uses, Mono County:
 Foster and others 1952
 McVay and Wilson 1943
 Watkins 1932

Colorado.

- Geology, Gunnison County: Crawford
 and Worcester 1916
 Occurrence: Foster and others 1952
 Gunnison County:
 Argall 1949
 Crawford and Worcester 1916
 Larimer County:
 Argall 1949
 Riddle and Foster 1949
 Technology and uses: Foster and others
 1952

Connecticut.

- Occurrence:
 Litchfield County:
 Ladoo and Myers 1951
 Hawes 1878

Delaware.

- Geology and occurrence, New Castle
 County: Bascom and Stose
 1932

Andalusite—Continued

Georgia.

Geology and occurrence, Baldwin County: Hurst 1956

Idaho.

General, Shoshone County: Abbott and Prater 1954

Geology:

Clearwater County: Hietanen 1956

Shoshone County: Hietanen 1956

Occurrence:

Clearwater County: Hietanen 1956

Shoshone County:

Abbott and Prater 1954

Hietanen 1956

Hubbard 1955

Kelly and others 1956

Maine.

Geology, Piscataquis County:

Houston 1956

Philbrick 1936, 1940

Occurrence:

Cumberland County:

Ford 1932

Ladoo and Myers 1951

Piscataquis County:

Houston 1956

Philbrick 1936, 1940

Maryland.

Geology, Harford County: Dale and others 1914

Occurrence, Harford County:

Agron 1950

Dale and others 1914

Massachusetts.

Geology:

Middlesex County:

Emerson 1917

Jahns 1942

Worcester County:

Clarke, F. W. 1908

Emerson 1917

Jahns 1942

Shaub 1953

Occurrence:

Franklin County: Emerson 1895

Hampden County: Emerson 1895

Middlesex County:

Emerson 1917

Ford 1932

Jahns 1942

Jensen 1943

Ladoo and Myers 1951

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Riddle and Foster 1949

Worcester County:

Clarke, F. W. 1908

Emerson 1917

Ford 1932

Jahns 1942

Ladoo and Myers 1951

Shaub 1953

Andalusite—Continued

Montana.

Geology, Park County:

Heinrich 1948, 1949

Seager 1944

Occurrence:

Deer Lodge County:

Emmons and Calkins 1913

Heinrich 1948

Granite County: Kauffman 1952

Park County:

Heinrich 1948, 1949

Kauffman 1952

Riddle and Foster 1949

Seager 1944

Nevada.

General:

Douglas County:

Binyon 1946

McLenegan 1956

Mineral County:

Kerr 1937

McLenegan 1956

U.S. Bureau of Mines 1932-33

Warner and others 1958

Geology:

Humboldt County:¹ Knopf 1917

Pershing County:

Foster 1947

Grawe 1928a

Jenney 1935

Jones 1928

Kerr 1940

Kerr and Jenney 1935

Knopf 1924

Warner and others 1958

Occurrence:

Douglas County:

Binyon 1946

McLenegan 1956

Humboldt County: Knopf 1917

Mineral County:

Foster and others 1952

Funk 1940a

Jensen 1943

Kerr 1937

Ladoo and Myers 1951

McLenegan 1956

McVay and Wilson 1943

Riddle and Foster 1949

U.S. Bureau of Mines 1932-33

Warner and others 1958

Pershing County:

Foster 1947

Funk 1940a

Grawe 1928a

Insley 1933

Jenney 1935

Jones 1928

Kerr 1940

¹ In 1919, the southern part of Humboldt County, which included the Rochester mining district in the Humboldt Range, was incorporated into Pershing County.

Andalusite—Continued

Nevada—Continued

Occurrence—Continued

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Ladoo and Myers 1951

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Riddle and Foster 1949

Warner and others 1958

Technology and uses :

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1952

Pershing County: Palmer 1928

New Hampshire.

Geology: Billings 1955, 1956

Belknap County: Modell 1936

Carroll County: Billings 1928

Cheshire County: Fowler—Billings
1941

Coos County :

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1946Grafton County: Williams and Billings
1938**Occurrence: Billings 1955, 1956**

Belknap County :

Myers and Stewart 1956

Modell 1936

Carroll County :

Billings 1928

Myers and Stewart 1956

Cheshire County :

Fowler—Billings 1941

Hawes 1878

Myers and Stewart 1956

Coos County :

Billings 1941

Billings, Chapman, and others
1946Billings, Fowler—Billings, and
others 1946

Myers and Stewart 1956

Grafton County :

Moke 1946

Williams and Billings 1938

Merrimack County :

Hawes 1878

Myers and Stewart 1956

Rockingham County :

Hawes 1878

Myers and Stewart 1956

Strafford County :

Bannerman 1941

Hawes 1878

Myers and Stewart 1956

Sullivan County :

Hawes 1878

Myers and Stewart 1956

New Mexico.

Geology :

Dona Ana County: Dunham 1935

Lincoln County: Sidwell 1946

Rio Arriba County: Montgomery
1953

Andalusite—Continued

New Mexico—Continued

Geology—Continued

Taos County: Montgomery 1953

Occurrence :

Dona Ana County :

Dunham 1935

Northrop 1942

Lincoln County: Sidwell 1946

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Northrop 1942

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Socorro County: Northrop 1942

Taos County :

Montgomery 1953

Northrop 1942

Talmage and Wootton 1937

*North Carolina.*Geology: Broadhurst and Council
1954Alamance County: Espenshade and
Potter 1959

Gaston County :

Espenshade and Potter 1959

Potter 1954

Granville County :

Broadhurst and Council 1953

Espenshade and Potter 1959

Lincoln County: Potter 1954

Orange County :

Broadhurst and Council 1953

Espenshade and Potter 1959

Randolph County: Espenshade and
Potter 1959Occurrence: Broadhurst and Council
1954

Alamance County :

Broadhurst 1955

Espenshade and Potter 1959

Gaston County :

Espenshade and Potter 1959

Potter 1954

Granville County :

Broadhurst 1955

Broadhurst and Council 1953

Espenshade and Potter 1959

Stuckey 1958

Lincoln County :

Espenshade and Potter 1959

Potter 1954

Montgomery County: Broadhurst
1955

Moore County: Broadhurst 1955

Orange County :

Broadhurst 1955

Broadhurst and Council 1953

Espenshade and Potter 1959

King 1958

Stuckey 1958

Randolph County :

Broadhurst 1955

Broadhurst and Council 1953

Espenshade and Potter 1959

Andalusite—Continued

Pennsylvania.

Geology:

Chester County: Bascom and Stose
1932

Delaware County:

Bascom and Stose 1932

Dike 1951

Gordon 1922

Lancaster County: Dale and others
1914

Northampton County: Anderson and
Chesley 1931

York County: Dale and others 1914

Occurrence:

Chester County: Bascom and Stose
1932

Delaware County:

Bascom and Stose 1932

Dike 1951

Ford 1932

Gordon 1922

McKinstry 1949

Lancaster County:

Agron 1950

Dale and others 1914

Northampton County: Anderson and
Chesley 1931

York County:

Agron 1950

Dale and others 1914

South Carolina.

Geology:

Chesterfield County: Espenshade and
Potter 1959

Edgefield County: Espenshade and
Potter 1959

York County: Espenshade and Potter
1953a

Occurrence:

Abbeville County: Espenshade and
Potter 1959

Chesterfield County:

Espenshade and Potter 1959

Peyton and Lynch 1953

Edgefield County: Espenshade and
Potter 1959

McCormick County: Espenshade and
Potter 1959

York County: Espenshade and Potter
1953a, 1959

South Dakota.

General, Pennington County: Connolly
and O'Harra 1929

Geology:

Custer County: Riddle and Peck
1935

Pennington County:

Lincoln and others 1937

Ziegler 1914

Occurrence, Black Hills:

Jensen 1934

Kerr 1937

Andalusite—Continued

South Dakota—Continued

Occurrence, Black Hills—Continued

See also Custer, Pennington, and
Lawrence Counties.

Custer County: Riddle and Peck
1935

Lawrence County: Hess 1909

Pennington County:

Connolly and O'Harra 1929

Hess 1909

Lincoln and others 1937

Page and others 1953

Petar 1930

Riddle and Foster 1949

Runner 1918

Ziegler 1914

United States, southeastern.

Geology and occurrence: Espenshade
and Potter 1959

Utah.

Geology:

Beaver County: Butler, B. S. 1913

Tooele County: Kemp and Billingsley
1918

Occurrence:

Beaver County:

Butler, B. S. 1913

Butler, B. S., and others 1920

Tooele County:

Kemp and Billingsley 1918

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Vermont.

Geology and occurrence, Orleans Coun-
ty: Doll 1951

Virginia.

Occurrence:

Fairfax County: Espenshade and
Potter 1959

Patrick County:

Dietrich, R. V. 1953, 1954

Espenshade and Potter 1959

Washington.

Geology:

Skamania County:

Clarke, F. W. 1908

Schaller 1905

Spokane County:

Anderson 1928

Collier 1908

Page 1942

Occurrence:

Kittitas County:

Smith and Calkins 1906

Valentine 1949

Pend Oreille County: Valentine
1949

San Juan County:

Kelly and others 1956

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Andalusite—Continued**Washington—Continued****Occurrence—Continued****Skamania County :**

- Clarke, F. W. 1908
 Kelly and others 1956
 Schaller 1905
 Valentine 1949

Spokane County :

- Anderson 1928
 Collier 1908
 Kelly and others 1956
 Page 1942
 Riddle and Foster 1949
 Valentine 1949

Stevens County :

- Kelly and others 1956
 Valentine 1949

Wyoming.**Occurrence :**

- Albany County : Osterwald and Osterwald 1952
 Fremont County :
 Birch 1955
 Osterwald and Osterwald 1952
 Platte County :
 Birch 1955
 Clabaugh and others 1946
 Osterwald and Osterwald 1952

Dumortierite.**General :**

- American Iron and Steel Institute—American Ceramic Society, Inc. 1950
 Funk 1940a
 Peck 1933
 Snedden 1945
 U.S. Bureau of Mines 1932-33
 Watkins and others 1952
 Winston 1944

Geology :

- Clarke, F. W. 1908
 Douglass 1953
 Ford 1932
 Grawe 1928b
 Jensen 1943
 Kerr 1937
 Ladoo and Myers 1951
 Riddle and Foster 1949

Technology and uses : Foster and others 1952**Arizona.****Geology, Yuma County :**

- Bowen and Wyckoff 1926
 Diller and Whitfield 1889
 Ford 1902
 Grawe 1928b
 Schaller 1905
 Wilson, E. D. 1929

Occurrence : Clarke, F. W. 1908**Yuma County :**

- Bowen and Wyckoff 1926
 Diller and Whitfield 1889
 Duke 1957
 Ford 1902, 1932

Dumortierite—Continued**Arizona—Continued****Occurrence—Continued****Yuma County—Continued**

- Funk 1940a
 Galbraith 1947
 Grawe 1928b
 Ladoo and Myers 1951
 Moore, B. N. 1936
 Riddle and Foster 1949
 Schaller 1905
 Wilson, E. D. 1929, 1933
 Wilson, E. D., and others 1953

California**General : Riddle and Foster 1949****Geology :****Imperial County :**

- Grawe 1928b
 Wolf 1930
 Merced County : Daviess 1946

Riverside County :

- Grawe 1928b
 Larsen 1948
 Murphy 1930

San Diego County :

- Ford 1902
 Funk 1940a
 Grawe 1928b
 Schaller 1905

Stanislaus County : Daviess 1946**Occurrence : Clarke, F. W. 1908****Imperial County :**

- Dietrich, F. W. 1928
 Eakle 1922
 Funk 1940a
 Grawe 1928b
 Jeffery 1943
 Murdoch and Webb 1954, 1956
 Pabst 1938
 Riddle and Foster 1949
 Sampson and Tucker 1931, 1942
 Tucker 1926
 Winston 1944
 Wolf 1930

Kern County :

- Murdoch and Webb 1956
 Reed and Bailey 1927

Merced County : Daviess 1946**Mono County : Woodhouse 1936****Riverside County :**

- Eakle 1922
 Funk 1940a
 Grawe 1928b
 Jeffery 1943
 Kunz 1905
 Larsen 1948
 Murdoch 1949
 Murdoch and Webb 1952, 1954, 1956
 Murphy 1930
 Pabst 1938
 Sampson and Tucker 1931
 Winston 1944

San Diego County :

- Eakle 1922
 Ford 1902, 1932

Dumortierite—Continued

California—Continued

Occurrence—Continued

San Diego County—Continued

- Funk 1940a
- Grawe 1928b
- Jeffery 1943
- Kunz 1905
- Murdoch and Webb 1954, 1956
- Pabst 1938
- Sampson and Tucker 1931
- Schaller 1905
- Winston 1944
- Stanislaus County: Daviess 1946

Colorado.

Geology, Fremont County:

- Finlay 1907
- Grawe 1928b

Occurrence, Fremont County:

- Argall 1949
- Finlay 1907
- Grawe 1928b

Montana.

Geology:

- Jefferson County: U.S. Geological Survey 1955
- Madison County: Graham and Robertson 1951, 1952

Occurrence:

- Granite County: Emmons and Calkins 1913
- Jefferson County: U.S. Geological Survey 1955
- Madison County: Graham and Robertson 1951, 1952

Nevada.

General, Pershing County:

- Funk 1940a
- Jeffery 1943
- Jensen 1943
- Kerr 1937
- Ladoo and Myers 1951
- Peck 1926
- Petar 1930
- Riddle and Foster 1949
- Warner and others 1958
- Winston 1944

Geology:

- Humboldt County:
 - Jones 1913
 - Knopf 1917
 - Schaller 1919
 - Schrader 1914
- Nye County: Grawe 1928b
- Pershing County:
 - Bowen and Wyckoff 1926
 - Fairbanks 1926
 - Foster 1947
 - Grawe 1928a, b
 - Jenney 1935
 - Jones 1928
 - Kerr and Jenney 1935
 - Knopf 1924
 - McLenegan 1956

Dumortierite—Continued

Nevada—Continued

Geology—Continued

Pershing County—Continued

- Riddle and Peck 1935
- York 1944

Occurrence: Watkins and others 1952

Humboldt County:

- Clarke, F. W. 1908
- Ford 1932
- Knopf 1917
- Schaller 1919
- Schrader 1914

Nye County:

- Grawe 1928b
- Stoddard 1932

Pershing County:

- Bowen and Wyckoff 1926
- Carpenter 1928
- Fairbanks 1926
- Foster 1947
- Fulton and Smith 1932
- Funk 1940a
- Grawe 1928a, b
- Jeffery 1943
- Jenney 1935
- Jensen 1943
- Jones 1928
- Kerr 1937
- Kerr and Jenney 1935
- Knopf 1924
- Ladoo and Myers 1951
- McLenegan 1956
- Newton 1944
- Palmer 1928
- Peck 1926
- Petar 1930
- Riddle and Foster 1949
- Riddle and Peck 1935
- Snedden 1945
- Stoddard 1932
- Warner and others 1958
- Winston 1944
- York 1944
- Washoe County:
 - Grawe 1928b
 - Stoddard 1932
- Technology and uses, Pershing County:
 - Carpenter 1928
 - Newton 1944
 - Palmer 1928
 - U.S. Bureau of Mines 1932-33

New Mexico.

Geology, Luna County:

- Grawe 1928b
- Schaller 1919

Occurrence:

Luna County:

- Grawe 1928b
- Northrop 1942
- Schaller 1919
- Talmage and Wootton 1937

Rio Arriba County:

- Jahns 1946
- Just 1937
- Northrop 1942

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New York.

- Geology, New York County:
 Diller and Whitfield 1889
 Ford 1902
 Grawe 1928b
 Riggs 1887
 Schaller 1905
- Occurrence, New York County:
 Butler, S. B. 1948
 Chamberlin 1888
 Diller and Whitfield 1889
 Ford 1902, 1932
 Grawe 1928b
 Ladoo and Myers 1951
 Riggs 1887
 Schaller 1905

Washington.

- Geology, Skamania County:
 Ford 1902
 Grawe 1928b
 Schaller 1905
- Occurrence: Clarke, F. W. 1908
- Skamania County:
 Ford 1902, 1932
 Grawe 1928b
 Kelley and others 1956
 Schaller 1905
 Valentine 1949

Kyanite.

General:

- American Iron and Steel Institute—American Ceramic Society, Inc. 1950
- Espenshade and Potter 1959
- Funk 1940a
- Greig 1925
- Gunsallus 1956
- Jeffery 1943
- Kerr 1937
- Norton, F. H. 1949
- Peck 1933
- Riddle and Foster 1949
- Snedden 1945
- U.S. Bureau of Mines 1932-33
- Waggaman 1953
- Watkins and others 1952
- Williamson 1949
- Winston 1944

Geology:

- Clarke, F. W. 1908
- Ford 1932
- Goldsmith 1953
- Hawes 1878
- Heinrich 1952
- Insley 1933
- Jensen 1943
- Ladoo and Myers 1951
- Norton, J. T. 1925a
- Roy and Osborn 1952a, c, 1954
- Sosman 1933
- Taylor 1933

Kyanite—Continued

Mineral synthesis:

- Clark and others 1957
- Kennedy 1954, 1955
- Roy and Osborn 1952a, 1954
- Schulling 1958
- Yoder 1957

Technology and uses:

- Broadhurst and Council 1953
- Ceramic Industry 1939a
- Galbreath and others 1944
- Gandrud 1935
- Greaves-Walker and others 1937
- Hopkins 1957
- McVay and others 1944
- Newton 1944
- Peck 1924
- Petar 1930
- Prindle and others 1935
- Ralston 1938
- Roy and Osborn 1952b
- Scholes 1938
- Tyler and Heuer 1937, 1949
- Watkins 1932

Alabama.

- Geology, Cleburne County: Bowles 1939

- Occurrence: Espenshade and Potter 1959

- Baldwin County: Havell and McVay 1939

Chilton County:

- Bowles 1939
- Pallister 1955a, b

Clay County:

- Bowles 1939
- Heinrich and Olson 1953
- Pallister 1955a, b

Cleburne County:

- Bowles 1939
- Heinrich and Olson 1953
- Pallister 1955a, b
- Riddle and Foster 1949

Coosa County:

- Bowles 1939
- Pallister 1955a, b

Randolph County:

- Bowles 1939
- Heinrich and Olson 1953
- Pallister 1955a, b
- Sterrett 1923

Tallapoosa County:

- Bowles 1939
- Heinrich and Olson 1953
- Sterrett 1923

Tuscaloosa County: Pallister 1955a

- Technology and uses, Baldwin County:
 Havell and McVay 1939

Arizona.

Geology, Yuma County:

- Schaller 1905
- Wilson, E. D. 1929

Kyanite—Continued

Arizona—Continued

Occurrence :

- Coconino County : Wilson, E. D. and others 1953
- Gila County : Wilson, E. D., and others 1953
- Maricopa County :
 - Galbraith 1947
 - Wilson, E. D., and others 1953
 - Wilson and Roseveare 1949
- Mohave County :
 - Galbraith 1947
 - Wilson, E. D., and others 1953
- Yavapai County :
 - Funk 1940a
 - Wilson, E. D., and others 1953
- Yuma County :
 - Duke 1957
 - Ford 1932
 - Funk 1940a
 - Galbraith 1947
 - Moore, B. N. 1936
 - Petar 1930
 - Riddle and Foster 1949
 - Schaller 1905
 - Wilson, E. D. 1929, 1933
 - Wilson, E. D., and others 1953

California.

General :

- Dietrich, W. F. 1928
- Jeffery 1943
- Imperial County :
 - Funk 1940a
 - Henshaw 1942
 - Kerr 1937
 - McLenegan 1956
 - Petar 1930
 - Riddle and Foster 1949
 - Sampson and Tucker 1931, 1942
 - Tucker 1926
 - Winston 1944
 - Wright 1950a, 1957a

Geology :

- Fresno County : Daviess 1946
- Imperial County :
 - Barlett 1940
 - Campbell and Wright 1950
 - Melhase 1925
 - Moore, B. N. 1936
- Los Angeles County : Bailey 1940
- Madera County : Daviess 1946
- Merced County : Daviess 1946
- San Diego County : Crawford, J. J. 1896
- Stanislaus County : Daviess 1946

Occurrence :

- Murdoch and Webb 1956
- Tyler and Heuer 1949
- Watkins and others 1952
- Fresno County : Daviess 1946
- Imperial County :
 - Barlett 1940
 - California Division of Mines, Staff 1952
 - Campbell and Wright 1950

Kyanite—Continued

California—Continued

Occurrence—Continued

- Imperial County—Continued
 - Dietrich, W. F. 1928
 - Eakle 1922
 - Funk 1940a
 - Henshaw 1942
 - Jeffery 1943
 - Jenkins and others 1954
 - Jensen 1943
 - Kerr 1937
 - Ladoo and Myers 1951
 - McLenegan 1956
 - McVay and Wilson 1943
 - Melhase 1925
 - Moore, B. N. 1936
 - Murdoch and Webb 1952, 1956
 - Pabst 1938
 - Petar 1930
 - Riddle and Foster 1949
 - Sampson and Tucker 1931, 1942
 - Tucker 1926
 - Watkins 1932
 - Winston 1944
 - Wright 1950a, 1957a
 - Wright and others 1954
- Kern County : Reed and Bailey 1927
- Los Angeles County :
 - Bailey 1940
 - Eakle 1922
 - Sampson and Tucker 1931
- Madera County : Daviess 1946
- Merced County : Daviess 1946
- San Diego County : Crawford, J. J. 1896
- Stanislaus County : Daviess 1946
- Tuolumne County :
 - Eakle 1922
 - Jeffery 1943
 - Pabst 1938
 - Sampson and Tucker 1931
 - Winston 1944
- Technology and uses, Imperial County :
 - Jensen 1943
 - Watkins 1932

Colorado.

- Geology, Park County : Heinrich and Bever 1957
- Occurrence, Park County :
 - Bever 1953
 - Heinrich and Bever 1957

Connecticut.

- Geology, Litchfield County :
 - Barlett 1940
 - Gates 1951, 1954
 - Gates and Bradley 1952
- Occurrence :
 - Fairfield County :
 - Ford 1932
 - Genth 1873
 - Hartford County : Ford 1932
 - Litchfield County :
 - Barlett 1940
 - Ford 1932
 - Gates 1951, 1954

Kyanite—Continued

Connecticut—Continued

Occurrence—Continued

Litchfield County—Continued

Gates and Bradley 1952

Genth 1873

Ladoo and Myers 1951

Florida.

General:

Alachua County: Thoenen and Warne
1949

Baker County: Spencer 1948

Bradford County:

Browning and others 1956

Spencer 1948

Clay County:

Browning and others 1956

Spencer 1948

Thoenen and Warne 1949

Duval County:

Browning and others 1956

Miller, Roswell, III 1945

Spencer 1948

Thoenen and Warne 1949

Escambia County: Miller, Ros-

well, III 1945

Highlands County: Thoenen and
Warne 1949Hillsborough County: Miller, Ros-
well, III 1945Indian River County: Miller, Ros-
well, III 1945Lake County: Thoenen and Warne
1949Marion County: Thoenen and Warne
1949Nassau County: Thoenen and Warne
1949Orange County: Thoenen and Warne
1949Putnam County: Thoenen and Warne
1949St. Johns County: Miller, Ros-
well, III 1945Santa Rosa County: Miller, Ros-
well, III 1945

Geology:

Cannon 1950

Martens 1935

Occurrence:

Cannon 1950

Espenshade and Potter 1959

Gunsallus 1956

Alachua County: Thoenen and Warne
1949

Baker County: Spencer 1948

Bradford County:

Browning and others 1956

Spencer 1948

Brevard County: Martens 1935

Broward County: Martens 1935

Clay County:

Browning and others 1956

Calver 1957

Engineering and Mining Journal
1952

Kyanite—Continued

Florida—Continued

Occurrence—Continued

Clay County—Continued

Spencer 1948

Thoenen and Warne 1949

Tyrrell and Klinefelter 1956

Dade County: Martens 1935

Duval County:

Browning and others 1956

Calver 1957

Martens 1935

Miller, Roswell, III 1945

Spencer 1948

Thoenen and Warne 1949

Escambia County:

Miller, Roswell, III 1945

Riddle and Foster 1949

Flagler County: Martens 1935

Highlands County: Thoenen and
Warne 1949Hillsborough County: Miller, Ros-
well, III 1945Indian River County: Miller, Ros-
well, III 1945Lake County: Thoenen and Warne
1949Marion County: Thoenen and Warne
1949

Nassau County:

Martens 1935

Thoenen and Warne 1949

Orange County: Thoenen and Warne
1949

Palm Beach County: Martens 1935

Putnam County: Thoenen and Warne
1949

St. Johns County:

Martens 1935

Miller, Roswell, III 1945

Santa Rosa County:

Miller, Roswell, III 1945

Riddle and Foster 1949

Volusia County: Martens 1935

Technology and uses, Clay County:

Engineering and Mining Journal
1952

Tyrrell and Klinefelter 1956

Georgia.

General:

Mattson 1934

O'Meara and Gandrud 1936

Cherokee County:

Furcron and Teague 1945

McVay and Wilson 1947

Dawson County:

Furcron and Teague 1945

McVay and Wilson 1947

Gilmer County:

Furcron and Teague 1945

McVay and Wilson 1947

Habersham County:

Espenshade and Potter 1959

Greene 1935

Riddle and Foster 1949

Smith, R. W. 1932, 1934, 1936a

Kyanite—Continued

Georgia—Continued

General—Continued

Lincoln County: Espenshade and Potter 1959

Pickens County:

Furcron and Teague 1945

McVay and Wilson 1947

Rabun County: Smith, R. W. 1934, 1936a

Geology:

Shell 1949

Stose and Smith 1939

Carroll County: Smith, R. W. 1932

Cherokee County:

Bayley 1928

Espenshade and Potter 1959

Furcron 1950

Prindle and others 1935

Smith, R. W. 1932

Clarke County: Hurst 1953

Dawson County: Furcron 1950

De Kalb County: Herrmann 1954

Fannin County:

Furcron 1950

Hurst 1955

LaForge and Phalen 1913

Prindle and others 1935

Smith, R. W. 1932

Fulton County: Crickmay 1935a

Gilmer County:

Furcron 1950

Smith, R. W. 1932

Gwinnett County: Herrmann 1954

Habersham County:

Crickmay 1952

Furcron 1950

Launer 1952

Prindle and others 1935

Smith, R. W. 1936b

Teague and Furcron 1948

Lincoln County:

Espenshade and Potter 1953b

Furcron 1950

Johnston 1935

Watkins 1942

Watson 1921

Watson and Watson 1912

Pickens County:

Espenshade and Potter 1959

Furcron 1950

Prindle and others 1935

Smith, R. W. 1932

Rabun County:

Crickmay 1952

Espenshade and Potter 1959

Furcron 1950

Prindle and others 1935

Smith, R. W. 1936b

Teague and Furcron 1948

Talbot County:

Clarke, J. W. 1952

Crickmay 1935b

Furcron 1950

Smith, R. W. 1932

Kyanite—Continued

Georgia—Continued

Geology—Continued

Towns County:

Furcron 1950

Prindle and others 1935

Union County:

Furcron 1950

LaForge and Phalen 1913

Prindle and others 1935

Smith, R. W. 1932

Upson County:

Clarke, J. W. 1952

Crickmay 1935b

Furcron 1950

Ingram 1950

Occurrence:

Foster and others 1952

Gunsallus 1956

Kerr 1937

Stose and Smith 1939

Tyler and Heuer 1949

Waggaman 1953

Watkins and others 1952

Carroll County:

Espenshade and Potter 1959

Shearer and Hull 1918

Smith, R. W. 1932

Chatham County: Martens 1935

Cherokee County:

Bayley 1928

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

McVay and Wilson 1947

Petar 1930

Prindle and others 1935

Riddle and Foster 1949

Smith, R. W. 1932

Clarke County: Hurst 1953

Cobb County: Petar 1930

Dawson County:

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

McVay and Wilson 1947

Riddle and Foster 1949

De Kalb County: Herrmann 1954

Fannin County:

Espenshade and Potter 1959

Furcron 1950

Greaves-Walker 1930

Hurst 1955

LaForge and Phalen 1913

Prindle and others 1935

Smith, R. W. 1932

Fulton County: Crickmay 1935a

Gilmer County:

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

McVay and Wilson 1947

Riddle and Foster 1949

Smith, R. W. 1932

Glynn County: Martens 1935

Kyanite—Continued

Georgia—Continued

Occurrence—Continued

Gwinnett County: Herrmann 1954

Habersham County:

Boyd 1940

Crickmay 1952

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

Greene 1935

Jensen 1943

Ladoo and Myers 1951

Lauer 1952

McVay and Wilson 1943

Petar 1930

Prindle and others 1935

Riddle and Foster 1949

Smith, R. W. 1932, 1934, 1936a, b

Teague and Furcron 1948

Haralson County:

Espenshade and Potter 1959

Shearer and Hull 1918

Harris County: Espenshade and Potter 1959

Lincoln County:

Espenshade and Potter 1953b, 1959

Furcron 1950

Furcron and Teague 1945

Genth 1873

Johnston 1935

Pratt 1898

Riddle and Foster 1949

Watkins 1942

Watson 1921

Watson and Watson 1912

Lumpkin County:

Espenshade and Potter 1959

Pardee and Park 1948

Nantahala National Forest: Prindle and others 1935

Pickens County:

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

McVay and Wilson 1947

Prindle and others 1935

Riddle and Foster 1949

Smith, R. W. 1932

Rabun County:

Crickmay 1952

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

Prindle and others 1935

Riddle and Foster 1949

Smith, R. W. 1934, 1936a, b

Teague and Furcron 1948

Talbot County:

Clarke, J. W. 1952

Crickmay 1935b

Espenshade and Potter 1959

Furcron 1950

Smith, R. W. 1932

Kyanite—Continued

Georgia—Continued

Occurrence—Continued

Towns County:

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

Hash and Van Horn 1951

Prindle and others 1935

Riddle and Foster 1949

Union County:

Espenshade and Potter 1959

Furcron 1950

Greaves-Walker 1930

LaForge and Phalen 1913

Prindle and others 1935

Smith, R. W. 1932

Upson County:

Clarke, J. W. 1952

Crickmay 1935b

Espenshade and Potter 1959

Furcron 1950

Ingram 1950

Petar 1930

Technology and uses:

Foster and others 1952

Ralston 1938

Habersham County:

Boyd 1940

Jensen 1943

McVay and Wilson 1943

Idaho.

General, Shoshone County: Abbott and Prater 1954

Geology:

Clearwater County: Hietanen 1956

Shoshone County: Hietanen 1956

Valley County: Schmidt 1958

Occurrence: Foster and others 1952

Clearwater County: Hietanen 1956

Idaho County: Kelly and others

1956

Lemhi County: Waggaman 1953

Shoshone County:

Abbott and Prater 1954

Hietanen 1956

Hubbard 1955

Kelly and others 1956

Valley County: Schmidt 1958

Technology and uses: Foster and others 1952

Maine.

Occurrence, Cumberland County: Clark and others 1957

Maryland.

Geology: Dryden and Dryden 1941

Baltimore County: Knopf and Jonas 1929

Calvert County: Miller, Roswell, III 1945

Occurrence:

Dryden and Dryden 1941

Kerr 1937

Kyanite—Continued

Maryland—Continued

Occurrence—Continued

- Baltimore County: Knopf and Jonas 1929
- Calvert County: Miller, Roswell, III 1945

Massachusetts.

Geology: Franklin, Hampden, Hampshire, and Worcester Counties: Emerton 1917

Occurrence:

- Franklin County: Emerton 1895, 1917
- Hampden County:
 - Emerson 1895, 1917
 - Ladoo and Myers 1951
 - Pearre 1956
- Hampshire County:
 - Emerson 1895, 1917
 - Ford 1932
 - Petar 1930
 - Riddle and Foster 1949
- Worcester County: Emerton 1917

Montana.

General: Gallatin and Madison Counties: Heinrich 1948

Geology:

- Gallatin County: Heinrich 1949
- Madison County:
 - Heinrich 1949
 - Reid 1957, 1958

Occurrence:

- Gallatin County: Heinrich 1948, 1949
- Lewis and Clark County: Kauffman 1952
- Madison County:
 - Heinrich 1948, 1949
 - Kauffman 1952
 - Kelly and others 1956
 - Reid 1957, 1958
 - Riddle and Foster 1949

New Hampshire.

Geology: Billings 1955, 1956

Grafton County:

- Bannerman 1941
- Chapman, C. A. 1939
- Hadley 1942
- Hadley and Chapman 1939
- Lyons 1955
- Riddle and Peck 1935

Sullivan County:

- Chapman, C. A. 1939
- Hadley and Chapman 1939

Occurrence: Billings 1955, 1956

Cheshire County:

- Fowler-Billings 1949a
- Hawes 1878
- Heald 1950a
- Meyers and Stewart 1956
- Moore, G. E., Jr. 1949a, b

Kyanite—Continued

New Hampshire—Continued

Occurrence—Continued

- Coos County: Meyers and Stewart 1956
- Grafton County:
 - Bannerman 1941
 - Chapman 1939
 - Hadley 1942
 - Hadley and Chapman 1939
 - Hawes 1878
 - Lyons 1955
 - Meyers and Stewart 1956
 - Pearre and Calkins 1957
 - Riddle and Peck 1935
- Sullivan County:
 - Chapman 1939
 - Hadley and Chapman 1939

New Mexico.

General, Rio Arriba County: Jahns 1946

Geology:

- Rio Arriba County:
 - Barker 1958
 - Corey 1954
 - Ellis 1930
 - Just 1937
 - Keller and others 1952
 - Montgomery 1953
 - Talmage and Wootton 1937
- Taos County:
 - Just 1937
 - Montgomery 1953

Occurrence:

- Rio Arriba County:
 - Barker 1958
 - Corey 1954
 - Ellis 1930
 - Jahns 1946
 - Just 1937
 - Keller and others 1952
 - Montgomery 1953
 - Northrop 1942
 - Petar 1930
 - Riddle and Foster 1949
 - Sterrett 1923
 - Talmage and Wootton 1937
- Taos County:
 - Just 1937
 - Montgomery 1953
 - Northrop 1942
 - Petar 1930
 - Riddle and Foster 1949

New York.

Geology:

- Dutchess County:
 - Balk 1936
 - Barth 1936
- Putnam County:
 - Balk 1936
 - Barth 1936

Occurrence:

- Dutchess County:
 - Balk 1936
 - Barth 1936

1024 CONTRIBUTIONS TO BIBLIOGRAPHY OF MINERAL RESOURCES

Kyanite—Continued

New York—Continued

Occurrence—Continued

- New York County :
 Butler, S. B. 1948
 Chamberlin 1888
 Putnam County :
 Balk 1936
 Barth 1936

North Carolina.

General :

- Broadhurst 1955
 Greaves-Walker 1930
 Buncombe County : Pole and Moore
 1938

Yancey County :

- Broadhurst 1955
 Espenshade and Potter 1959
 Jensen 1943
 Kerr 1937
 Mattson 1934, 1936, 1937
 Murdock 1950
 Riddle and Foster 1949
 Stuckey 1932, 1937
 Trauffer 1936

Geology :

- Broadhurst and Council 1954
 Bryson 1928
 Greaves-Walker and Riggs 1937
 Shell 1949
 Stuckey 1935
 Stuckey and Conrad 1958
 Stuckey and others 1947

Ashe County : Stuckey 1937

Avery County :

- Kulp and Brobst 1956
 Olson 1944
 Stuckey 1937

Buncombe County :

- Barlett 1940
 Bryson 1930
 Espenshade and Potter 1959
 Genth 1873
 Keith 1904, 1905, 1907b
 Overstreet and Griffiths 1955
 Stuckey 1932, 1937

Catawba County : Overstreet and Griffiths 1955

Clay County :

- Bryson 1930
 Hash and Van Horn 1951
 Stuckey 1937

Cleveland County :

- Espenshade and Potter 1959
 Keith and Sterrett 1917
 Overstreet and Griffiths 1955

Franklin County : Stuckey 1937

Gaston County :

- Espenshade and Potter 1953a, b,
 1959
 Furcron 1950
 Keith and Sterrett 1917, 1931
 Potter 1954
 Stuckey 1937

Granville County : Broadhurst and Council 1953

Kyanite—Continued

North Carolina—Continued

Geology—Continued

Haywood County :

- Keith 1907b
 Stuckey 1937

Iredell County : Stuckey 1937

Jackson County : Stuckey 1937

Johnston County :

- Broadhurst and Council 1953
 Dunn 1933
 Espenshade and Potter 1959
 Furcron 1950
 Stuckey 1932, 1937

Lincoln County :

- Espenshade and Potter 1953a,
 1959
 Potter 1954
 Stuckey 1937

McDowell County : Overstreet and Griffiths 1955

Macon County :

- Bryson 1932
 Hash and Van Horn 1951
 Keith 1907a
 Stuckey 1937

Mecklenburg County : Stuckey 1937

Mitchell County :

- Adler 1950
 Brobst 1952
 Bryson 1930
 Espenshade and Potter 1959
 Furcron 1950
 Keith 1907c
 Kulp and Brobst 1956
 Kunz 1888
 Olson 1944
 Stuckey 1932, 1937

Person County :

- Broadhurst and Council 1953
 Espenshade and Potter 1953b,
 1959
 Stuckey 1935, 1937

Randolph County : Stuckey 1937

Rutherford County :

- Espenshade and Potter 1959
 Stuckey 1937

Stokes County : Stuckey 1937

Surry County :

- Overstreet and Griffiths 1955
 Stuckey 1937

Wake County : Steel 1952

Western : Fessler and McCaughey 1929

Wilkes County :

- Bryson 1930
 Genth 1873
 Stuckey 1937

Yancey County :

- Bryson 1930, 1932
 Chute 1944
 Furcron 1950
 Keith 1905
 Olson 1944
 Payne 1928
 Pratt 1898

Kyanite—Continued

North Carolina—Continued

Occurrence :

- Broadhurst and Council 1954
- Foster and others 1952
- Gunsallus 1956
- O'Meara and Grandrud 1936
- Pratt 1901
- Stuckey 1935
- Stuckey and Conrad 1958
- Tyler and Heuer 1949
- Waggaman 1953
- Watkins and others 1952
- Alleghany County: Genth and Kerr 1881
- Ashe County :
 - Espenshade and Potter 1959
 - Genth 1891
 - Greaves-Walker 1945
 - Greaves-Walker and Riggs 1937
 - Stuckey 1937
- Avery County :
 - Bryson 1928, 1930
 - Espenshade and Potter 1959
 - Greaves-Walker 1945
 - Greaves-Walker and Riggs 1937
 - Kulp and Brobst 1956
 - Olson 1944
 - Petar 1930
 - Stuckey 1937
- Buncombe County :
 - Barlett 1940
 - Broadhurst 1955
 - Bryson 1930, 1938
 - Espenshade and Potter 1959
 - Genth 1873, 1891
 - Genth and Kerr 1881
 - Greaves-Walker 1930, 1945
 - Greaves-Walker and Riggs 1937
 - Hash and Van Horn 1951
 - Keith 1904, 1905, 1907b
 - King 1958
 - Kunz 1907
 - Murdock 1950
 - Overstreet and Griffiths 1955
 - Pole and Moore 1938
 - Stuckey 1932, 1937, 1952
 - Stuckey and others 1947
 - Stuckey and Steel 1953
- Burke County: Genth and Kerr 1881
- Caldwell County :
 - Bryson 1928
 - Genth 1871, 1891
 - Genth and Kerr 1881
 - Petar 1930
- Catawba County :
 - Genth 1871, 1891
 - Genth and Kerr 1881
 - Overstreet and Griffiths 1955
- Cherokee County :
 - Bryson 1928
 - Espenshade and Potter 1959
 - Genth 1891
 - Genth and Kerr 1881
 - Petar 1930

Kyanite—Continued

North Carolina—Continued

Occurrence—Continued

- Clay County :
 - Broadhurst 1955
 - Bryson 1928, 1930
 - Genth 1873, 1891
 - Genth and Kerr 1881
 - Greaves-Walker 1930, 1945
 - Greaves-Walker and Riggs 1937
 - Hash and Van Horn 1951
 - Petar 1930
 - Stuckey 1937
 - Stuckey and Steel 1953
- Cleveland County :
 - Broadhurst 1955
 - Espenshade and Potter 1953b, 1959
 - Hash and Van Horn 1951
 - Keith and Sterrett 1917
 - Overstreet and Griffiths 1955
 - Sterrett 1923
 - Stuckey and Steel 1953
- Franklin County :
 - Espenshade and Potter 1959
 - Greaves-Walker 1945
 - Greaves-Walker and Riggs 1937
 - Stuckey 1937
 - Stuckey and Steel 1953
- Gaston County :
 - Broadhurst 1955
 - Espenshade and Potter 1953a, b, 1959
 - Ford 1932
 - Furcron 1950
 - Genth 1871, 1873, 1891
 - Genth and Kerr 1881
 - Greaves-Walker and Riggs 1937
 - Keith and Sterrett 1917, 1931
 - Kunz 1907
 - Ladoo and Myers 1951
 - Potter 1954
 - Sterrett 1923
 - Stuckey 1937
 - Stuckey and Steel 1953
 - Watson 1921
- Graham County :
 - Bryson 1928
 - Petar 1930
- Granville County :
 - Broadhurst 1955
 - Broadhurst and Council 1953
 - Stuckey 1958
- Haywood County :
 - Bryson 1928, 1930
 - Espenshade and Potter 1959
 - Genth 1891
 - Genth and Kerr 1881
 - Greaves-Walker 1930, 1945
 - Greaves-Walker and Riggs 1937
 - Keith 1907b
 - Petar 1930
 - Pratt 1906
 - Sterrett 1923
 - Stuckey 1937

Kyanite—Continued

North Carolina—Continued

Occurrence—Continued

Iredell County :

- Bryson 1928, 1930
 Espenshade and Potter 1959
 Genth 1891
 Genth and Kerr 1881
 Greaves-Walker and Riggs 1937
 Petar 1930
 Pratt 1906
 Stuckey 1937
 Stuckey and Steel 1953

Jackson County :

- Bryson 1928, 1930
 Greaves-Walker 1930, 1945
 Greaves-Walker and Riggs 1937
 Hash and Van Horn 1951
 Petar 1930
 Pratt 1906
 Stuckey 1937

Johnston County :

- Broadhurst 1955
 Broadhurst and Councill 1955
 Dunn 1933
 Espenshade and Potter 1959
 Furcron 1950
 Greaves-Walker 1945
 Greaves-Walker and Riggs 1937
 King 1958
 Stuckey 1932, 1937
 Stuckey and Steel 1953

Lincoln County :

- Espenshade, Potter 1953a, 1959
 Genth and Kerr 1881
 Greaves-Walker and Riggs 1937
 Griffiths and Olson 1953a
 Overstreet and Griffiths 1955
 Potter 1954
 Sterrett 1923
 Stuckey 1937

McDowell County :

- Bryson 1930
 Genth and Kerr 1881
 Greaves-Walker 1945
 Greaves-Walker and Riggs 1937
 Overstreet and Griffiths 1955

Macon County :

- Broadhurst 1955
 Bryson 1930, 1932, 1938
 Genth 1871, 1891
 Genth and Kerr 1881
 Greaves-Walker 1930, 1945
 Greaves-Walker and Riggs 1937
 Hash and Van Horn 1951
 Keith 1907a
 Pratt 1906
 Stuckey 1937
 Stuckey and Steel 1953

Madison County :

- Bryson 1930
 Genth 1891
 Genth and Kerr 1881

Kyanite—Continued

North Carolina—Continued

Occurrence—Continued

Mecklenburg County :

- Espenshade and Potter 1959
 Genth 1871, 1891
 Genth and Kerr 1881
 Greaves-Walker and Riggs 1937
 Stuckey 1937

Mitchell County :

- Adler 1950
 Brobst 1952
 Bryson 1927, 1928, 1930, 1938
 Espenshade and Potter 1959
 Furcron 1950
 Genth 1871, 1891
 Genth and Kerr 1881
 Greaves-Walker 1930, 1945
 Greaves-Walker and Riggs 1937
 Keith 1907c
 Kulp and Brobst 1956
 Kunz 1888, 1907
 Olson 1944
 Parker 1952
 Petar 1930
 Pratt 1898, 1901
 Stuckey 1932, 1937

Moore County :

- Genth 1891
 Genth and Kerr 1881

Nantahala National Forest vicinity :

- Mattson 1934

Person County :

- Broadhurst 1955
 Broadhurst and Councill 1953
 Espenshade, Potter 1953b, 1959
 Genth 1871, 1891
 Genth and Kerr 1881
 Greaves-Walker 1945
 Greaves-Walker and Riggs 1937
 Jonas 1932
 Stuckey 1935, 1937

Randolph County :

- Greaves-Walker 1945
 Greaves-Walker and Riggs 1937
 Stuckey 1937, 1938

Rockingham County : Genth and Kerr
1881

Rutherford County :

- Broadhurst 1955
 Espenshade and Potter 1959
 Genth 1873
 Greaves-Walker 1945
 Greaves-Walker and Riggs 1937
 Kunz 1907
 Ladoo and Myers 1951
 Stuckey 1937

Stokes County :

- Espenshade and Potter 1959
 Genth 1871, 1891
 Genth and Kerr 1881
 Greaves-Walker and Riggs 1937
 Stuckey 1937

Kyanite—Continued

North Carolina—Continued

Occurrence—Continued

Surry County :

- Espenshade and Potter 1959
- Genth 1871, 1891
- Genth and Kerr 1881
- Greaves-Walker and Riggs 1937
- Overstreet and Griffiths 1955
- Stuckey 1937

Transylvania County :

- Genth 1891
- Genth and Kerr 1881
- Mattson 1934
- Pratt 1906

Wake County :

- Broadhurst 1955
- Espenshade and Potter 1959
- Genth 1891
- Genth and Kerr 1881
- Steel 1952

Watauga County: Genth, Kerr 1881

Western: Fessler and McCaughey 1929

Wilkes County :

- Bryson 1928, 1930
- Espenshade and Potter 1959
- Genth 1871, 1873, 1891
- Genth and Kerr 1881
- Greaves-Walker and Riggs 1937
- Petar 1930
- Stuckey 1937

Yancey County :

- Broadhurst 1955
- Bryson 1927, 1928, 1930, 1932, 1938

Chute 1944

Espenshade and Potter 1959

Ford 1932

Furcron 1950

Genth 1871, 1891

Genth and Kerr 1881

Greaves-Walker 1930, 1945

Greaves-Walker and Riggs 1937

Jeffery 1943

Jensen 1943

Keith 1905

Kerr 1937

Kunz 1907

Ladoo and Myers 1951

McVay and Wilson 1943

Mattson 1934, 1936, 1937

Murdock 1950

Olson 1944

Parker 1952

Payne 1928

Petar 1930

Pratt 1898, 1901

Riddle and Foster 1949

Stuckey 1932, 1937, 1952

Stuckey and others 1947

Stuckey and Steel 1953

Trauffer 1936

Watkins 1932

Kyanite—Continued

North Carolina—Continued

Technology and uses :

- Bryson 1930, 1938
- Foster and others 1952
- Greaves-Walker 1945
- Insley 1933
- Ralston 1938

Yancey County :

- Greaves-Walker 1945
- Jeffery 1943
- McVay and Wilson 1943
- Watkins 1932

Pennsylvania.

Geology :

Chester County: Gordon 1922

Delaware County :

- Dike 1951
- Gordon 1922
- Postel 1941
- Weiss 1949
- Wyckoff 1952

Montgomery County :

- Postel 1941
- Weiss 1949
- Wyckoff 1952

Northampton County: Anderson and Chesley 1931

Philadelphia County :

- Postel 1941
- Weiss 1949
- Wyckoff 1952

Occurrence: Kerr 1937

Bucks County: Gordon 1922

Chester County :

- Gordon 1922
- Ladoo and Myers 1951
- McKinstry 1949

Delaware County :

- Dike 1951
- Gordon 1922
- Ladoo and Myers 1951
- McKinstry 1949
- Petar 1930
- Postel 1941
- Riddle and Foster 1949
- Weiss 1949
- Wyckoff 1952

Lancaster County: Gordon 1922

Montgomery County :

- McKinstry 1949
- Postel 1941
- Weiss 1949
- Wyckoff 1952

Northampton County: Anderson and Chesley 1931

Philadelphia County :

- Gordon 1922
- McKinstry 1949
- Postel 1941
- Weiss 1949
- Wyckoff: 1952

Kyanite—Continued

South Carolina.

General, York County:

Bole 1949

Espenshade and Potter 1959

Geology:

Cherokee County:

Espenshade and Potter 1959

Keith and Sterrett 1931

Overstreet and Griffiths 1955

Chesterfield County: Espenshade and Potter 1959

Edgefield County: Espenshade and Potter 1959

Greenville County: Sloan 1908

Newberry County: Espenshade and Potter 1959

York County:

Espenshade and Potter 1953a, b, 1959

Furcron 1950

Keith and Sterrett 1931

Potter 1954

Smith and Newcome 1951

Occurrence:

Tyler and Heuer 1949

Watkins and others 1952

Charleston County: Martens 1935

Cherokee County:

Espenshade and Potter 1959

Furcron 1950

Keith and Sterrett 1931

Overstreet and Griffiths 1955

Van Horn and others 1949

Chesterfield County:

Espenshade and Potter 1959

Fries 1942

Peyton and Lynch 1953

Watson 1921

Edgefield County: Espenshade and Potter 1959

Greenville County:

Griffiths and Olson 1953b

Sloan 1908

Sterrett 1923

Newberry County:

Bole 1949

Espenshade and Potter 1959

Richland County: Smith, L. L. 1932

York County:

Avery 1953a

Brunenkant 1949

Bole 1949

Espenshade and Potter 1953a, b, 1959

Furcron 1950

Giese and Smith 1958

Gunsallus 1956

Jensen 1943

Keith and Sterrett 1931

Potter 1954

Riddle and Foster 1949

Smith, L. L. 1932

Smith and Newcome 1951

Waggaman 1953

Kyanite—Continued

South Carolina—Continued

Occurrence—Continued

York County—Continued

Wilson, H. H., Bole, G. A., 1958

Technology and uses, York County:

Avery 1953a

Brunenkant 1949

Giese and Smith 1958

Gunsallus 1956

Wilson, H. H., Bole, G. A. 1958

United States.

South Atlantic States, general: Mattson 1934

Southeastern, geology and occurrence:

Cannon 1950

Espenshade and Potter 1959

Furcron 1950

Stuckey 1953

Utah.

Geology and occurrence, Box Elder County: Crawford, A. L., and others 1948

Vermont.

Geology:

Orange County:

Doll 1944

Hadley and Chapman 1939

Jacobs 1944

Windsor County:

Currier 1934

Doll 1944

Lyons 1955

Occurrence:

Orange County:

Doll 1944

Hadley and Chapman 1939

Jacobs 1944

Windsor County:

Currier 1934

Doll 1944

Hawes 1878

Lyons 1955

Virginia.

General: Peck 1925, 1933

Buckingham County: Jones and Eilertsen 1954

Charlotte County: Kerr 1937

Grayson County: Stose and Stose 1957

Prince Edward County:

Corriveau 1955

Espenshade and Potter 1959

Hubbell 1941a

Jensen 1943

Mattson 1934

Riddle and Foster 1949

Sawyer and Whittemore 1941

Geology:

Dryden and Dryden 1941

Shell 1949

Kyanite—Continued

Virginia—Continued

Geology—Continued

Buckingham County:

Espenshade, Potter 1953a, b, 1959
 Jonas 1932
 Taber 1913, 1935

Carroll County:

Furcron 1950
 Jonas 1932
 Stose and Stose 1957

Charlotte County:

Espenshade and Potter 1953a, 1959
 Jonas 1932
 Taber 1913
 Watson and Watkins 1911

Goochland County: Taber 1913, 1935

Grayson County:

Furcron 1950
 Jonas 1932

Halifax County: Espenshade and Potter 1959

Henry County: Pegau 1932

Pittsylvania County: Pegau 1932

Prince Edward County:

Espenshade and Potter 1953a, b
 Furcron 1950
 Jonas 1932
 Sawyer and Whittemore 1940
 Stose and Stose 1957

Occurrence:

Dryden and Dryden 1941
 Tyler and Heuer 1949
 Watkins and others 1952

Amelia County: Dietrich, R. V. 1953, 1954, 1958

Buckingham County:

Dietrich, R. V. 1953, 1954, 1958
 Espenshade and Potter 1953a, b, 1959

Herod 1957

Jonas 1932

Jones and Ellersten 1954

Riddle and Foster 1949

Taber 1913, 1935

Waggaman 1953

Watkins 1932

Watson 1907

Campbell County:

Dietrich, R. V. 1955, 1958
 Espenshade and Potter 1959
 Watkins 1932

Caroline County:

Espenshade and Potter 1959
 Jahns and Griffiths 1953

Carroll County:

Dietrich, R. V. 1953, 1954, 1955, 1958
 Furcron 1950
 Jonas 1932
 Stose and Stose 1957

Kyanite—Continued

Virginia—Continued

Occurrence—Continued

Charlotte County:

Dietrich, R. V. 1953, 1954, 1958
 Espenshade, Potter 1953a, 1959
 Jonas 1932
 Kerr 1937
 Peck 1925
 Petar 1930
 Taber 1913

Watson and Watkins 1911

Fairfax County: Espenshade and Potter 1959

Fluvanna County: Dietrich, R. V. 1953, 1954, 1958

Franklin County:

Dietrich, R. V. 1955, 1958
 Sterrett 1923

Goochland County:

Dietrich, R. V. 1953, 1954, 1958
 Espenshade and Potter 1959
 Pardee and Park 1948
 Taber 1913, 1935

Grayson County:

Dietrich, R. V. 1953, 1954, 1955, 1958
 Espenshade and Potter 1959
 Furcron 1950
 Jahns and Griffiths 1953
 Jonas 1932
 Stose and Stose 1957
 Watkins 1932

Halifax County:

Dietrich, R. V. 1953, 1954, 1958
 Espenshade and Potter 1959
 Jonas 1932

Hanover County:

Dietrich, R. V. 1953, 1954, 1958
 Espenshade and Potter 1959
 Jahns and Griffiths 1953
 Watson 1907

Henry County:

Espenshade and Potter 1959
 Jahns and Griffiths 1953
 Pegau 1932

Louisa County:

Espenshade and Potter 1959
 Jahns and Griffiths 1953

Lunenburg County: Dietrich, R. V. 1953, 1954, 1958

Patrick County:

Dietrich, R. V. 1953, 1954, 1958
 Espenshade and Potter 1959
 Watkins 1932

Pittsylvania County:

Espenshade and Potter 1959
 Jahns and Griffiths 1953
 Pegau 1932

Prince Edward County:

Avery 1953b
 Bevan 1942
 Corriveau 1955

Kyanite—Continued

Virginia—Continued

Occurrence—Continued

Prince Edward County—Continued

Dietrich, R. V. 1953, 1954, 1955,
1958

Espenshade, Potter 1953a, b, 1959

Furcron 1950

Gunsallus 1956

Hubbell 1941a, b

Jensen 1943

Jonas 1932

Ladoo and Myers 1951

McVay and Wilson 1943

Mattson 1934

Riddle and Foster 1949

Sawyer and Whittemore 1940,
1941

Stose and Stose 1957

Waggaman 1953

Watkins 1932

Whittemore and Allen 1942

Spotsylvania County:

Dietrich, R. V. 1953, 1954, 1958

Espenshade and Potter 1959

Jahns and Griffiths 1953

Watson 1907

Technology and uses:

Galbreath and others 1944

Insley 1933

Jeffery 1943

Buckingham County: Herod 1957

Prince Edward County:

Avery 1953b

Gunsallus 1956

Hubbell 1941b

McVay and Wilson 1943

Watkins 1932

Whittemore and Allen 1942

Washington.

Occurrence: Kerr 1937

Chelan County:

Kelly and others 1956

Valentine 1949

Kittitas County: Kelly and others
1956

Skagit County:

Kelly and others 1956

Valentine 1949

Wisconsin.

Geology, Iron County:

Allen and Barrett 1915

Fries 1939

Occurrence, Iron County:

Allen and Barrett 1915

Fries 1939

Hanson 1954

Riddle and Foster 1949

Wyoming.

Geology:

Albany County: Hagner 1953

Carbon County: Beckwith 1932

Kyanite—Continued

Wyoming—Continued

Occurrence: Kerr 1937

Albany County:

Birch 1955

Clabaugh and others 1946

Hagner 1953

Osterwald and Osterwald 1952

Carbon County:

Beckwith 1932

Birch 1955

Clabaugh and others 1946

Osterwald and Osterwald 1952

Platt 1947

Riddle and Foster 1949

Platte County:

Birch 1955

Clabaugh and others 1946

Ladoo and Myers 1951

Osterwald and Osterwald 1952

Petar 1930

Riddle and Foster 1949

Pyrophyllite.

General:

American Iron and Steel Insti-
tute—American Ceramic Soci-
ety, Inc. 1950

Espenshade and Potter 1959

Irving 1956

Ladoo and Myers 1951

Norton, F. H. 1949

Peck 1933

Treischel 1957

U.S. Bureau of Mines 1932-33

Geology:

Bowen, C. H. 1954

Clarke, F. W. 1908

Ford 1932

Keller 1954

Launer 1952

Roy and Osborn 1952a, c, 1954

Mineral synthesis:

Folk 1947

Gruner 1944

Kennedy 1954, 1955

Roy 1954

Roy and Osborn 1952a, 1954

Yoder 1952

Technology and uses:

Greaves-Walker 1945

Mulryan 1958

Arizona.

Geology, Yuma County: Wilson, E. D.
1929

Occurrence:

Mohave County:

Galbraith 1947

Wilson, E. D., and others 1953

Yuma County:

Duke 1957

Galbraith 1947

Ladoo and Myers 1951

Wilson, E. D. 1929

Wilson, E. D., and others 1953

Pyrophyllite—Continued

California.

General :

- Inyo County: Wright 1957b
- Mono County: Wright 1950b, 1957b
- San Bernardino County:
 - Wright 1957b
 - Wright and others 1953
- San Diego County:
 - Jahns and Lance 1950
 - Wright 1950b, 1957b

Geology :

- Mariposa County: Kerr, Hamilton, and Pill 1950
- Mono County: Peck 1924
- San Bernardino County:
 - Bowen, O. E., Jr. 1954
 - Pask and Bowen 1954
- San Diego County:
 - Lance 1950
 - Richard 1935

Occurrence :

- Irving 1956
- Murdoch and Webb 1956
- Alameda County: Eakle 1922
- Butte County: Eakle 1922
- Imperial County:
 - Moore, B. N. 1936
 - Pabst 1938
 - Sampson and Tucker 1942
 - Tucker 1926
- Inyo County:
 - California Division of Mines 1958
 - Eakle 1922
 - Jenkins and others 1954
 - Murdoch 1949
 - Murdoch and Webb 1952, 1956
 - Wright 1950b, 1957b
- Los Angeles County: Jenkins and others 1954
- Madera County:
 - Erwin 1934
 - Pabst 1938
- Mariposa County:
 - Bowen and Gray 1957
 - Burgess 1949
 - Ford 1932
 - Kerr, Hamilton, and Pill 1950
 - Pabst 1938
- Mono County:
 - Foster and others 1952
 - Jeffery and Woodhouse 1931
 - Jenkins and others 1954
 - Kerr 1932
 - Ladoo and Myers 1951
 - Lemmon 1937
 - Pabst 1938
 - Peck 1924
 - Woodhouse 1936
 - Wright 1950b, 1957b
 - Wright and others 1954
- San Bernardino County:
 - Bowen, O. E., Jr. 1954
 - Jenkins and others 1954
 - Pask and Bowen 1954

Pyrophyllite—Continued

California—Continued

Occurrence—Continued

- San Bernardino County—Continued
 - Wright 1957b
 - Wright and others 1953
 - San Diego County:
 - Burgess 1949
 - California Division of Mines 1958
 - Gillson 1937
 - Jahns and Lance 1950
 - Jenkins and others 1954
 - Ladoo and Myers 1951
 - Lance 1950
 - Murdoch 1949
 - Murdoch and Webb 1952, 1956
 - Richard 1935
 - Wright 1950b, 1957b
 - Wright and others 1954
 - Shasta County: Jenkins, others 1954
 - Tulare County: Jenkins and others 1954
- Technology and uses :**
- California Division of Mines, Staff 1952
 - Jenkins and others 1954
 - Inyo County: California Division of Mines 1958
 - Mono County: Foster and others 1952
 - San Diego County: California Division of Mines 1958

Georgia.

- Geology, Lincoln County:
 - Espenshade and Potter 1959
 - Genth 1873
 - Johnston 1935
 - Watson and Watson 1912
- Occurrence, Lincoln County:
 - Burgess 1949
 - Espenshade and Potter 1959
 - Ford 1932
 - Genth 1873
 - Johnston 1935
 - Ladoo and Myers 1951
 - Stuckey 1950
 - Watson 1921
 - Watson and Watson 1912

Massachusetts.

- Occurrence, Franklin County: Emerson 1895

Montana.

- Geology and occurrence, Beaverhead County: Perry 1948

Nevada.

- General, Mineral County: Warner and others 1958
- Geology, Pershing County: Kerr 1940
- Occurrence:
 - Mineral County: Warner and others 1958
 - Pershing County: Kerr 1940

Pyrophyllite—Continued

New Mexico.

Occurrence:

- Dona Ana County:
 Dunham 1935
 Northrop 1942
- Rio Arriba County:
 Just 1937
 Montgomery 1953
 Northrop 1942
- Taos County:
 Just 1937
 Montgomery 1953
 Northrop 1942

North Carolina.

General:

- Broadhurst 1955
 Engineering and Mining Journal
 1938
- Greaves-Walker and others 1937
 Greaves-Walker and Riggs 1937
 Stuckey 1958
 Treischel 1957
- Alamance County:
 Burgess 1949
 Espenshade and Potter 1959
 Stuckey and others 1947
- Chatham County:
 Pratt 1900, 1901
 Stuckey 1925, 1926, 1927a, 1928
- Granville County: Stuckey 1928
- Moore County:
 Bell and others 1953
 Burgess 1949
 Emrich 1941
 Gower and Bell 1956
 Milliken 1938
 Pratt 1900, 1901
 Stuckey 1925, 1926, 1927a, 1928
 Stuckey and others 1947
- Randolph County:
 Burgess 1936, 1949
 Espenshade and Potter 1959
 Stuckey 1928
 Stuckey and others 1947
- Geology:
 Broadhurst and Councill 1954
 Clarke, F. W. 1908
 Stuckey 1950
 Stuckey and Conrad 1958
- Alamance County:
 Broadhurst and Councill 1953
 Stuckey 1928, 1942
- Chatham County:
 Gillson 1937
 Reinemund 1955
 Stuckey 1927b, 1935, 1942
- Granville County:
 Broadhurst and Councill 1953
 Espenshade and Potter 1959
 Stuckey 1942
- Johnston County: Espenshade and
 Potter 1959

Pyrophyllite—Continued

North Carolina—Continued

Geology—Continued

- Lincoln County:
 Espenshade and Potter 1959
 Potter 1954
- Montgomery County:
 Broadhurst and Councill 1953
 Stuckey 1928
- Moore County:
 Adler 1950
 Broadhurst and Councill 1953
 California Research Corp. 1950
 Ceramic Industry 1939b
 Davis, D. W., and others 1950
 Gillson 1937
 Hunt 1950
 Keller and others 1952
 Kerr and Adler 1950
 Kerr, Hamilton, and Pili 1950
 Kerr and Kulp 1949
 Kerr, Kulp, and Hamilton 1949
 Kerr, Main, and Hamilton 1950
 Lewis 1950
 Main 1950
 Mielenz and others 1950
 Parmelee and Barrett 1938
 Reinemund 1955
 Reno and Taylor 1950
 Ross and Hendricks 1945
 Stuckey 1927b, 1935, 1942
 Wheeler and Burkhardt 1950
- Orange County:
 Broadhurst and Councill 1953
 Espenshade and Potter 1959
 Stuckey 1928
- Randolph County:
 Broadhurst and Councill 1953
 Ceramic Industry 1939b
 Gillson 1937
 Stuckey 1938, 1942
- Occurrence:
 Broadhurst and Councill 1954
 Clarke, F. W. 1908
 Irving 1956
 Stuckey and Conrad 1958
 Treischel 1957
 U.S. Bureau of Mines 1932-33
- Alamance County:
 Broadhurst 1955
 Broadhurst and Councill 1953
 Burgess 1949
 Espenshade and Potter 1959
 Genth 1891
 King 1958
 Ladoo and Myers 1951
 Murdock 1950
 Stuckey 1928, 1938, 1942, 1950,
 1951, 1958
 Stuckey and others 1947
 Stuckey and Steel 1953
 Valley and others 1958
- Chatham County:
 Broadhurst 1955
 Bryson 1927, 1932, 1938

Pyrophyllite—Continued

North Carolina—Continued

Occurrence—Continued

Chatham County—Continued

Drane and Stuckey 1925
 Genth 1871, 1873, 1891
 Genth and Kerr 1881
 Gillson 1937
 Greaves-Walker 1945
 Greaves-Walker and Riggs 1937
 Murdock 1950
 Pratt 1900, 1901
 Reinemund 1955
 Stuckey 1925, 1926, 1927a, b,
 1928, 1930, 1935, 1942, 1950
 Stuckey and others 1947

Gaston County:

Genth 1871, 1873, 1891
 Genth and Kerr 1881
 Watson 1921

Granville County:

Broadhurst 1955
 Broadhurst and Councill 1953
 Bryson 1932
 Bryson and others 1937
 Espenshade and Potter 1959
 Genth 1891
 Greaves-Walker 1945
 Greaves-Walker and Riggs 1937
 King 1958
 Ladoo and Myers 1951
 Stuckey 1928, 1930, 1938, 1942,
 1950, 1958
 Stuckey and Steel 1953

Guilford County: Ford 1932

Johnston County:

Broadhurst 1955
 Broadhurst and Councill 1953
 Espenshade and Potter 1959
 King 1958
 Stuckey 1932, 1937

Lincoln County:

Espenshade and Potter 1959
 Potter 1954

McDowell County:

Genth 1871, 1891
 Genth and Kerr 1881

Mecklenburg County:

Genth 1891
 Genth and Kerr 1881

Mitchell County: Genth, Kerr 1881

Montgomery County:

Broadhurst 1955
 Broadhurst and Councill 1953
 Bryson 1932
 Genth 1871, 1873, 1891
 Genth and Kerr 1881
 Greaves-Walker 1945
 Greaves-Walker and Riggs 1937
 Ladoo and Myers 1951
 Murdock 1950
 Stuckey 1928, 1930, 1938, 1950
 Stuckey and others 1947

Moore County:

Adler 1950

Pyrophyllite—Continued

North Carolina—Continued

Occurrence—Continued

Moore County—Continued

Bell and others 1953
 Bray and Stevens 1950
 Broadhurst 1955
 Broadhurst and Councill 1953
 Bryson 1927, 1928, 1932, 1938
 Bryson and others 1937
 Burgess 1949
 California Research Corp. 1950
 Ceramic industry 1939b
 Davis, D. W., and others 1950
 Drane and Stuckey 1925
 Emrich 1941
 Engineering, Mining Journal 1938
 Genth 1871, 1873, 1891
 Genth and Kerr 1881
 Gillson 1937
 Gower and Bell 1956
 Greaves-Walker 1945
 Greaves-Walker and Amero 1941
 Greaves-Walker and others 1937
 Greaves-Walker and Riggs 1937
 Hunt 1950
 Keller and others 1952
 Keller and Pickett 1950
 Kerr and Adler 1950
 Kerr, Hamilton, and Pill 1950
 Kerr and Kulp 1949
 Kerr, Kulp, and Hamilton 1949
 Kerr, Main, and Hamilton 1950
 Ladoo and Myers 1951
 Lewis 1950
 Main 1950
 Mielenz and others 1950
 Milliken 1938
 Murdock 1950
 Parmelee and Barrett 1938
 Pratt 1900, 1901
 Reinemund 1955
 Reno and Taylor 1950
 Ross and Hendricks 1945
 Stuckey 1925, 1926, 1927a, b,
 1928, 1930, 1935, 1938, 1942,
 1950, 1951, 1958
 Stuckey and others 1947
 Stuckey and Steel 1953
 Vallyly and others 1958
 Wheeler and Burkhardt 1950

Orange County:

Broadhurst 1955
 Broadhurst and Councill 1953
 Bryson 1932
 Bryson and others 1937
 Espenshade and Potter 1959
 Ford 1932
 Genth 1871, 1873, 1891
 Genth and Kerr 1881
 Greaves-Walker 1945
 Greaves-Walker and Amero 1941
 Greaves-Walker and others 1937
 Greaves-Walker and Riggs 1937
 King 1958

Pyrophyllite—Continued

North Carolina—Continued

Occurrence—Continued

Orange County—Continued

Stuckey 1928, 1930, 1938, 1950,
1958

Valley and others 1958

Randolph County:

Bishop 1952

Broadhurst 1955

Broadhurst and Councill 1953

Bryson 1932, 1938

Bryson and others 1937

Burgess 1936, 1949

Ceramic Industry 1939b

Engineering and Mining Journal
1943

Espenshade and Potter 1959

Genth 1871, 1873, 1891

Genth and Kerr 1881

Gillson 1937

Greaves-Walker 1945

Greaves-Walker and Amero 1941

Greaves-Walker and others 1937

Greaves-Walker and Riggs 1937

King 1948, 1958

Ladoo and Myers 1951

Murdock 1950

Stuckey 1928, 1930, 1938, 1942,
1950, 1951, 1958

Stuckey and others 1947

Stuckey and Steel 1953

Valley and others 1958

Zodiac 1948

Richmond County: Genth and Kerr
1881

Technology and uses:

Bryson 1938

Ceramic Industry 1939b

Greaves-Walker 1945

U.S. Bureau of Mines 1932-33

Alamance County:

Murdock 1950

Stuckey 1951

Valley and others 1958

Chatham County: Stuckey 1930

Granville County: Stuckey 1930

Moore County:

Bray and Stevens 1950

Bryson 1928

Bryson and others 1937

Engineering and Mining Journal
1938

Keller and Pickett 1950

Murdock 1950

Stuckey 1930, 1951

Valley and others 1958

Orange County: Valley and others
1958

Randolph County:

Bishop 1952

Bryson and others 1937

Engineering and Mining Journal
1943

Murdock 1950

Stuckey 1930, 1951

Valley and others 1958

Pyrophyllite—Continued

South Carolina.

Geology, Edgefield County: Espenshade
and Potter 1959

Occurrence:

Buie 1949

Burgess 1949

Abbeville County: Espenshade and
Potter 1959

Chesterfield County:

Burgess 1941

Espenshade and Potter 1959

Ford 1932

Fries 1942

Genth 1873

Ladoo and Myers 1951

Pardee and Park 1948

Peyton and Lynch 1953

Watson 1921

Zodiac 1948

Edgefield County: Espenshade and
Potter 1959

Newberry County: Espenshade and
Potter 1959

United States, southeastern.

Geology and occurrence:

Espenshade and Potter 1959

Stuckey 1953

Sillimanite.

General:

American Iron and Steel Insti-
tute—American Ceramic So-
ciety, Inc. 1950

Espenshade and Potter 1959

Greig 1925

Jeffery 1943

Norton, F. H. 1949

Peck 1925, 1933

Riddle and Foster 1949

Snedden 1945

U.S. Bureau of Mines 1932-33

Waggaman 1953

Watkins and others 1952

Williamson 1949

Geology:

Bowen and Greig 1924

Clarke, F. W. 1908

Ford 1932

Funk 1940a

Goldsmith 1953

Heinrich 1952

Insley 1933

Jensen 1943

Keller 1954

Kerr 1937, 1940

Ladoo and Myers 1951

Norton, J. T. 1925b

Petar 1930

Posnjak and Greig 1933

Roy and Osborn 1952a, c, 1954

Sosman 1933

Taylor 1933

Winston 1944

Sillimanite—Continued

Mineral synthesis:

- Clark and others 1957
- Kennedy 1954, 1955
- Morey 1942
- Riddle and Foster 1949
- Roy and Osborn 1952a, 1954
- Schuiling 1958
- Smith, R. W. 1932
- Stuckey 1937
- Yoder 1952

Technology and uses:

- Dager and Betteley 1931
- Hunter and White 1946
- Newton 1944
- Palmer 1928
- Roy and Osborn 1952b
- Tyler and Heuer 1937
- Wilson, H. H., Jr. 1952

Alabama.

Occurrence:

Clay County:

- Espenshade and Potter 1959
- Riddle and Foster 1949
- Teague 1950

Coosa County: Pallister 1955a, b

Randolph County:

- Espenshade and Potter 1959
- Riddle and Foster 1949
- Teague 1950

Arizona.

Geology:

Yavapai County: Anderson, C. A., and others 1955

Yuma County: Wilson, E. D. 1929

Occurrence:

Coconino County:

- Galbraith 1947
- Wilson, E. D., and others 1953

Gila County:

- Galbraith 1947
- Wilson, E. D., and others 1953

Mohave County:

- Galbraith 1947
- Wilson, E. D., and others 1953

Pinal County: Galbraith 1953

Yavapai County:

- Anderson, C. A., and others 1955
- Galbraith 1947

- Wilson, E. D., and others 1953

Yuma County:

- Wilson, E. D. 1929
- Wilson, E. D., and others 1953

California.

General Mono County: Petar 1930

Geology:

Los Angeles County:

- Beverly 1934
- Miller, W. J. 1934

Mariposa County:

- Clarke, F. W. 1908
- Rose 1957

Sillimanite—Continued

California—Continued

Geology—Continued

- Merced County: Daviess 1946
- Orange County: Larsen 1948
- Riverside County: Larsen 1948
- San Diego County:
 - Clarke, F. W. 1908
 - Larsen 1948
 - Merriam 1946
 - Schaller 1905

Occurrence: Murdoch and Webb 1956

Inyo County:

- Eakle 1922
- Jeffery 1943
- Pabst 1938
- Sampson and Tucker 1931
- Winston 1944

Kern County: Miller, W. J. 1931

Los Angeles County:

- Beverly 1934
- Funk 1940a
- Jeffery 1943
- Miller, W. J. 1934
- Pabst 1938
- Winston 1944

Mariposa County:

- Clarke, F. W. 1908
- Eakle 1922
- Jeffery 1943
- Pabst 1938
- Rose 1957

Sampson and Tucker 1931

- Winston 1944

Merced County: Daviess 1946

Mono County: Petar 1930

Orange County: Larsen 1948

Riverside County:

- Funk 1940a
- Larsen 1948

San Bernardino County:

- Eakle 1922
- Jeffery 1943
- Pabst 1938
- Sampson and Tucker 1931
- Winston 1944

San Diego County:

- Clarke, F. W. 1908
- Eakle 1922
- Funk 1940a
- Jeffery 1943
- Larsen 1948
- Merriam 1946
- Murdoch 1949
- Murdoch and Webb 1952, 1956
- Pabst 1938

Sampson and Tucker 1931

- Schallier 1905
- Waring 1905
- Winston 1944

Tuolumne County:

- Jeffery 1943
- Pabst 1938
- Winston 1944

Sillimanite—Continued

Colorado.

Geology:

- Boulder County:
Dings 1941
Lovering and Tweto 1953
- Chaffee County:
Crawford, R. D. 1913
Heinrich and Griffiths 1947
- Clear Creek County:
Ball 1908
Harrison and Wells 1956, 1958
Lovering 1935
- Custer County:
Heinrich and Bever 1957
Singewald and Brock 1956
- Fremont County:
Finlay 1907
Hanley and others 1950
Heinrich and Bever 1957
- Gilpin County: Sims, others 1955
- Park County:
Heinrich and Bever 1957
Lovering 1935
- Summit County: Lovering 1935

Occurrence:

- Boulder County:
Argall 1949
Dings 1941
Heinrich and Bever 1957
Lovering and Goddard 1950
Lovering and Tweto 1953
- Chaffee County:
Argall 1949
Crawford, R. D. 1913
Heinrich and Griffiths 1947
- Clear Creek County:
Argall 1949
Ball 1908
Harrison and Wells 1956, 1958
Heinrich and Bever 1957
Lovering 1935
Lovering and Goddard 1950
- Custer County:
Heinrich and Bever 1957
Singewald and Brock 1956
- Eagle County:
Argall 1949
Crawford and Gibson 1925
Pearson and Tweto 1958
- Fremont County:
Argall 1949
Bever 1953
Finlay 1907
Grawe 1928b
Hanley and others 1950
Heinrich and Bever 1957
Riddle and Foster 1949
Sterrett 1923
- Gilpin County:
Lovering and Goddard 1950
Sims and others 1955
- Grand County: Heinrich, Bever 1957
- Gunnison County:
Argall 1949
Heinrich and Bever 1957

Sillimanite—Continued

Colorado—Continued

Occurrence—Continued

- Jackson County:
Argall 1949
Heinrich and Bever 1957
- Jefferson County:
Heinrich and Bever 1957
Riddle and Foster 1949
- Lake County: Heinrich, Bever 1957
Pearson and Tweto 1958
- Larimer County:
Argall 1949
Thurston 1955
- Park County:
Argall 1949
Bever 1953
Heinrich and Bever 1957
Lovering 1935
Lovering and Goddard 1950
Vanderwilt 1947
- Pitkin County: Pearson and Tweto 1958
- Summit County:
Argall 1949
Lovering 1935
- Teller County: Lovering and Goddard 1950

Connecticut.

Geology:

- Litchfield County: Gates and Bradley 1952
- Middlesex County: Bowen and others 1924
- New London County: Roy and Francis 1953

Occurrence:

- Litchfield County: Gates and Bradley 1952
- Middlesex County:
Bowen and others 1924
Ford 1932
- New London County:
Ford 1932
Ladoo and Myers 1951
Pratt 1906
Roy and Francis 1953
- Windham County:
Ford 1932
Ladoo and Myers 1951

Delaware.

Geology, New Castle County:

- Bascom and Stose 1932
Roy and Francis 1953

Occurrence, New Castle County:

- Bascom and Stose 1932
Ford 1932
Roy and Francis 1953

Florida.

General:

- Alachua County: Thoenen and Warne 1949
- Baker County: Spencer 1948
- Bradford County:
Browning and others 1956
Spencer 1948

Sillimanite—Continued
Florida—Continued
 General—Continued
 Clay County :
 Browning and others 1956
 Spencer 1948
 Thoenen and Warne 1949
 Duval County :
 Browning and others 1956
 Spencer 1948
 Thoenen and Warne 1949
 Highlands County: Thoenen and
 Warne 1949
 Lake County: Thoenen and Warne
 1949
 Marion County: Thoenen and Warne
 1949
 Nassau County: Thoenen and Warne
 1949
 Orange County: Thoenen and Warne
 1949
 Putnam County: Thoenen and Warne
 1949
 Geology :
 Cannon 1950
 Martens 1928, 1935
 Occurrence :
 Cannon 1950
 Espenshade and Potter 1959
 Gunsallus 1956
 Alachua County: Thoenen and
 Warne 1949
 Baker County: Spencer 1948
 Bay County: Martens 1928
 Bradford County :
 Browning and others 1956
 Spencer 1948
 Brevard County: Martens 1928,
 1935
 Broward County: Martens 1935
 Clay County :
 Browning and others 1956
 Calver 1957
 Engineering and Mining Journal
 1952
 Martens 1928
 Spencer 1948
 Thoenen and Warne 1949
 Tyrrell and Klinefelter 1956
 Dade County: Martens 1935
 Duval County :
 Browning and others 1956
 Calver 1957
 Martens 1935
 Spencer 1948
 Thoenen and Warne 1949
 Flagler County: Martens 1935
 Gulf County: Martens 1928
 Highlands County: Thoenen and
 Warne 1949
 Lake County: Thoenen and Warne
 1949
 Marion County :
 Martens 1928
 Thoenen and Warne 1949

Sillimanite—Continued
Florida—Continued
 Occurrence—Continued
 Nassau County :
 Martens 1928, 1935
 Thoenen and Warne 1949
 Orange County: Thoenen and Warne
 1949
 Palm Beach County: Martens 1935
 Putnam County: Thoenen and Warne
 1949
 St. Johns County: Martens 1928,
 1935
 St. Lucie County: Martens 1935
 Sarasota County: Martens 1928
 Volusia County: Martens 1935
 Technology and uses, Clay County :
 Engineering and Mining Journal
 1952
 Tyrrell and Klinefelter 1956
Georgia.
 General: Teague 1950
 Elbert County :
 Espenshade and Potter 1959
 Hudson 1946
 Hart County :
 Espenshade and Potter 1959
 Hudson 1946
 Teague 1950
 Geology : Stose and Smith 1939
 Butts County: Hudson 1946
 Clarke County :
 Hudson 1946
 Hurst 1953
 Dawson County :
 Furcron 1950
 Furcron and Teague 1945
 De Kalb County :
 Herrmann 1954
 Hurst 1953
 Elbert County :
 Furcron 1950
 Furcron and Teague 1945
 Teague 1950
 Gilmer County: Hurst 1957
 Gwinnett County: Herrmann 1954
 Hart County :
 Furcron 1950
 Furcron and Teague 1945
 Grant 1954, 1958
 Griffitts and Olson 1953b
 Jasper County: Hudson 1946
 Jones County: Hurst 1953
 Madison County :
 Furcron 1950
 Furcron and Teague 1945
 Hudson 1946
 Teague 1950
 Morgan County: Hudson 1946
 Newton County: Hudson 1946
 Oconee County: Hudson 1946
 Oglethorpe County :
 Hudson 1946
 Hurst 1953

Sillimanite—Continued

Georgia—Continued

Geology—Continued

Talbot County :

Clarke, J. W. 1952

Hudson 1946

Towns County :

Furcron 1950

Furcron and Teague 1945

Hash and Van Horn 1951

Upson County : Clarke, J. W. 1952

Walton County : Hudson 1946

Wilkes County : Hurst 1953

Occurrence :

Foster and others 1952

Stose and Smith 1939

Tyler and Heuer 1949

Butts County : Hudson 1946

Chatham County : Martens 1935

Clarke County :

Hudson 1946

Hurst 1953

Dawson County :

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

De Kalb County :

Herrman 1954

Hurst 1953

Elbert County :

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

Griffitts and Olson 1953b

Hudson 1946

Peyton 1949

Riddle and Foster 1949

Teague 1950

Gilmer County : Hurst 1957

Glynn County : Martens 1928, 1935

Gwinnett County : Herrmann 1954

Hart County :

Espenshade and Potter 1959

Furcron 1950, 1953

Furcron and Teague 1945

Grant 1954, 1958

Griffitts and Olson 1953b

Hudson 1946

Peyton 1949

Rampacek and others 1945

Riddle and Foster 1949

Teague 1950

Jasper County : Hudson 1946

Jones County : Hurst 1953

Madison County :

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

Hudson 1946

Peyton 1949

Riddle and Foster 1949

Teague 1950

Sillimanite—Continued

Georgia—Continued

Occurrence—Continued

Morgan County : Hudson 1946

Newton County : Hudson 1946

Oconee County :

Hudson 1946

Teague 1950

Oglethorpe County :

Hudson 1946

Hurst 1953

Talbot County :

Clarke, J. W. 1952

Hudson 1944, 1946

Teague 1950

Towns County :

Broadhurst 1955

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

Hash and Van Horn 1951

Riddle and Foster 1949

Teague 1950

Upson County : Clarke, J. W. 1952

Walton County : Hudson 1946

Wilkes County : Hurst 1953

Technology and uses : Foster and others 1952

Hart County :

Furcron 1953

Furcron and Teague 1945

Rampacek and others 1945

Idaho.

General : Forrester 1942

Geology :

Clearwater County : Hietanen 1956

Latah County : Kelly 1948

Shoshone County : Hietanen 1956

Valley County : Schmidt 1958

Occurrence :

Engel and Shelton 1941

Foster and others 1952

Blaine County : Kauffman 1952

Cassia County : Kauffman 1952

Clearwater County : Hietanen 1956

Latah County :

Forrester 1942

Hubbard 1955, 1957

Kauffman 1952

Kelly 1948

Kelly and others 1956

Riddle and Foster 1949

Skinner and Kelly 1947

Snedden 1945

Shoshone County :

Hietanen 1956

Kauffman 1952

Valley County : Schmidt 1958

Technology and uses :

Engel and Shelton 1941

Foster and others 1952

Latah County : Skinner, Kelly 1947

Sillimanite—Continued

Maine.

General, Knox County: Forsyth 1955
Geology:

Knox County: Houston 1956
Piscataquis County: Philbrick 1936, 1940

Occurrence:

Knox County:
Forsyth 1955
Houston 1956
Piscataquis County: Philbrick 1936, 1940

Maryland.

Geology and occurrence: Dryden and Dryden 1941

Massachusetts.

Geology:

Franklin County: Emerson 1917
Hampden County:
Emerson 1917
Shannon 1921
Hampshire County: Emerson 1917
Worcester County:
Clarke, F. W. 1908
Emerson 1917

Occurrence:

Franklin County: Emerson 1895, 1917
Hampden County:
Emerson 1895, 1917
Shannon 1921
Hampshire County: Emerson 1895, 1917
Worcester County:
Clarke, F. W. 1908
Emerson 1917
Ladoo and Myers 1951

Montana.

General:

Beaverhead County: Heinrich 1950
Gallatin County: Heinrich 1948
Madison County:
Heinrich 1948, 1950
Reid 1957

Geology:

Beaverhead County:
Heinrich 1949
Sinkler 1942
Gallatin County:
Clabaugh 1952
Clabaugh and Armstrong 1950
Heinrich 1949
Madison County:
Clabaugh 1952
Clabaugh and Armstrong 1950
Heinrich 1949
Hopkins and Taber 1947
Levandowski 1958
Reid 1958
Sinkler 1942
Park County: Heinrich 1948, 1949

Sillimanite—Continued

Montana—Continued

Occurrence:

Beaverhead County:

Heinrich 1949, 1950
Kauffman 1952
Kelly and others 1956
Sinkler 1942

Deer Lodge County:

Emmons and Calkins 1913
Heinrich 1948

Gallatin County:

Clabaugh 1952
Clabaugh and Armstrong 1950
Heinrich 1948, 1949
Kauffman 1952
O'Brien 1947

Granite County: Kauffman 1952

Madison County:

Clabaugh 1952
Clabaugh and Armstrong 1950
Heinrich 1948, 1949, 1950
Hopkins and Taber 1947
Kauffman 1952
Kelly and others 1956
Levandowski 1958
Reid 1957, 1958
Sinkler 1942

Park County:

Heinrich 1948, 1949
Kauffman 1952
Seager 1944

Technology and uses, Gallatin County:
O'Brien 1947

Nevada.

Occurrence:

Mineral County: Riddle and Foster 1949
Nye County: Riddle and Foster 1949

New Hampshire.

Geology: Billings 1955, 1956

Belknap County: Modell 1936

Carroll County:

Billings 1928
Moke 1946

Cheshire County:

Fowler-Billings 1941, 1944, 1949a, b
Heald 1950a
Kurger 1946a
Moore, G. E., Jr., 1949a
Smith, L. L. 1945

Coos County:

Billings 1941
Billings, Chapman, and others 1946
Billings, Fowler-Billings, and others 1946
Chapman, R. W. 1948

Grafton County:

Bannerman 1941
Billings 1935, 1937
Billings and Williams 1935

Sillimanite—Continued

New Hampshire—Continued

Geology—Continued

Grafton County—Continued

Fowler-Billings and Kingsley 1937

Fowler-Billings and Page 1942

Moke 1946

White and Billings 1951

Williams and Billings 1938

Merrimack County :

Chapman, C. A. 1952

Fowler-Billings and Kingsley
1937

Fowler-Billings and Page 1942

Rockingham County: Freedman
1950a, bStrafford County: Freedman
1950a, b

Sullivan County :

Chapman, C. A. 1939, 1952

Fowler-Billings and Page 1942

Heald 1950a

Occurrence: Billings 1955, 1956

Belknap County :

Meyers and Stewart 1956

Modell 1936

Quinn 1941

Carroll County :

Billings 1928

Meyers and Stewart 1956

Moke 1946

Cheshire County :

Clark and others 1957

Fowler-Billings 1941, 1944,
1949a, b

Heald 1950a, b

Kruger 1946a, b

Meyers and Stewart 1956

Moore, G. E., Jr. 1949a, b

Pearre and Calkins 1957

Smith, L. L. 1945

Snedden 1945

Coos County :

Billings 1941

Billings, Chapman, others 1946

Billings, Fowler-Billings, and
others 1946

Chapman, R. W. 1948

Meyers and Stewart 1956

Grafton County :

Bannerman 1941

Billings 1935, 1937

Billings and Williams 1935

Fowler-Billings and Kingsley
1937

Fowler-Billings and Page 1942

Meyers and Stewart 1956

Moke 1946

Sterrett 1923

White and Billings 1951

Williams and Billings 1938

Merrimack County :

Chapman, C. A. 1952, 1953

Fowler-Billings and Kingsley
1937

Sillimanite—Continued

New Hampshire—Continued

Occurrence—Continued

Merrimack County—Continued

Fowler-Billings and Page 1942

Meyers and Stewart 1956

Rockingham County :

Freedman 1950a, b

Meyers and Stewart 1956

Strafford County :

Freedman 1950a, b

Meyers and Stewart 1956

Sullivan County :

Chapman, C. A. 1939, 1952, 1953

Fowler-Billings and Page 1942

Heald 1950a, b

Meyers and Stewart 1956

Sterrett 1923

New Jersey.

Geology and occurrence :

Morris County: Sims 1953, 1958

Passaic County: Hotz 1953

Sussex County :

Baker 1955

Sims and Leonard 1952

Warren County: Hotz 1954

New Mexico.

Geology :

Rio Arriba County: Montgomery
1953

Taos County :

Just 1937

Montgomery 1953

Talmage and Wootton 1937

Occurrence :

Rio Arriba County :

Jahns 1946

Montgomery 1953

Northrop 1942

Riddle and Foster 1949

Taos County :

Just 1937

Montgomery 1953

Northrop 1942

Riddle and Foster 1949

Talmage and Wootton 1937

New York.

Geology :

Adirondack Mountains :

Alling 1926

Buddington 1929, 1939, 1948

See also individual counties.

Clinton County :

Kemp and Alling 1925

Postel 1952

Dutchess County :

Balk 1936

Barth 1936

Essex County :

Kemp and Alling 1925

Ogllvie 1905

Jefferson County: Buddington 1934,

1939

Lewis County: Buddington 1934,

1939

Sillimanite—Continued

New York—Continued

Geology—Continued

Orange County: Hotz 1953

Putnam County:

Balk 1936

Barth 1936

St. Lawrence County:

Buddington 1934, 1939

Dale 1935

Dietrich, R. W. 1957

Warren County:

Alling 1926

Ogilvie 1905

Washington County: Alling 1926

Occurrence:

Adirondack Mountains:

Alling 1926

Buddington 1929, 1939, 1948

Engel and Engel 1950

See also individual counties

Clinton County:

Kemp and Alling 1925

Postel 1952

Dutchess County:

Balk 1936

Barth 1936

Essex County:

Kemp and Alling 1925

Ogilvie 1905

Hamilton County: Miller, W. J. 1916

Jefferson County: Buddington 1934, 1939

Lewis County:

Buddington 1934, 1935

Miller, W. J. 1910

Smyth and Buddington 1926

Monroe County: Ladoo, Meyers 1951

Oneida County: Miller, W. J. 1909

Orange County: Hotz 1953

Putnam County:

Balk 1936

Barth 1936

St. Lawrence County:

Buddington 1934, 1939

Dale 1935

Dietrich, R. V. 1957

Miller, W. J. 1922

Smyth and Buddington 1926

Warren County:

Alling 1926

Miller, W. J. 1914

Ogilvie 1905

Washington County: Alling 1926

Westchester County:

Ford 1932

Ladoo and Myers 1951

North Carolina.

General:

Hash and Van Horn 1951

Teague 1950

Wilson, H. H., Jr. 1952

Burke County: Hash and Van Horn 1951

Sillimanite—Continued

North Carolina—Continued

General—Continued

Caldwell County:

Hash and Van Horn 1951

Wilson, H. H., Jr. 1952

Gaston County: Espenshade and Potter 1959

Jackson County: Hash and Van Horn 1951

Geology:

Broadhurst 1955

Stuckey and Conrad 1958

Alexander County:

Furcron 1950

Hash and Van Horn 1951

Hunter and White 1946

Buncombe County: Hash and Van Horn 1951

Burke County:

Espenshade and Potter 1959

Furcron 1950

Hunter and White 1946

Overstreet and Griffiths 1955

Caldwell County:

Espenshade and Potter 1959

Furcron 1950

Hunter and White 1946

Catawba County:

Hash and Van Horn 1951

Overstreet and Griffiths 1955

Clay County:

Espenshade and Potter 1959

Furcron 1950

Furcron and Teague 1945

Hash and Van Horn 1951

Hunter and White 1946

Cleveland County:

Espenshade and Potter 1953b, 1959

Furcron 1950

Hash and Van Horn 1951

Hunter and White 1946

Overstreet and Griffiths 1955

Gaston County:

Espenshade and Potter 1953a, b

Potter 1954

Haywood County: Hash and Van Horn 1951

Iredell County:

Furcron 1950

Hash and Van Horn 1951

Hunter and White 1946

Jackson County: Espenshade and Potter 1959

Lincoln County:

Espenshade, Potter, 1953a, 1959

Hash and Van Horn 1951

Potter 1954

Macon County:

Espenshade and Potter 1959

Hash and Van Horn 1951

Rutherford County:

Furcron 1950

Hash and Van Horn 1951

Hunter and White 1946

Overstreet and Griffiths 1955

Sillimanite—Continued

North Carolina—Continued

Geology—Continued

Wilkes County :

- Furcron 1950
 Hash and Van Horn 1951
 Hunter and White 1946

Yadkin County :

- Furcron 1950
 Hunter and White 1946

Occurrence : Stuckey and Conrad 1958

Alexander County :

- Broadhurst 1955
 Espenshade and Potter 1959
 Furcron 1950
 Hash and Van Horn 1951
 Hunter and White 1946
 Murdoch 1950
 Stuckey 1952
 Stuckey and Steel 1953
 Teague 1950
 Wilson, H. H., Jr. 1952

Buncombe County :

- Espenshade and Potter 1959
 Hash and Van Horn 1951
 Hunter and White 1946
 Murdoch 1950
 Teague 1950
 Wilson, H. H., Jr. 1952

Burke County :

- Broadhurst 1955
 Espenshade and Potter 1959
 Furcron 1950
 Genth and Kerr 1881
 Hash and Van Horn 1951
 Hunter and White 1946
 Murdoch 1950
 Overstreet and Griffiths 1955
 Pratt 1906
 Stuckey 1951, 1952
 Stuckey and others 1947
 Stuckey and Steel 1953
 Teague 1950
 Wilson, H. H., Jr. 1952

Caldwell County :

- Broadhurst 1955
 Espenshade and Potter 1959
 Furcron 1950
 Griffiths and Olson 1953a
 Hash and Van Horn 1951
 Hunter and White 1946
 Murdoch 1950
 Stuckey 1952
 Stuckey and Steel 1953
 Teague 1950
 Wilson, H. H., Jr. 1952

Catawba County :

- Broadhurst 1955
 Griffiths and Olson 1953a
 Hash and Van Horn 1951
 Overstreet and Griffiths 1955

Clay County :

- Broadhurst 1955
 Bryson 1932
 Espenshade and Potter 1959

Sillimanite—Continued

North Carolina—Continued

Occurrence—Continued

Clay County—Continued

- Furcron 1950
 Furcron and Teague 1945
 Hash and Van Horn 1951
 Hunter and White 1946
 Murdoch 1950
 Riddle and Foster 1949
 Stuckey 1937, 1951, 1952
 Stuckey and Steel 1953
 Teague 1950
 Wilson, H. H., Jr. 1952

Cleveland County :

- Broadhurst 1955
 Espenshade, Potter 1953b, 1959
 Furcron 1950
 Griffiths and Olson 1953a
 Hash and Van Horn 1951
 Hunter and White 1946
 Murdoch 1950
 Overstreet and Griffiths 1955
 Stuckey 1952
 Stuckey and Steel 1953
 Teague 1950
 Wilson, H. H., Jr. 1952

Gaston County :

- Espenshade and Potter 1953a, b,
 1959
 Griffiths and Olson 1953a
 Potter 1954

Granville County : Broadhurst 1955

Haywood County :

- Espenshade and Potter 1959
 Hash and Van Horn 1951
 Hunter and White 1946

Iredell County :

- Broadhurst 1955
 Espenshade and Potter 1959
 Furcron 1950
 Hash and Van Horn 1951
 Hunter and White 1946
 King 1958
 Murdoch 1950
 Stuckey 1952
 Stuckey and Steel 1953
 Teague 1950
 Wilson, H. H., Jr. 1952

Jackson County :

- Broadhurst 1955
 Espenshade and Potter 1959
 Hash and Van Horn 1951
 Stuckey 1951, 1952
 Stuckey and Steel 1953

Lincoln County :

- Broadhurst 1955
 Espenshade and Potter 1953a,
 1959
 Griffiths and Olson 1953a
 Hash and Van Horn 1951
 Potter 1954
 Teague 1950

Macon County :

- Broadhurst 1955
 Espenshade and Potter 1959

Sillimanite—Continued

North Carolina—Continued

Occurrence—Continued

Macon County—Continued

Ford 1932

Hash and Van Horn 1951

Stuckey 1951, 1952

Stuckey and Steel 1953

Madison County: Hash, Van Horn 1951

Rutherford County:

Broadhurst 1955

Espenshade and Potter 1959

Furcron 1950

Griffitts and Olson 1953a

Hash and Van Horn 1951

Hunter and White 1946

King 1958

Murdock 1950

Overstreet and Griffitts 1955

Stuckey 1951, 1952

Stuckey and others 1947

Stuckey and Steel 1953

Teague 1950

Wilson, H. H., Jr. 1952

Stokes County: Overstreet and Griffitts 1955

Surry County:

Overstreet and Griffitts 1955

Stuckey 1951, 1952

Stuckey and others 1947

Stuckey and Steel 1953

Wilkes County:

Broadhurst 1955

Furcron 1950

Hash and Van Horn 1951

Hunter and White 1946

Murdock 1950

Stuckey 1952

Stuckey and Steel 1953

Teague 1950

Wilson, H. H., Jr. 1952

Yadkin County:

Furcron 1950

Hunter and White 1946

Murdock 1950

Stuckey 1952

Wilson, H. H., Jr. 1952

Yancey County: Hash, Van Horn 1951

Pennsylvania.

General, Delaware County: Greig 1925

Geology:

Chester County:

Bascom and Stose 1932

Gordon 1922

Roy and Francis 1953

Delaware County:

Bascom and Stose 1932

Bowen and Greig 1924

Bowen and others 1924

Gordon 1922

Navias and Davey 1925

Postel 1941

Weiss 1949

Wyckoff 1952

Wyckoff and others 1926

Sillimanite—Continued

Pennsylvania—Continued

Geology—Continued

Montgomery County:

Postel 1941

Weiss 1949

Wyckoff 1952

Philadelphia County:

Postel 1941

Weiss 1949

Wyckoff 1952

Occurrence:

Chester County:

Bascom and Stose 1932

Gordon 1922

McKinstry 1949

Roy and Francis 1953

Delaware County:

Bascom and Stose 1932

Bowen and Greig 1924

Bowen and others 1924

Ford 1932

Gordon 1922

Greig 1925

Ladoo and Myers 1951

McKinstry 1949

Navias and Davey 1925

Postel 1941

Wyckoff 1952

Wyckoff and others 1926

Montgomery County:

McKinstry 1949

Postel 1941

Wyckoff 1952

Philadelphia County:

Gordon 1922

McKinstry 1949

Postel 1941

Wyckoff 1952

South Carolina.

General: Teague 1950

Anderson County: Buie 1949

Greenville County: Hudson 1946

Spartanburg County: Buie 1949

Geology: Shell 1949

Anderson County:

Hudson 1944, 1946

Teague 1950

Cherokee County: Overstreet and

Griffitts 1955

Greenville County:

Furcron 1950

Hudson 1944

Sloan 1908

Smith, L. L. 1943, 1945

Teague 1950

Laurens County: Hudson 1946

Spartanburg County:

Dosh 1950

Furcron 1950

Hickman 1947

Hudson 1944, 1946

Smith, L. L. 1943, 1945

Teague 1950

Sillimanite—Continued

South Carolina—Continued

Geology—Continued

York County: Espenshade and Potter 1959

Occurrence: Tyler and Heuer 1949

Anderson County:

Bule 1949

Espenshade and Potter 1959

Furcron and Teague 1945

Hudson 1944, 1946

Overstreet and Griffiths 1955

Rampack and others 1945

Riddle and Foster 1949

Teague 1950

Charleston County: Martens 1935

Cherokee County:

Bule 1949

Espenshade and Potter 1959

Keith and Starrett 1917

Overstreet and Griffiths 1955

Greenville County:

Bule 1949

Espenshade and Potter 1959

Furcron 1950

Hudson 1944, 1946

Overstreet and Griffiths 1955

Rampack and others 1945

Riddle and Foster 1949

Sloan 1908

Smith, L. L. 1943, 1945

Teague 1950

Laurens County:

Espenshade and Potter 1959

Hudson 1946

Teague 1950

Oconee County: Overstreet and Griffiths 1955

Spartanburg County:

Bule 1949

Dosh 1950

Espenshade and Potter 1959

Furcron 1950

Hickman 1947

Hudson 1944, 1946

Overstreet and Griffiths 1955

Rampack and others 1945

Riddle and Foster 1949

Smith, L. L. 1943, 1945

Teague 1950

York County: Espenshade and Potter 1959

Technology and uses:

Anderson County:

Espenshade and Potter 1959

Furcron and Teague 1945

Rampack and others 1945

Greenville County:

Espenshade and Potter 1959

Rampack and others 1945

Spartanburg County:

Espenshade and Potter 1959

Rampack and others 1945

Sillimanite—Continued

South Dakota.

General: Connolly and O'Harra 1929

Geology:

Custer County:

Page and others 1953

Riddle and Peck 1935

Sheridan 1955

Pennington County: Lincoln and others 1937

Occurrence:

Foster and others 1952

Smith, R. W. 1932

Black Hills: Jensen 1943

Custer County:

Connolly and O'Harra 1929

Page and others 1953

Riddle and Foster 1949

Riddle and Peck 1935

Sheridan 1955

Pennington County: Lincoln and others 1937

Technology and uses: Foster and others 1952

United States.

Occurrence: Petar 1930

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