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

GEOLOGICAL SURVEY BULLETIN 1019-N
Selected Bibliography of Andalusite, Kyanite Sillimanite, Dumortierite Topaz, and Pyrophyllite in the United States

By AGNES B. GRAMETBAUR

CONTRIBUTIONS TO BIBLIOGRAPHY OF MINERAL RESOURCES

GEOLOGICAL SURVEY BULLETIN 1019-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 PYROPHYLITE 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 (Al₂O₃·SiO₂) but different crystallographic, physical, and optical properties; and dumortierite (8Al₂O₃·B₂O₃·6SiO₂·H₂O) and topaz ([Al(F,OH)]₂SiO₄), which are closely allied in composition and thermal behavior.

All these minerals disassociate upon heating to high temperatures to form mullite (3Al₂O₃·2SiO₂) and free silica. Kyanite alters at the lowest temperature, 1,100° to 1,480°C, sillimanite at the highest, 1,550° to 1,650°C, andalusite at 1,350° to 1,450°C, dumortierite at <1,000° to 1,250°C, and topaz at <1,000° to 1,480°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-
eally 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 (Al₂O₃·4SiO₂·H₂O) and kaolinite (Al₂O₃·2SiO₂·2H₂O), 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 metal­
lurgical industry and 40 percent in the glass industry. The remain­
ing 10 percent is used chiefly in the ceramic industry in manufac­
turing 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 de­
posits 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, quartz­
ites, 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.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Publication</th>
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<tr>
<td>Am. Geologist</td>
<td>The American Geologist. Minneapolis, Minn.</td>
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<tr>
<td>Annotated Bibliography Econ. Geology.</td>
<td>Annotated Bibliography of Economic Geology. Urbana, Ill.</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Publication</td>
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<tr>
<td>Cement, Mill, &amp; Quarry</td>
<td>Ceramic Abstracts. American Ceramic Society, Columbus, Ohio.</td>
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<tr>
<td>Ceramic Abs.</td>
<td>Ceramic Abstracts. American Ceramic Society, Columbus, Ohio.</td>
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<tr>
<td>Ceramic Age</td>
<td>Newark, N.J.</td>
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<tr>
<td>Ceramic Industry</td>
<td>Chicago, Ill.</td>
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<tr>
<td>Ceramist</td>
<td>The Ceramist. Newark, N.J.</td>
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<tr>
<td>Econ. Geology</td>
<td>Economic Geology. Urbana, Ill.</td>
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<td>Abbreviation</td>
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<tr>
<td>Manufacturers Rec.</td>
<td>Manufacturers Record. Baltimore, Md.</td>
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<tr>
<td>Mining and Metallurgy</td>
<td>The Mineralogist. Portland, Oreg.</td>
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<td>Abbreviation</td>
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<tr>
<td>Pit and Quarry</td>
<td>Chicago, Ill.</td>
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<tr>
<td>Rocks and Minerals</td>
<td>Peekskill, N.Y.</td>
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Abbreviation


Vermont Geol. Survey Bull.

Vermont Geol. Survey State Geologist Rept.


Washington Univ. Pubs. in Geology.

Wyoming Geol. Survey Bull.

Publication


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

Occurrence—Continued

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Hawes 1878
Meyers and Stewart 1956
Sullivan County:
Hawes 1878
Meyers and Stewart 1956

North Carolina.

Geology: Broadhurst and Councill 1954
Alamance County: Espenshade and Potter 1959
Gaston County: Espenshade and Potter 1959
Potter 1954
Granville County:
Broadhurst and Councill 1953
Espenshade and Potter 1959
Lincoln County: Potter 1954
Orange County:
Broadhurst and Councill 1953
Espenshade and Potter 1959
Randolph County: Espenshade and Potter 1959

Occurrence: Broadhurst and Councill 1954
Alamance County:
Broadhurst 1954
Espenshade and Potter 1959
Potter 1954
Granville County:
Broadhurst 1955
Broadhurst and Councill 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 Councill 1953
Espenshade and Potter 1959
King 1958
Stuckey 1958
Randolph County:
Broadhurst 1955
Broadhurst and Councill 1953
Espenshade and Potter 1959

New Mexico.

Geology:
Dona Ana County: Dunham 1935
Lincoln County: Sidwell 1946
Rio Arriba County: Montgomery 1953
Andalusite—Continued

**Pennsylvania.**

Geology:
- Chester County: Bascom and Stose 1932
- Delaware County:
  - Bascom and Stose 1932
  - Dike 1951
  - Ford 1932
  - 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:
  - Connolly and O’Harra 1929
  - Hess 1909
  - Lincoln and others 1937
  - Page and others 1933
  - Ziegler 1914

Occurrence, Black Hills:
- See also Custer, Pennington, and Lawrence Counties.
- Custer County:
  - Riddle and Peck 1935
  - Hess 1909
  - Lincoln and others 1937
  - Page and others 1933
  - 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
  - Nolan 1935

**Vermont.**

Geology and occurrence, Orleans County: 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
  - McLellan 1927
  - Valentine 1949
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 1962
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 1937
Ford 1902, 1932

Dumortierite—Continued
Arizona—Continued
Occurrence—Continued
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Funk 1940a
Garbrial 1947
Grawe 1928b
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Wilson, E. D. 1929, 1933
Wilson, E. D., and others 1953

California
General: Riddle and Foster 1949

Geology:
Imperial County:
Grawe 1928b
Wolff 1930

Merced County: Daviess 1946

Riverside County:
Grawe 1928b
Larson 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
Wolff 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
Larson 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**

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San Diego County—Continued
Funk 1940a
Grawe 1928b
Jeffery 1943
Kunz 1905
Murdoch and Webb 1954, 1955
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:
Madison County: Graham and Robertson 1951, 1952

Occurrence:
Granite County: Emmons and Catkins 1913
Madison County: Graham and Robertson 1951, 1952

**Nevada.**

General, Pershing County:
Funk 1940a
Jeffery 1945
Jensen 1943
Kerr 1937
Ladoo and Myers 1951
Peck 1926
Petar 1930
Riddle and Foster 1949
Winston 1944

Geology:
Humboldt County:
Jones 1913
Knopf 1917
Schaller 1919
Schrader 1914

Nye County: Grawe 1928b

Pershing County:
Bower and Wyckoff 1920
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:
Bower 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
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Kerr and Jenney 1935
Knopf 1924
Ladoo and Myers 1951
McLenegan 1956
Newton 1944
Palmer 1928
Peck 1926
Petar 1930
Riddle and Foster 1949
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Snedden 1945
Stoddard 1932
Warner and others 1958
Winston 1944
York 1944

Washeoe 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
Dumortierite—Continued

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 1948
Kerr 1927
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 1933
Hawes 1878
Heinrich 1952
Insley 1925
Jensen 1943
Ladoo and Myers 1951
Norton, J. T. 1925a
Roy and Osborn 1952a, c, 1954
Sosman 1983
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 1959
Ceramic Industry 1959a
G柴breath 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 1958
Pallister 1955a, b

Cleburne County:
Bowles 1939
Heinrich and Olson 1958
Pallister 1955a, b

Tanapoosa County:
Bowles 1939
Heinrich and Olson 1958
Pallister 1955a, b

Randolph County:
Bowles 1939
Heinrich and Olson 1958
Pallister 1955a, b
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
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#### California

##### General:
- Dietrich, W. F. 1928
- Jeffery 1943

##### Imperial County:
- Funk 1940a
- Henshaw 1942
- Kerr 1937
- McLenegan 1956
- Petar 1930
- Riddle and Foster 1949
- Schaller 1905
- Wilson, E. D. 1929, 1933
- Wilson, E. D., and others 1953

##### 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:

##### Technology and uses, Imperial County:
- Jensen 1948
- Watkins 1932

##### Colorado.

##### Geology, Park County:
- Heinrich and Bever 1957

##### Occurrence, Park County:
- Bever 1958
- Heinrich and Bever 1957

##### Connecticut.

##### Geology, Litchfield County:
- Barlett 1940
- Gates 1951, 1954
- Gates and Bradley 1952

##### Occurrence:
- Fairfield County:
- Ford 1932
- Genoa County: 1937
- Hartford County: Ford 1932
- Litchfield County:
- Barlett 1940
- Ford 1932
- Gates 1951, 1954
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Connecticut—Continued
Occurrence—Continued
Litchfield County—Continued
Gates and Bradley 1952
Genth 1878
Ladd and Myers 1951

Florida.
General:
Alachua County: Thoenen and Warne 1949
Baker County: Spencer 1948
Bradford County:
Browning and others 1956
Spencer 1948
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Browning and others 1956
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Thoenen and Warne 1949
Duval County:
Browning and others 1956
Miller, Roswell, III 1945
Spencer 1948
Thoenen and Warne 1949
Escambia County: Miller, Roswell, III 1945
Geology:
Cannon 1950
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Gates and Bradley 1952
Genth 1878
Ladd and Myers 1951

Florida—Continued
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Highlands County: Thoenen and Warne 1949
Hillsborough County: Miller, Roswell, III 1945
Indian River County: Miller, Roswell, III 1945
Lake County: Thoenen and Warne 1949
Marion County: Thoenen and Warne 1949
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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:
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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
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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
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Smith, R. W. 1932
Clarke County: Hurst 1953
Dillon 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
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Teague and Furcron 1948
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Glynn County: Martens 1935


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General: Gallatin and Madison Counties: Heinrich 1948
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Fowler-Billings 1949a
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New Mexico.
General, Rio Arriba County: Jahns 1946
Geology:
Rio Arriba County:
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Corey 1954
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Occurrence:
Dutchess County:
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New York County:
Butler, S. B. 1948
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Broadhurst 1955
Greaves-Walker 1930
Buncombe County: Pole and Moore 1938
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Franklin County: Stuckey 1937

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Granville County: Broadhurst and Council 1953

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Person County:
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Bryson 1930
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| Burke County: | Genth and Kerr 1881  
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**Transylvania County:**
- Genth 1891
- Genth and Kerr 1881
- Mattson 1934
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**Wake County:**
- Broadhurst 1955
- Espenshade and Potter 1959
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**Watauga County:**
- Genth, Kerr 1881

**Western:**
- Fessler and McCaughey 1929

**Wilkes County:**
- Bryson 1928, 1930
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- Genth 1871, 1873, 1891
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- Broadhurst 1955
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- Trauffer 1936
- Watkins 1932

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**Geology:**
- Chester County: Gordon 1922
- Delaware County:
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  - Gordon 1922
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  - Weiss 1949
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- Montgomery County:
  - Postel 1941
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- Northampton County: Anderson and Chesley 1931
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**Occurrence:**
- Kerr 1937
- Bucks County: Gordon 1922
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  - Gordon 1922
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South Carolina.

General, York County:
- Bulle 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

Edgfield County: Espenshade and Potter 1959

Greenville County: Sloan 1908

Newberry County: Espenshade and Potter 1959

York County:
- Espenshade and Potter 1953a, b, 1959
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- Tyler and Heuer 1949
- Watkins and others 1952

Charleston County: Martens 1935

Cherokee County:
- Espenshade and Potter 1959
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- Keith and Sterrett 1931
- Overstreet and Griffiths 1955
- Van Horn and others 1949

Chesterfield County:
- Espenshade and Potter 1959
- Fries 1942
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- Watson 1921

Edgfield County: Espenshade and Potter 1959

Greenville County:
- Griffiths and Olson 1953b
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Newberry County:
- Bulle 1949
- Espenshade and Potter 1959

Richland County: Smith, L. L. 1932

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- Avery 1953a
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- Espenshade and Potter 1953a, b, 1959
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- Jensen 1943
- Keith and Sterrett 1931
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- Riddle and Foster 1949
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- Smith and Newcome 1951
- Waggaman 1953

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

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- Orange County:
  - Doll 1944
  - Hadley and Chapman 1939
  - Jacobs 1944
- Windsor County:
  - Currier 1934
  - Doll 1944
  - Hawes 1878
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Virginia.

General: Peck 1925, 1933

Buckingham County: Jones and Ellertsen 1954

Charlotte County: Kerr 1937

Grayson County: Stose and Stose 1957

Prince Edward County:
- Corrienteau 1955
- Espenshade and Potter 1959
- Hubbell 1941a
- Jensen 1943
- Mattson 1934
- Riddle and Foster 1949
- Sawyer and Whitemore 1941

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- Shell 1949
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- Inyo County: Wright 1957b
- Mono County: Wright 1950b, 1957b
- San Bernardino County: Wright 1957b
  - Wright and others 1953
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- Mono County: Peck 1924
- San Bernardino County: Bowen, O. E., Jr. 1954
  - Pask and Bowen 1954
- San Diego County: Lance 1950
  - Richard 1935

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- Murdoch and Webb 1956
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  - 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
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  - 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

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- 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
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- Richard 1935
- Wright 1950b, 1957b
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- Tulare County: Jenkins and others 1954

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- 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
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- Watson 1921
- Watson and Watson 1912

**Massachusetts.**

Occurrence, Franklin County: Emerson 1895

**Montana.**

Geology and occurrence, Beaverhead County: Perry 1948

**Nevada.**

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Geology, Pershing County: Kerr 1940

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- Taos County:
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  - Engineering and Mining Journal 1938
  - Greaves-Walker and others 1937
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- Chatham County:
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- Granville County:
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- Johnston County:
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- Lincoln County:
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- Montgomery County:
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- Moore County:
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  - Broadhurst and Councill 1953
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  - Mielens and others 1950
  - Parmelee and Barrett 1938
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  - Reno and Taylor 1950
  - Ross and Hendricks 1945
  - Stuckey 1927b, 1935, 1942
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- Orange County:
  - Broadhurst and Councill 1953
  - Esplenshade and Potter 1959
  - Stuckey 1928

- Randolph County:
  - Broadhurst and Councill 1953
  - Ceramic Industry 1939b
  - Gillson 1937
  - Stuckey 1935, 1942

Occurrence:

- Alamance County:
  - Broadhurst and Councill 1954
  - Clarke, F. W. 1908
  - Irving 1956
  - Stuckey and Conrad 1958
  - Treischel 1957
  - U.S. Bureau of Mines 1932-33

- Chatham County:
  - Broadhurst 1955
  - Broadhurst and Councill 1953
  - Burgess 1949
  - Esplenshade and Potter 1959
  - Genth 1891
  - King 1955
  - Ladoo and Myers 1951
  - Murdock 1950
  - Stuckey and others 1947
  - Stuckey and Steel 1953
  - Vallely 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 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 and others 1947
Stuckey and Steel 1953
Vallely 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


Vallely and others 1958

Randolph County:

Bishop 1952

Broadhurst 1955

Broadhurst and Councill 1953

Bryson 1932, 1938

Bryson and others 1937

Burgess 1939, 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 Amos 1941

Greaves-Walker and others 1937

Greaves-Walker and Rigs 1937

King 1948, 1958

Ladoo and Myers 1951

Murdock 1950


Stuckey and others 1947

Stuckey and Steel 1952

Vallely and others 1958

Zodiac 1948

Richmond County: Genth and Kerr 1881

Technology and uses:

Bryson 1938

Ceramic Industry 1939b

Espenshade-Walker 1945

U.S. Bureau of Mines 1932–33

Alamance County:

Murdock 1950

Rusk 1951

Vallely 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

Vallely and others 1958

Orange County: Vallely and others 1958

Randolph County:

Bishop 1952

Bryson and others 1937

Engineering and Mining Journal 1943

Murdock 1950

Stuckey 1930, 1951

Vallely and others 1958

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 Institute—American Ceramic Society, 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 1933

Helrich 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
Kyanite and Related Minerals in the United States

**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
  - Merriman 1946
  - Schaller 1905

**Occurrence:** Murdoch and Webb 1956
- **Inyo County:**
  - Eakle 1922
  - Jeffery 1943
  - Pabst 1938
  - Sampson and Tucker 1931
  - Winston 1944
- **Mariposa County:**
  - Clarke, F. W. 1908
  - Eakle 1922
  - Jeffery 1943
  - Pabst 1938
  - Rose 1957
- **San Bernardino County:**
  - 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
  - Merriman 1946
  - Murdoch 1949
  - Murdoch and Webb 1952, 1956
  - Pabst 1938
  - Sampson and Tucker 1931
  - Schaller 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 Griffitts 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 Griffitts 1947

Clear Creek County:
- Argall 1949
- Ball 1908
- Harrison and Wells 1956, 1958
- Lovering 1935

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
- Grave 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

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 1955
- 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: Martens 1928, 1935

Orange County: Martens 1928, 1935

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

Jasper County: Hudson 1946

Jones County: Hurst 1953

Madison County:
- Furcron 1950
- Furcron and Teague 1945
- Teague 1950

Gwinnett County: Herrmann 1954

Hart County:
- Furcron 1950
- Furcron and Teague 1945
- Grant 1954, 1958
- Griffits and Olson 1953b

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, 1958
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

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 1958
- 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
  - Laddo and Myers 1951

Montana.

General:
- Beaverhead County: Heinrich 1950
- Gallatin County: Heinrich 1948
- Madison County:
  - Heinrich 1948, 1950
  - Reid 1937
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 1937
  - Sinkler 1942
- Park County: Heinrich 1948, 1949

Nebraska.

Occurrence:
- Minerals County: Riddle and Foster 1949
- Nye County: Riddle and Foster 1949

New Hampshire.

Geology: Billings 1935, 1936
- Belknap County: Modell 1936
- Carroll County:
  - Billings 1928
  - Moke 1946
- Cheshire County:
  - Fowler—Billings 1941, 1944, 1948a, b
  - Hold 1950a
  - Kugler 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
**New Hampshire—Continued**

**Sillimanite Continued**

**Geology—Continued**

**Grafton County—Continued**
- Fowler-Billings and Klingsley 1937
- Fowler-Billings and Page 1942
- Moke 1946
- White and Billings 1951
- Williams and Billings 1938

**Merrimack County—Continued**
- Chapman, C. A. 1952
- Fowler-Billings and Klingsley 1937
- Fowler-Billings and Page 1942

**Occurrence—Continued**
- Merrimack County: Freedman 1950a, b
- Meyers and Stewart 1956
- Rockingham County: Freedman 1950a, b
- Strafford County: Freedman 1950a, b
- Sullivan County:
  - Chapman, C. A. 1939, 1952
  - 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 1948
  - 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:
  - Ailing 1926
  - Buddington 1929, 1939, 1948
  - See also individual counties.
- Clinton County:
  - Kemp and Ailing 1925
  - Postel 1952
- Dutchess County:
  - Balk 1936
  - Barth 1936
- Essex County:
  - Kemp and Ailing 1925
  - Ogilvie 1905
- Jefferson County: Buddington 1934, 1939
- Lewis County: Buddington 1934, 1939
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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: Ailing 1926
Ogilvie 1905
Washington County: Ailing 1926

Occurrence:

Adirondack Mountains:
Ailing 1926
Buddington 1929, 1939, 1948
Engel and Engel 1950
See also individual counties

Clinton County:
Kemp and Ailing 1925
Postel 1932

Dutchess County:
Balk 1936
Barth 1936

Essex County:
Kemp and Ailing 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:
Ailing 1926
Miller, W. J. 1914
Ogilvie 1905

Washington County: Ailing 1926
Westchester County:
Ford 1932
Ladoo and Myers 1951

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

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

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
CONTRIBUTIONS TO BIBLIOGRAPHY OF MINERAL RESOURCES

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
Hash and Van Horn 1951
Hash and Van Horn 1951
Hunter and White 1946
Murdock 1950
Stuckey 1952
Stuckey and Steel 1953
Teague 1950
Wilson, H. H., Jr. 1952

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

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

Catawba County:
Broadhurst 1955
Espenshade and Potter 1959
Furcron 1950
Griffitts and Olson 1953
Hash and Van Horn 1951
Hunter and White 1946
Murdock 1950
Stuckey 1952
Stuckey and Steel 1953
Teague 1950
Wilson, H. H., Jr. 1952

Clay County:
Broadhurst 1955
Bryson 1932
Espenshade and Potter 1959

Granville County:
Broadhurst 1955
Espenshade and Potter 1959
Furcron 1950
Griffitts and Olson 1953
Hash and Van Horn 1951
Hunter and White 1946
Teague 1950
Wilson, H. H., Jr. 1952

Henderson County:
Broadhurst 1955
Espenshade and Potter 1959
Furcron 1950
Griffitts and Olson 1953
Hash and Van Horn 1951
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