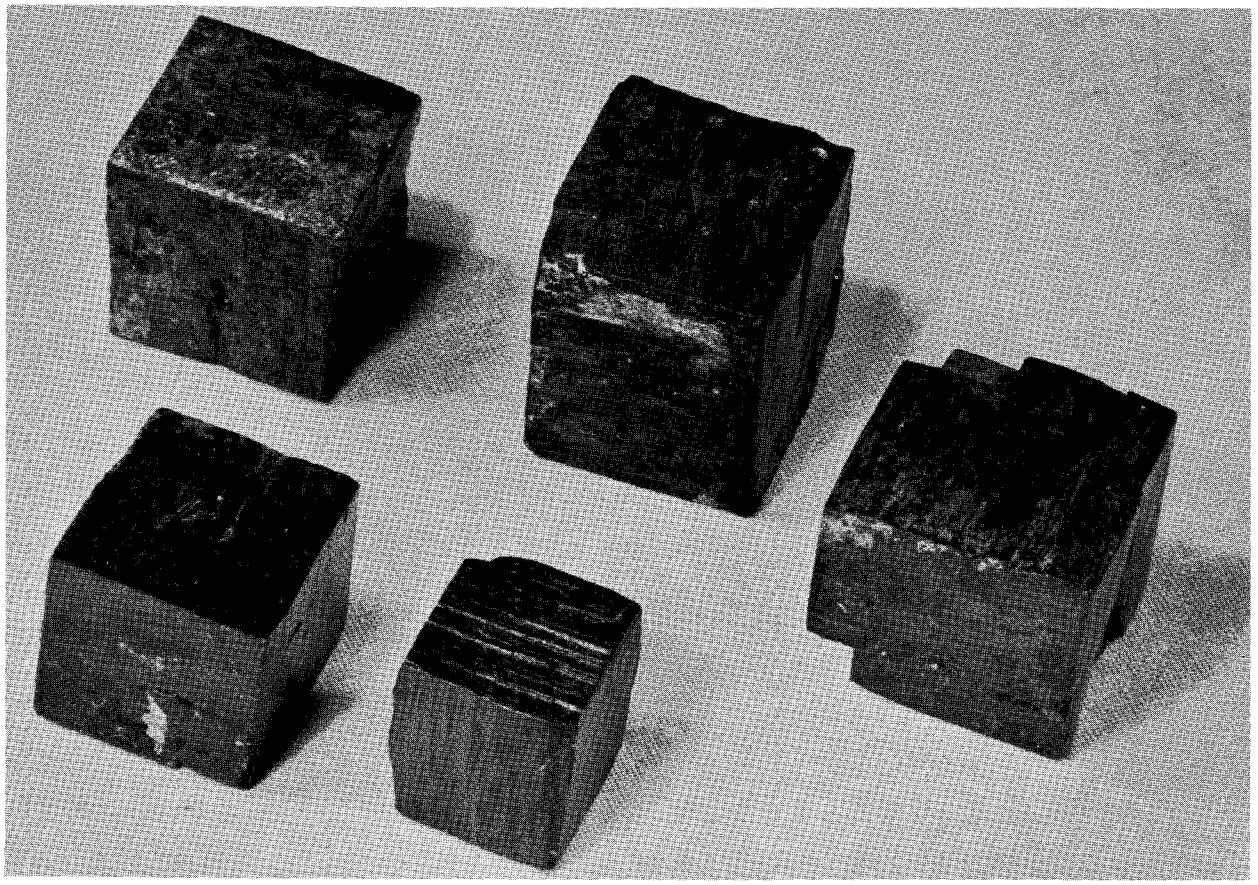
VIRGINIA DIVISION OF MINERAL RESOURCES
PUBLICATION 89

MINERALS OF ALBEMARLE COUNTY, VIRGINIA

Richard S. Mitchell and William F. Giannini



COMMONWEALTH OF VIRGINIA
DEPARTMENT OF MINES, MINERALS AND ENERGY
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Robert C. Milici, Commissioner of Mineral Resources and State Geologist

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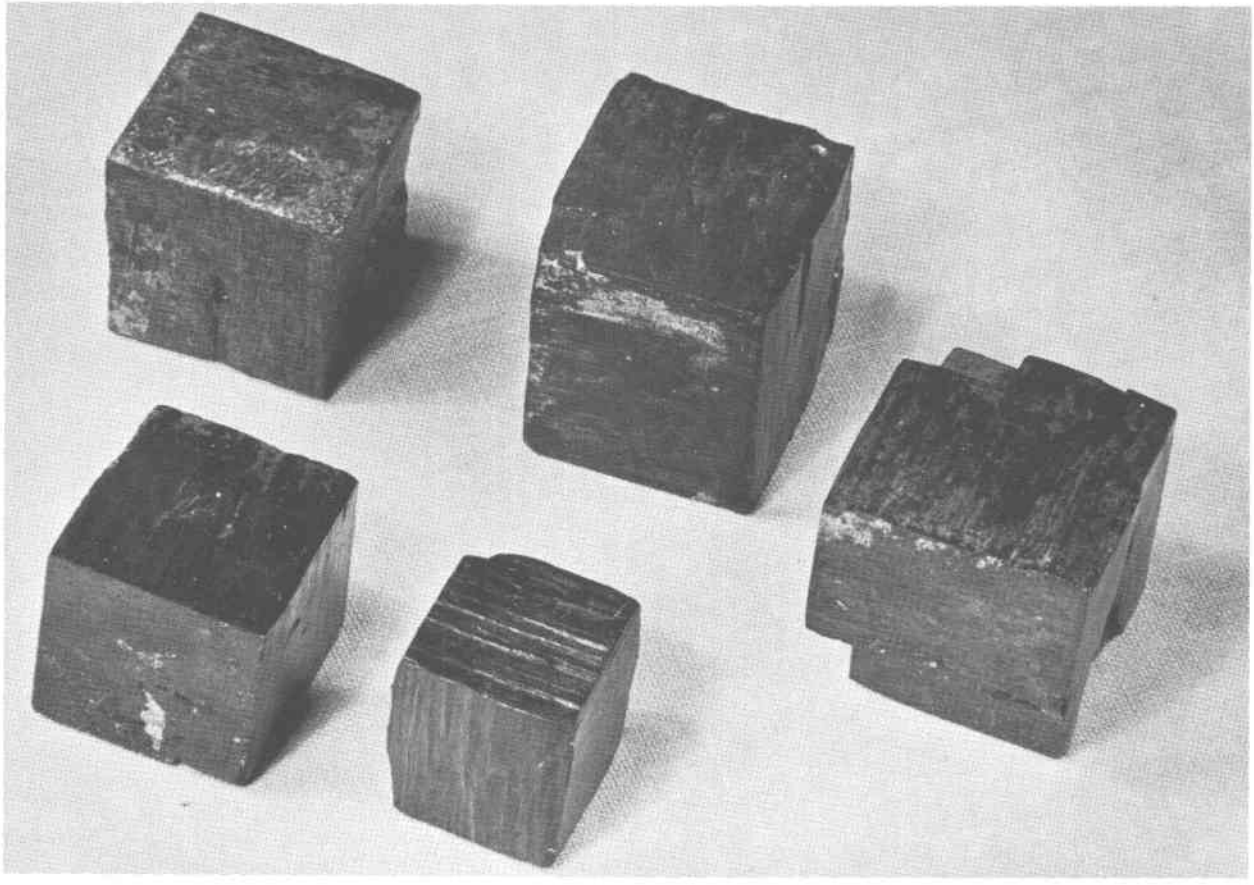

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FRONT COVER: Goethite pseudomorphs after pyrite ("devil's dice") to 1 inch across, collected from the north side of State Highway 6 approximately 500 feet east of the intersection with State Road 800 (Photograph by T. M. Gathright, II).

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DEPARTMENT OF MINES, MINERALS AND ENERGY
RICHMOND, VIRGINIA
O. Gene Dishner, Director

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF PURCHASES AND SUPPLY
RICHMOND

CONTENTS

ILLUSTRATIONS

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and
William F. Giannini

INTRODUCTION

Scattered references to various minerals found in Albemarle County are found in both published and unpublished geological reports for many years. About 25 years ago an attempt was made to present these data in a comprehensive list. At that time Mitchell and Bland (1963, 1964a, 1964b) published a three-part paper on this subject. A few years after that, as a result of the discovery of additional minerals, an addendum by Mitchell and Taylor (1971a, 1971b) reported these newest discoveries. Now, with many additional mineral localities, a revised publication of the minerals in Albemarle County was compiled. The minerals in this report are arranged alphabetically, whereas in the older publications they were organized according to a crystal-chemical classification.

Cataloged specimens of most of the 86 mineral species described in this work are stored at the Division of Mineral Resources and some of the outstanding specimens are displayed in Clark Hall at the University of Virginia, Charlottesville. Others are in private collections.

Albemarle County is in the central portion of Virginia (Figure 1). Minerals found therein occur in the Blue Ridge physiographic province that trends along the northwestern portion of the county or the Piedmont province that covers the remainder of the county.

We wish to acknowledge Howard R. Freeland for kindly giving his time to photograph all mineral specimens used in this publication, and Thomas M. Gathright, II, who photographed the specimens for the cover.

The mention of mineral localities in this report does not give an individual permission to enter a property and collect without permission of the owner. It should be stressed that before attempting to collect any materials on a property, an individual should make himself known to the owner and obtain permission. ENTERING PRIVATE PROPERTY WITHOUT PERMISSION VIOLATES TRESPASS LAWS AND IS PUNISHABLE BY LAW.

MINERAL SPECIES

ACTINOLITE - (See tremolite-actinolite series.)

AEGIRINE - According to S. S. Greenberg (personal communication, 1964), microscopic aegirine crystals occur in a gray trachyte porphyry exposed along Houchins and Massey creeks east of State Road 795 in the Ash Lawn area.

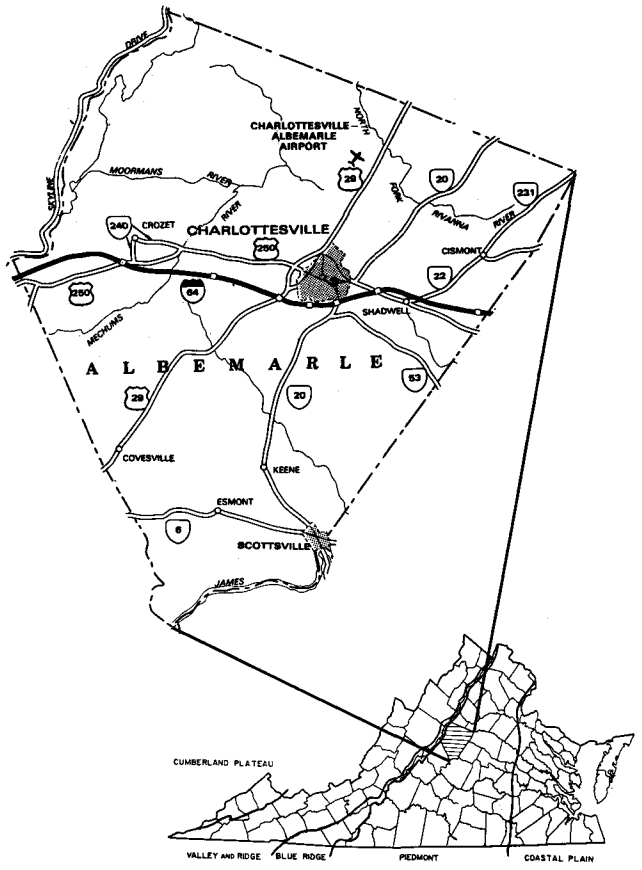

Figure 1. Location map of Albemarle County.

ALBITE - (See plagioclase feldspar series.)

ANALCIME - X-ray diffraction studies of the microcrystalline matrix of weathered dark porphyritic dike rocks from the southern boundary of Charlottesville show abundant analcime. The rocks are no longer in place, but large boulders of the Rockfish metaconglomerate (Precambrian) containing the dikes showed they averaged about 5 inches wide. Aylor (1970) called the dike rocks lamprophyres and pointed out that one variety is similar to fourchite (containing analcime, augite, hornblende, magnetite), while another phase resembles monchiquite (containing analcime, augite, biotite, magnetite, and minor olivine and magnesite). Crusts of secondary churchite occur on the latter rock. The rocks were found in road construction dumps 0.5 mile south of the Charlottesville city boundary where the U.S. Highway 29 Bypass crosses over old U.S. Highway 29.

S. S. Greenberg (personal communication, 1964) noted microscopic crystals of analcime in a gray trachyte porphyry exposed along Houchins and Massey creeks east of State Road 795 in the Ash Lawn area.

* Department of Environmental Sciences, University of Virginia, Charlottesville (deceased).

ANATASE - Anatase occurs in the iron mine about 0.25 mile west of North Garden on the northeastern side of Cook Mountain as small white patches in a biotite-rich, magnetite nelsonite.

ANGLESITE - Tiny adamantine anglesite crystals are intimately associated with galena in the quartz vein on the Hickory Ridge farm east of Free Union and northwest of State Road 665.

APATITE GROUP - Olive-green apatite masses, to 2 inches across, and rounded, stubby, hexagonal crystals, to 0.75 inch across, occur with talc in ferroan-dolomite veins in the Old Dominion soapstone quarry. Giles (1961) observed similar material in the Alberene soapstone quarry.

Rare earth-bearing apatite occurs with ilmenite in a biotite-nelsonite rock in the iron mine west of North Garden. The brown stained apatite grains are to 0.0625 of an inch in diameter (Dagenhart and Maddox, 1977).

Elongated chalky-white apatite crystals occur in quartz at the quartz mine on Hickory Ridge farm northwest of State Road 665, east of Free Union.

Wilkens and Nitze (1897) mention "a mixture of apatite and rutile, occurring in a deposit near Charlottesville." This may have been in reference to the magnetite-biotite-nelsonite near North Garden, or perhaps to rock from near Roseland, Nelson County, also named nelsonite.

According to Gravatt (1920) the rocks of the Johnson Mill graphitic slate (Lynchburg Formation) are phosphatic in places. Whether this phosphate is apatite or not is a matter of conjecture.

ARAGONITE - White coatings of aragonite occur on slate at the Stony Point iron-copper mine. Similar aragonite is found as thin white crusts on rocks at the Ohio Sulphur Mining Company's pyrite mine near Proffit (Wiggins and Horne, 1967). In each case the mineral was verified by X-ray diffraction analysis.

AUGITE - Abundant euhedral augite crystals, to about 0.5 inch long, occur in lamprophyre dikes at the southern boundary of Charlottesville (Figure 2). The crystals, rarely twinned on a {100}, show the forms: m {110}, a {100}, b {010}, s {111}. (See discussion under analcime.)

Augite, is an important constituent of several diabase dike rocks which occur in the county (Rowan, 1955; Roberts, 1958). The crystals are microscopic.

AXINITE - A zone of grayish-pink axinite crystals embedded in chlorite was noted in the Catoctin Formation at the Shadwell quarry in the 1970s. The platy crystals are to 0.25 inch thick and 1 inch across. Approximately 100 pounds of the material was observed there by R. T. Harper (written communication, 1977) of Roanoke. Chemical and crystallographic data for the mineral were reported by Lumpkin and Ribbe (1979).

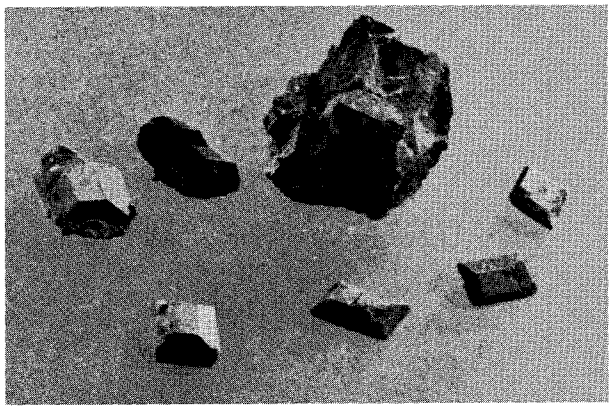

Figure 2. Augite crystals to 0.5 inch long from the southern border of Charlottesville.

AZURITE - Seamon (1885) and Watson (1905) reported azurite at the Faber lead-zinc mine.

BARITE - Coarse masses of cleavable barite occur at a quartz-crystal locality as float in red soil south of U.S. Highway 250 and half-way between Charlottesville and Shadwell. The barite is milky white and individual plates measure several inches across and to one inch in thickness. Near the same locality similar barite was also found in excavations made for Interstate Highway 64 south of where it crosses U.S. Highway 250. Some sphalerite occurs within these platy masses. Barite also was collected by W. G. Giannini, of Charlottesville, from the farm of Leonard Hartman, which is north of U.S. Highway 250, east of Charlottesville.

Small amounts of cleavable barite were found with the lamprophyre dikes south of Charlottesville (see analcime).

BERYL - Small masses of golden beryl were observed in granite at the Rivanna Reservoir dam-construction site off State Road 643.

BIOTITE - Biotite is an important rock-forming mineral in the county. It is abundant, for example, in the Lovingston Formation (gneiss) (Adkins, 1954; Rowan, 1955), and in some rocks of the Lynchburg Formation (gneiss) (Vance, 1959). It usually occurs only as small lamellae.

Irregular pseudohexagonal books of biotite (to 1 inch across) are associated with augite crystals in lamprophyre dikes at the southern boundary of Charlottesville (see analcime for discussion of the rocks).

Biotite is found in nelsonite adjacent to the ore body in the iron mine west of North Garden. It occurs as weathered, brown, schistose masses, containing euhedral spessartine garnet (Dagenhart and Maddox, 1977).

BORNITE - Bornite, associated with chalcopyrite, occurs in the Catoctin Formation especially in the massive epidote

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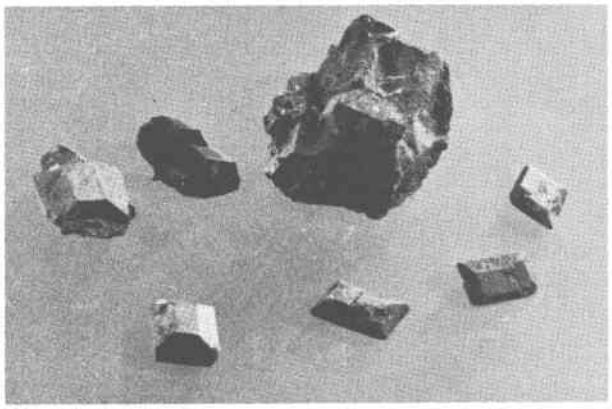

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BORNITE - Bornite, associated with chalcopyrite, occurs in the Catoctin Formation especially in the massive epidote

phases. Lewis (1926) observed it in the Charlottesville area, and Edmundson (1930), in the Red Hill area. Masses, 1 inch across, were observed in an excavation at the summit of Peters Mountain which is southeast of State Road 777. Bornite with chalcocite and quartz was collected on the fire-trail extension of State Road 629, not far from Browns Cove.

Bornite was collected from the quartz mine on the Hickory Ridge farm on the northwestern side of State Road 665, east of Free Union (S. S. Johnson, personal communication, 1988).

Small amounts of bornite occur in the newer soapstone quarry at Alberene.

CALCITE - Calcite occurs in the Catoctin Formation, and associated rhyolite dike, at the quarry near Shadwell (Giannini and Rector, 1958). Dogtooth crystals were noted. Pink to white calcite cleavages, to 0.5 inch across, occur in quartz veins in the Catoctin Formation on Peters Mountai n southeast of State Road 777. Thin veins of calcite crystals are associated with the Catoctin Formation in a road cut just west of State Highway 20 and Interstate Highway 64.

Tiny, clear, calcite crystals occur in clusters on the ceiling of the northeast drift of the Faber lead-zinc mine (Giannini, 1959). These crystals fluoresce a weak greenish-yellow under short-wave ultraviolet light. Watson (1905) also noted calcite at the Faber mine.

Small, rhombohedral calcite crystals occur with pyrite in cavities at the Ohio Sulphur Mining Company's mine near Proffit.

Giles (1961, 1962) observed calcite, as crystals in vugs and as crusts, in soapstone from the Alberene quarry. In the newer quarry at Alberene white cleavable calcite occurs which shows red fluorescence under both long- and short-wave ultraviolet light.

Pink cleavable masses of calcite, and white cleavable masses which fluoresce a strong red under short-wave ultraviolet radiation, occur in veins at the active quarry at Red Hill.

Small scalenohedral crystals with rhombohedral terminations are associated with pyrite and dolomite in a vein in the road cut, south of Charlottesville along the off ramp heading south onto U.S. Highway 29 from the Highway 29 Bypass.

Gray calcite fills cavities in a quartz vein, northwestern side of State Road 665 on the Hickory Ridge farm east of Free Union. Chalcopyrite and galena also occur in the quartz. Clear calcite occurs with ferroan dolomite in quartz veins in the slate quarry at Esmont.

Calcite is the major component of the Everona Limestone which crosses the eastern portion of the county. White cleavable calcite veins are common in the rock. This limestone has been mapped and described by Mack (1957, 1964).

Marble occurs under the bridge over Happy or Howards Creek on State Highway 231, 2.4 miles southwest of Gordonsville (Conley and Johnson, 1975).

Jefferson (1801) mentioned that pure white marble, as well as red, blue, and purple-variegated types, occurs in the form of a large precipice overhanging the James River near its confluence with the Rockfish River. According to W. A. Nelson (personal communication, 1963) this occurrence has not been verified. Furcron (1935) believes Jefferson's reference may be to a cliff of marble on the James River near Warminster in Nelson County. However, marble does occur in Albemarle County near Howardsville (Furcron, 1935) which is not far from the locality mentioned by Jefferson.

CERUSSITE - Cerussite, as clusters of slender white, needlelike crystals to 0.125 inch long, occurs on the ceiling of the northeast-trending drift of the Faber lead-zinc mine (Giannini, 1959). Seamon (1885) and Watson (1905) also observed this mineral.

CHALCANTHITE - Dark-blue, fine-grained crusts of chalcanthite occur with cerussite in the Faber lead-zinc mine (Giannini, 1959).

CHALCOCITE - A small mass of chalcocite associated with bornite and quartz was found in the Browns Cove area on the fire-trail extension of State Road 629.

According to Weed and Watson (1911) chalcocite occurs in the iron-copper mine near Stony Point.

CHALCOPYRITE - Large masses and crystals of chalcopyrite occur in a quartz mine on the northern side of U.S. Highway 250, just west of the Fluvanna County border.

According to Seamon (1885) chalcopyrite occurs at the Faber lead-zinc mine. Giannini (1959) noted that it occurs rather sparingly at the mine.

Chalcopyrite occurs in the Catoctin Formation in the Shadwell quarry (Giannini and Rector, 1958), and in an excavation on Peters Mountain. Lewis (1926) and Edmundson (1930) also observed it with bornite in the Catoctin Formation.

Chalcopyrite with quartz occurs in the Catoctin Formation in the first road cut on Interstate Highway 64 west of the intersection of State Highway 20 and Interstate Highway 64, south of Charlottesville.

Chalcopyrite is associated with goethite at the iron-copper mine near Stony Point (Tazelaar, 1958a). Crystals to 0.25 inch were observed in cavities with quartz crystals.

Small irregular masses of chalcopyrite occur in ferroan-dolomite veins in the soapstone quarries at Alberene (Giles, 1961, 1962) and near Old Dominion.

Small amounts of chalcopyrite also was observed in slate from Esmont.

Chalcopyrite is associated with pyrite and pyrrhotite in quartz veins in the Red Hill quarry.

At the Rivanna Reservoir dam just off State Road 643, masses of chalcopyrite were discovered in quartz.

Massive chalcopyrite is associated with galena in a quartz mine on the Hickory Ridge farm on the northwestern side of State Road 665, east of Free Union.

CHLORITE GROUP - Chlorite is an important constituent of the Catoctin Formation. In addition to being one of the components of the greenstone, it also exists as pure massive zones, or fills amygdules, or is in veins with milky quartz in a cross-fibrous relationship. A few of the many localities which yield this mineral are an excavation on Peters Mountain southeast of State Road 777, the Shadwell quarry (Giannini and Rector, 1958), and in Sugar Hollow and Buck Mountain Creek.

Chlorite is associated with the soapstone quarried at Alberene (Giles, 1961) and Old Dominion. It occurs in the soapstone and is also associated with the ferroan-dolomite veins in this rock. It occurs as foliated masses and as microscopic crystals in dolomite cavities. At the Old Dominion quarries chlorite also occurs as parallel fibrous masses of radiating habit. These gray-green fibers occur in talc veins and closely resemble fibrous actinolite (Watson and others, 1977).

Bright-green, schistose masses of chlorite, with plates 0.25 inch across, occur at the Martin-Marietta Red Hill quarry.

According to Bird (1885-86) chlorite occurs as olive-green, scaly masses, on Castle Mountain 4 miles south of Batesville. From his chemical analysis, Bird obtained a formula which he said was close to the corundophilite variety, although to him the mineral resembled thuringite in physical properties. A review of Bird's analysis indicated a close similarity to published analyses of thuringite (Deer and others, 1962), now considered to be a ferrian variety of chamosite.

White chlorite, possibly clinochlore, and tremolite are the major constituents of a soft "soapstone" rock occurring near the specular hematite locality near Burnleys. Exposures of a similar rock occur on the Nick Evans property (personal communication, 1987) also near Burnleys.

CHURCHITE (weinschenkite) - White globular churchite crusts are associated with florencite in nelsonite at the iron mine west of North Garden (Dagenhart and Maddox, 1977).

Churchite, as seams and crusts (less than 0.0039 inch thick), was observed on weathered lamprophyre (monchiquite?) dikes on road construction dumps, 0.5 mile south of the Charlottesville boundary where U.S. Highway 29 Bypass crosses over Highway 29 Business. The white crusts, with fibrous structure, were verified by X-ray diffraction and spectrochemical analyses (Aylor and Zulkiewicz, 1970).

CLINOZOISITE - Greenish-brown crystals of clinozoisite, to 0.5 inch long, occur in cleavable calcite in veins in the newer soapstone quarry at Alberene.

Microscopic crystals of clinozoisite are in metagabbro and metapyroxenite rocks associated with soapstone from the belt just west of Green Mountain (Burfoot, 1930). Cordova (1955) observed accessory clinozoisite in the Catoctin Formation between Charlottesville and Shadwell.

Small, greenish, clinozoisite crystals, embedded in quartz, occur in rocks off State Road 643 at the Rivanna Reservoir dam site.

COBALTITE - Small grains of cobaltite in talc were identified by X-ray diffraction analysis of materials from the southernmost Old Dominion soapstone quarry off State Road 721 in southern Albemarle County (Giannini and Penick, 1983).

COVELLITE - Dark-blue, sooty covellite coats larger masses of chalcopyrite in a quartz vein at a quartz mine on the northern side of U.S. Highway 250 near the Fluvanna County line.

CUPRITE - Microscopic octahedral crystals of cuprite, associated with malachite on goethite masses, were found by S. S. Johnson, at the iron-copper mine near Stony Point (Johnson, 1964).

DICKITE - A medium-grained white clay, from the Ohio Sulphur Company's mine near Proffit, was shown by X-ray analysis to be dickite, one of the kaolinite minerals.

DOLOMITE - Ferroan dolomite is very common at the Old Dominion soapstone quarry. Cleavages over 3 inches across occur in veins to 1 foot wide. According to chemical analyses made by O. M. Fordham, Jr. (personal communication, 1986) this ferroan dolomite has a MgO/FeO ratio of 0.916/0.084 . These dolomite veins contain many other minerals: talc, apatite, ilmenite, and various sulfides. Occasionally cavities in the veins contain rhombohedral dolomite crystals to 0.5 inch across. Dolomite crystals are also embedded in some of the soapstone. Giles (1961, 1962) observed similar ferroan dolomite in the Alberene soapstone quarry. The ferroan dolomite from both quarries is buff to white and weathers to form a brown limonite coating (Figure 3).

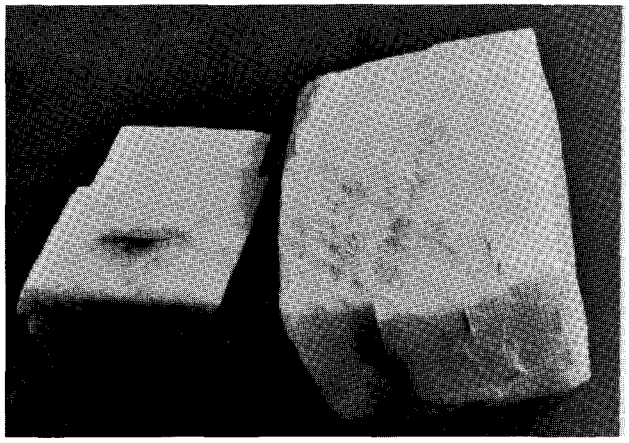

Figure 3. Ferroan dolomite, exhibiting rhombohedral cleavage, from the southwestern group of soapstone quarries at Old Dominion.

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CUPRITE - Microscopic octahedral crystals of cuprite, associated with malachite on goethite masses, were found by S. S. Johnson, at the iron-copper mine near Stony Point (Johnson, 1964).

DICKITE - A medium-grained white clay, from the Ohio Sulphur Company's mine near Proffit, was shown by X-ray analysis to be dickite, one of the kaolinite minerals.

DOLOMITE - Ferroan dolomite is very common at the Old Dominion soapstone quarry. Cleavages over 3 inches across occur in veins to 1 foot wide. According to chemical analyses made by O. M. Fordham, Jr. (personal communication, 1986) this ferroan dolomite has a MgO/FeO ratio of 0.916/0.084 . These dolomite veins contain many other minerals: talc, apatite, ilmenite, and various sulfides. Occasionally cavities in the veins contain rhombohedral dolomite crystals to 0.5 inch across. Dolomite crystals are also embedded in some of the soapstone. Giles (1961, 1962) observed similar ferroan dolomite in the Alberene soapstone quarry. The ferroan dolomite from both quarries is buff to white and weathers to form a brown limonite coating (Figure 3).

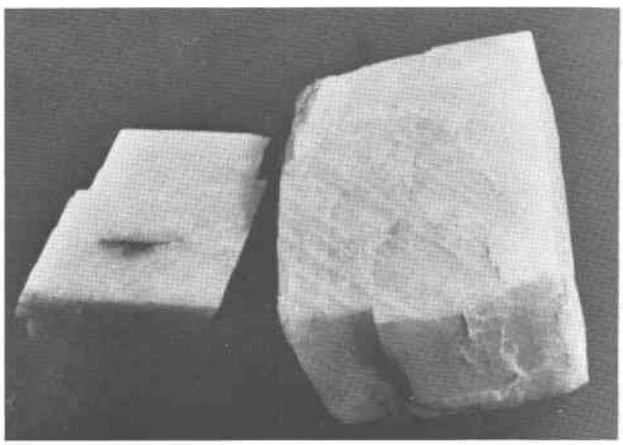

Figure 3. Ferroan dolomite, exhibiting rhombohedral cleavage, from the southwestern group of soapstone quarries at Old Dominion.

Quartz veins in the Esmont slate quarry contain cleavable buff-colored ferroan dolomite which weathers brown.

Saddle-shaped dolomite crystals occur in a rhyolite dike in the Shadwell quarry (Giannini and Rector, 1958).

Small saddle-shaped crystals of dolomite are associated with calcite and pyrite crystals at the intersection of U.S. Highway 29 and U.S. Highway 29 Bypass along the off ramp south onto U.S. Highway 29. Dolomite was observed at the Ohio Sulphur Mining Company's pyrite mine near Proffit by Wiggins and Horne (1967).

EPIDOTE - Epidote is a common mineral in the Catoctin Formation. The greenstone of this formation makes up much of the Blue Ridge Mountains on the western edge of the county as well as a series of mountains, including the Southwestern Mountains, on the eastern edge (Nelson, 1962). Epidote is the principal constituent of massive epidosite zones in the greenstone. It also occurs as radiating columnar crystals and fine-grained masses in amygdules and other cavities in the greenstone. Cordova (1955) described the petrology of the greenstone in detail. Specimens of epidote occur in the Shadwell quarry (Giannini and Rector, 1958). Crystals, to 2 inches long, and masses occur in an excavation on Peters Mountain, southeast of State Road 777. Buck Mountain Creek and Sugar Hollow are two localities of many containing epidote along the eastern flank of the Blue Ridge Mountains. Chemical analyses of the epidote from the Catoctin Formation made by Lippit (1882) of samples from Greenwood and by Froehling and Robertson (1904) of samples from Shadwell.

Dark-green epidote crystals, embedded in quartz, occur in veins in the Red Hill quarry. The crystals are sharp, have typical b-axis elongation, and are to 0.5 inch long. Massive fine-grained epidote also occurs in some of the rocks in the quarry. VanLandingham (1962) referred to some of these rocks as "unakite-like."

Unakite, a granitic rock containing epidote, pink feldspar, and quartz, is found in Sugar Hollow and on the North Fork of Moormans River (Nelson, 1962). VanLandingham (1962) observed unakite in the Shadwell quarry; he mapped a second locality about 3.5 miles southwest of Charlottesville on U.S. Highway 29.

EPSOMITE - White efflorescences of epsomite occur on surfaces of weathered soapstone in the quarries near Old Dominion. This mineral, identified by X-ray diffraction, probably formed by the reaction of the soapstone with acid formed from the decomposition of pyrite.

ERYTHRITE - A small amount of erythrite was observed by Giles (1961, 1962) at the Alberene Soapstone quarry. It occurs as small pink patches in a chloritic soapstone. The identification was verified by X-ray analysis. Erythrite also was observed by T. V. Dagenhart (personal communication, 1977) in the Old Dominion soapstone quarry. The association of erythrite with cobaltite in talc at the quarry was reported by Giannini and Penick (1983).

FELDSPAR - (See plagioclase feldspar series, orthoclase, microcline.)

FLORENCITE - Dagenhart and Maddox (1977) described florencite at the iron mine about 0.25 mile west of North Garden. Here it occurs as cream to tan crusts on weathered nelsonite. The rare earth elements contained in the mineral were determined.

FLUORITE - The mineral fluorite occurs at the Faber lead-zinc mine. The best description of this locality is given by Giannini (1959). The fluorite exhibits three color variations: pale to dark purple, pale greenish-blue, and milky white. It occurs as cleavable masses, except for some of the white variety which is fine-grained and saccharoidal. The fluorite is not fluorescent, but is thermoluminescent. The purple fluorite exhibits this property especially well. Seamon (1885) mentioned pink fluorite at this location. Fluorite at the mine is also listed by Bain (1904), Watson (1905), and Van Mater (1906).

Fine-grained purple and white fluorite occurs in a rhyolite dike in the Shadwell quarry (Giannini and Rector, 1958).

A small amount of pale-violet, cleavable fluorite, associated with pink and white calcite, was observed in the Red Hill quarry.

Massive to cleavable purple fluorite occurs in granite at the Rivanna Reservoir dam-construction site just off State Road 643.

GALENA - Galena was an important ore mineral at the Faber lead-zinc mine. According to Giannini (1959) it occurs as cleavable masses to 4 inches across. Cleaved cube faces exhibit outward bulging, characteristic of argentiferous galena. The mineral contains silver according to Seamon (1885), Watson (1905), and Jones (1932). Watson (1905) reported small amounts of arsenic and antimony in the mineral. Galena at this locality is also listed by Bain (1904) and Van Mater (1906).

Small galena cleavages also occur in ferroan-dolomite veins in the Old Dominion soapstone quarry, and in the newer quarry at Alberene.

On the Hickory Ridge farm, northwestern side of State Road 665, east of Free Union, masses of galena associated with chalcopyrite occur in a quartz mine.

Galena occurs at the Rivanna Reservoir dam site off State Road 643. Small cleavage masses of galena occur in quartz veins in the Red Hill quarry.

Galena also was observed in quartz veins that cut a graphitic schist in the dump of the Ohio Sulphur Mining Company mine near Proffit.

Galena, as cleavage masses 0.5 inch across, occurs in quartz veins to 4 inches wide on the southwestern side of State Highway 6, about 3700 feet northwest of the intersection with State Road 630, near the Nelson County line.

GARNET GROUP - Garnets occur at various places in the Lovingston Formation. They are found along State Road 637 between Ivy and Batesville (Nelson, 1962), and in a road cut on U.S. Highway 29 south of Charlottesville and north of Red Hill. Pink, deeply-striated garnet crystals, embedded in quartz and a carbonate rock, occur in small dikes in a road cut along U.S. Highway 29 just north of Neve Hall. Garnet also occurs in microcline-quartz dikes 0.25 mile south of Covesville on the northwestern side of the south bound lane of U.S. Highway 29.

Garnet crystals measuring to 0.5 inch across are associated with the dark lamprophyre (lamproschist?) dikes in the abandoned Martin-Marietta quarry northwest of State Road 643 north of Charlottesville.

Garnet occurs in schists associated with the Faber lead-zinc deposits (Watson, 1905). According to Chappell (1885), almandine garnet is associated with nontronite at an unspecified locality.

Spessartine garnet, in brownish, weathered, schistose masses of biotite, occurs at the iron mine west of North Garden (Dagenhart and Maddox, 1977).

Amber colored garnet occurs rarely with albite in amygdules in the Catoctin Formation at Sugar Hollow. The mineral is tentatively identified as grossular-andradite on the basis of its X-ray diffraction data (a = 11.96 A).

Garnets replaced by goethite were observed in the county. These are described under goethite-limonite.

GOETHITE-LIMONITE - Large quantities of massive to fibrous goethite occur at the Stony Point iron-copper mine, about 1.5 miles northeast of Stony Point on State Road 640, about 200 yards northwest of the junction with State Highway 20. The mineral is in a typical cellular gossan. Geodes and stalactites of goethite are common (Figure 4). Tazelaar (1958a, 1858b) described the deposit.

Pseudomorphs of geothite-limonite after cubical-pyrite crystals are numerous in the Lynchburg Formation which crosses Albemarle County. Peare (1959) described 12 specific collecting localities in the county. (1) At Rio, 150 yards east of the bridge crossing the Southern Railroad tracks, on the eastern side of Rio Road. (2) Along the Southern Railroad cut through McIntire Park in Charlottesville; the zone was traced 1.25 miles along the cut. (3) Frys Springs area of Charlottesville on State Road 779, 0.4 mile west of the intersection of State Road 779 with State Road 631. (4) Three miles south of Charlottesville on State Road 631 between Moores Creek and Biscuit Run, 0.25 mile east of the intersection of State roads 631 and 780. (5) Four miles south of Charlottesville on State Road 631, 0.1 mile southeast of the intersection with State Road 781. (6) One-half mile south 30 degrees east of Mathews Chapel, and 0.4 mile due east of Biscuit Run. (7) Northeast of the intersection of State roads 631 and 717 and 1.4 miles south 58 degrees west of Chestnut Grove Church. (8) On State Road 708, 1.7 miles southeast of the Hardware Church and 1.3 miles northwest of the junction of State Road 708 with State Highway 20. (9) At the intersection of State roads 719 and 712 about 1.2 miles northeast of Alberene. (10) In Alberene, 345 feet south 85 degrees west of the general store in the town as well as on the eastern side of the newer soapstone quarry. (11) On a fire trail which intersects State Road 630, 0.7 mile east of Unionville. (12) On State Road 755, 0.6 mile east of the Albemarle Soapstone Company quarry. The specimens there are large and numerous. Crystals measuring several inches on the cube edge have been found (Figure 5). Unoxidized pyrite occurs in the centers of many of the pseudomorphs (Figure 6).

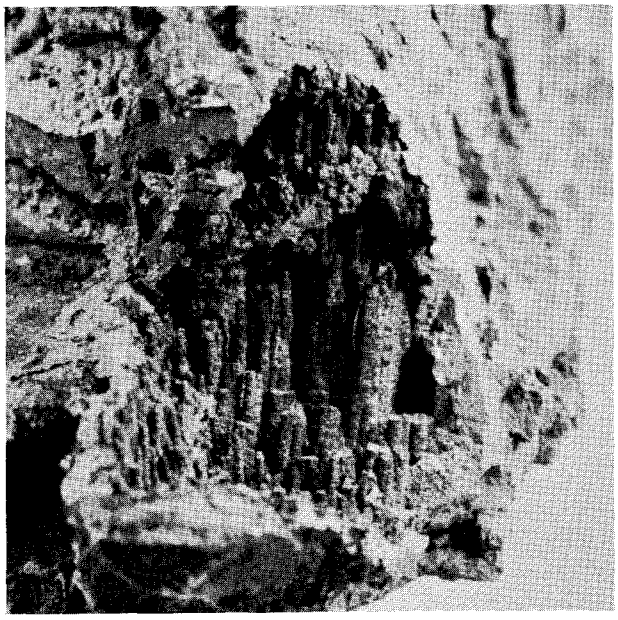

Figure 4. Goethite mass, containing stalactites approximately 1 inch long, collected from the Stony Point Iron-copper mine.

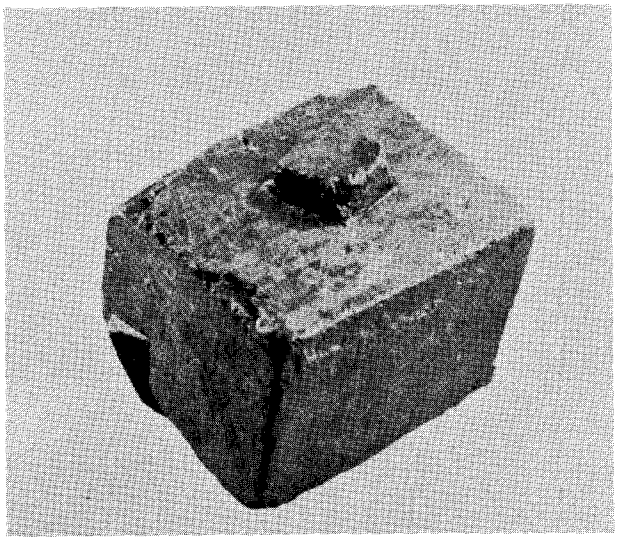

Figure 5. Goethite pseudomorph, after a cubic pyrite crystal, approximately 2 inches across the front face.

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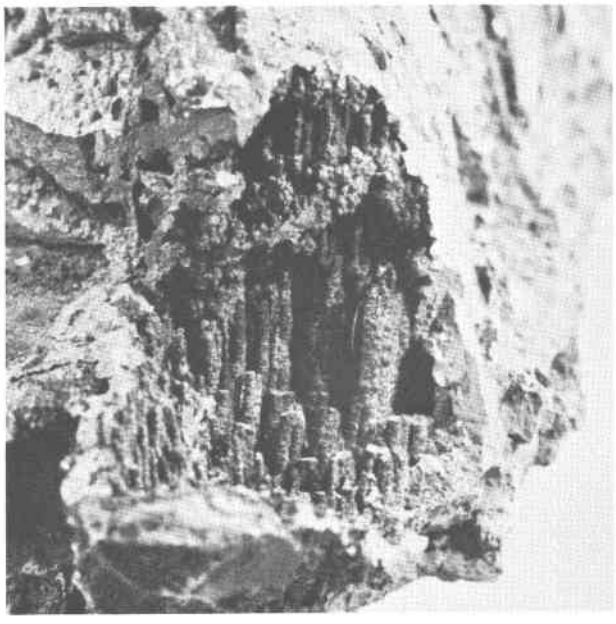

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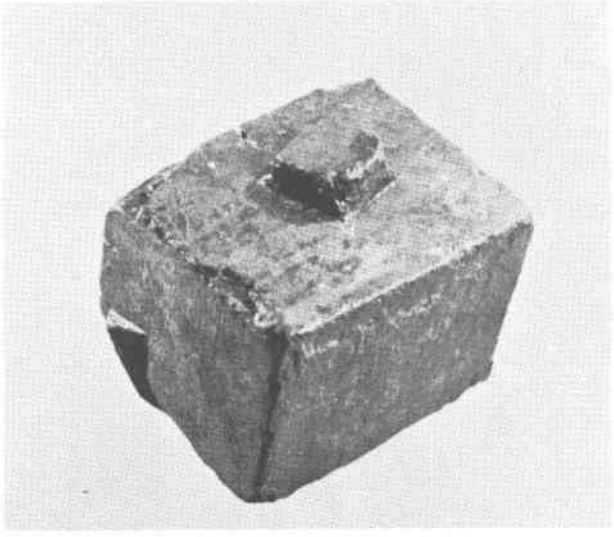

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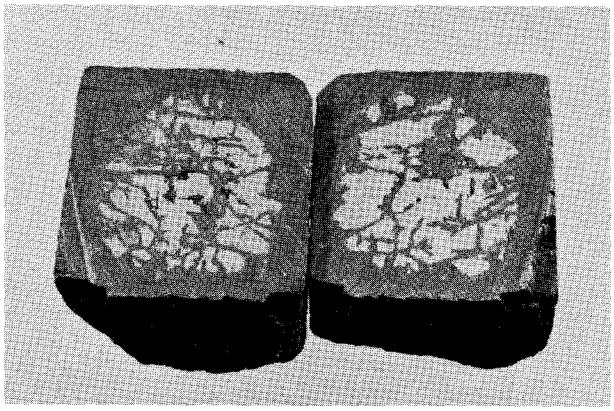


Figure 6. A sawn goethite pseudomorph exhibiting unreplaced pyrite near the center of a 1.25-inch cube.

Goethite pseudomorphs after pyrite occur along a 1200 feet zone on a Civilian Conservation Corp (C.C.C.) road. The zone begins 1000 feet west of State Road 719 at Alberene. This C.C.C. road intersects State Road 719 about 4000 feet southwest of the intersection of State roads 712 and 719. The crystals are to 1.25 inches across and cubic in habit. Similar pseudomorphs are found at Alberene about 500 feet west of State Road 719 and 1.05 miles southwest of the intersection of State roads 712 and 719. The specimens are found along dirt roads just southeast of the old soapstone quarries.

Sharp, bright pseudomorphs of goethite after pyrite occur along a soil and rock cut just behind a grocery store on the northern side of State Highway 6. The site is approximately 100 feet from Highway 6 and approximately 500 feet east of the intersection of Highway 6 and State Road 800 in the southern part of the county (Giannini, 1984).

Cubic pseudomorphs after pyrite to 0.75 inch across occur in the soil along a farm road and erosion ditch approximately 900 feet west of State Road 715 and 300 feet north of Wolftrap Branch. The turnoff from State Road 715 is approximately 0.85 mile south of Highway 6. The pseudomorphs occur in a weathered phyllite in the Candler Formation (Vicki G. Bibb, personal communication, 1986).

Well-shaped, cubical pseudomorphs after pyrite to 1 inch across occur on the J. H. Nay farm about 1.5 miles south of Batesville on the southeastern side of State Road 635 (Pugh, 1959).

Pseudomorphs containing considerable pyrite are common in the driveway at the Esmont slate quarry.

Limonite pseudomorphs after pyrite cubes were observed at the end of State Road 670, not far from Old Dominion.

Small sharp pseudomorphs after pyrite, showing pyritohedrons and cubes, were collected on the Airslie farm south of Cismont. Large pyritohedral pseudomorphs after pyrite occur in a road cut on Interstate Highway 64, just east of the overpass where State Road 731 crosses the interstate.

Distorted crystals of geothite after pyrite occur in the Catoctin Formation in an outcrop in a bank southwest of a Westvaco road 1.25 miles west of Mount Alto and 600 feet east of the Rockfish River.

Goethite pseudomorphs after dodecahedral crystals of garnet , to 0.5 inch across, occur in a road cut along State Road 677 northeast of Ivy . Also similar pseudomorphs after garnet occur in a light gray mica-quartz schist on the east side of U.S. Highway 29 a short distance north of the entrance road to Carrsbrook. These measure 0.375 inch across and show dodecahedral forms (Figure 7).

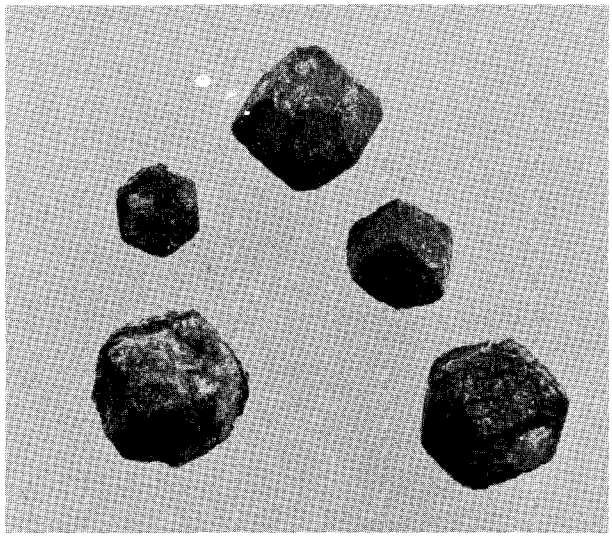


Figure 7. Goethite pseudomorphs after dodecahedral garnet crystals, to 0.375 inch across the largest face, from a location north of Charlottesville.

Black, resinous, amorphous-limonite masses, with brown crusts, occur as replacements of chalcopyrite masses in quartz veins associated with the Catoctin Formation on Peters Mountain, southeast of State Road 777. The limonite masses, which usually measure less than 0.5 inch across, resemble allanite.

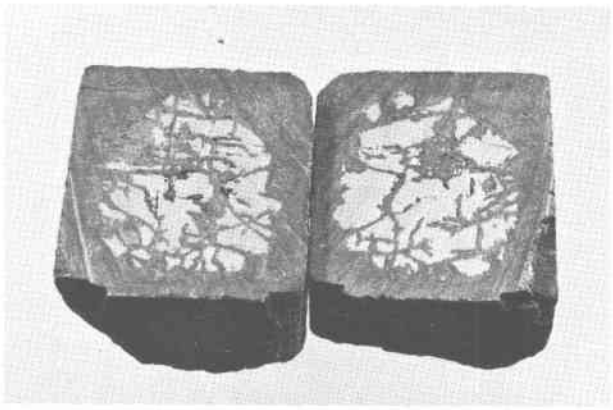
Nelson (1962) listed and mapped three limonite deposits: on the southwest side of Mechunk Creek, 1 mile east of Cobham; a few hundred yards from Lindsey's Station; and 1.5 miles northeast of Woodbridge School.

Edmundson (1930) observed a residual limonite deposit on Dudley Mountain near Red Hill.

Small goethite needles, elongated parallel to their c-axes, occur as inclusions in amethyst crystals found near Ash Lawn.

Earthy limonite occurs as alteration crusts on the ferroan-dolomite veins at the Alberene (Giles, 1961) and Old Dominion soapstone quarries. It also occurs on similar veins in the Esmont slate quarry.

GOLD - According to Sweet and Trimble (1982) gold was mined in southern Albemarle County at the Ivy Creek mine in the late 1800s or early 1900s. At least 20 pits and trenches are still visible in the area. Although no production records were found, gold was reportedly found. A white quartz vein



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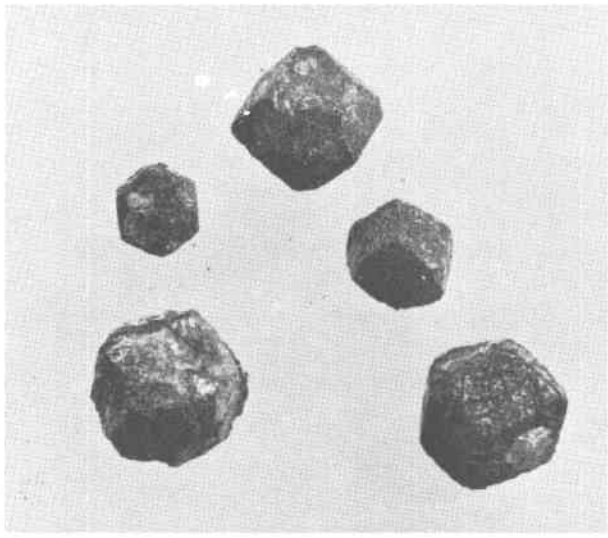

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is present in the bedrock of quartz-biotite gneiss (Charlottesville Formation), but no metallic mineralization was observed in recent studies.

Another gold occurrence, according to Sweet and Trimble (1982), is at the Rocky Branch prospect. This site, in the Swift Run Formation, was prospected in the 1920s. It is 0.6 mile southeast of Old Dominion, on the southeastern side of State Highway 6 along Rocky Branch. D. C. Trimble and W. F. Giannini panned small pieces of gold during the summer of 1982 in a tributary to Rocky Branch about 0.75 mile to the north-northwest.

According to Lambeth (1901) gold "streaks" were obtained from panning selected specimens of quartz from veins in the mica slates east of Southwestern Mountain.

GRAPHITE - Specimens of pure, massive, and fibrous graphite occur at the Naylor-Bruce Graphite Company's abandoned mine (Figure 8). This mine is near the headwaters of Piney Creek, on the northeastern flank of Fox Mountain, about 1.5 miles northwest of State Road 671. The graphite veins range from 13 inches to 8 feet wide and produced single blocks weighing several hundred pounds (Anonymous, 1906).

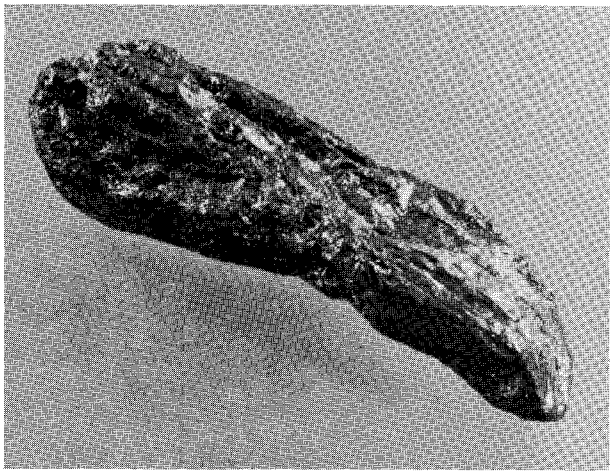

Figure 8. Pure massive graphite about 3 inches long from the abandoned Naylor-Bruce graphite mine on the northeastern flank of Fox Mountain.

Large amounts of very impure and fine grained graphite occur in the Lynchburg Formation (Johnson Mill graphite slate at its type locality at Johnson Mill) on State Road 712 on the Hardware River, 2.7 miles southeast of North Garden (Nelson, 1962). The Ohio Sulphur Mining Company's pyrite mine near Proffit is in this graphite-rich unit (Nelson, 1962).

Traces of graphite were noted in white calcite in veins found in the Red Hill quarry.

Graphite also was observed in small amounts associated with microcline, quartz, and garnet in weathered dikes in the Lovingston Formation (gneiss) along U.S. Highway 29 on the northwestern side of the south-bound lane a short distance south of Covesville.

GRUNERITE - Dagenhart and Maddox (1977) reported that the amphibole grunerite occurs as tan to white elongated blades associated with nelsonite at the iron mine west of North Garden.

GYPSUM - Microscopic gypsum crystals occur with limonite in cavities in weathered rocks at the Ohio Sulphur Mining Company's pyrite mine near Proffit.

HALLOYSITE (10A-halloysite) - A chocolate-colored homogeneous clay from an excavation on the north side of U.S. Highway 250, a short distance west of the Farmington entrance, was shown by S. S. Greenberg (personal communication, 1964), from an X-ray study, to be chiefly 10A-halloysite (endellite). (Also see metahalloysite.)

HEMATITE - Large amounts of massive specular hematite occur north of State Road 641, extending from State Highway 20 to Burnleys. Some of the material is coarsely crystalline with individual plates measuring nearly 0.75 inch across (Figure 9). Nelson (1962) mapped a pit where the ore was mined over 100 years ago. Specular hematite occurs in quartz veins associated with the Catoctin Formation at the Shadwell quarry (Giannini and Rector, 1958), and in similar rocks in Sugar Hollow and Buck Mountain Creek. The hematite is usually in the form of tabular hexagonal crystals. Vernon (1952) observed considerable amounts of specular hematite as fracture fillings in the Catoctin Formation on the eastern side of Pasture Fence Mountain along the northern boundary of the Crozet district.

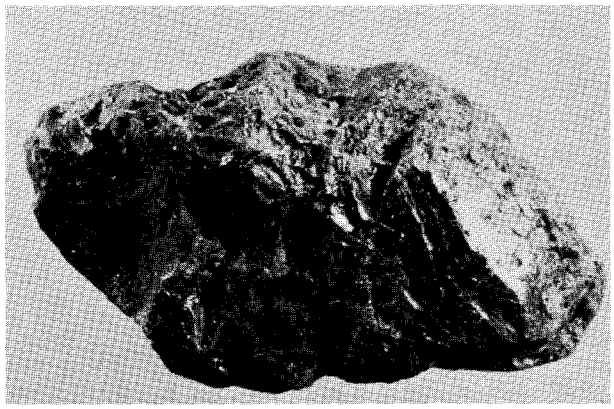

Figure 9. Specular hematite specimen 2 inches long collected 1 mile east of Burnleys.

Small disseminated masses of specular hematite were found at the intersection of U.S. Highway 250 and Interstate Highway 64, east of Charlottesville. Specular hematite also was collected in the first road cut west of the intersection of State Highway 20 and Interstate Highway 64, south of Charlottesville.

Very splendent micaceous flakes and crystals of

is present in the bedrock of quartz-biotite gneiss (Charlottesville Formation), but no metallic mineralization was observed in recent studies.

Another gold occurrence, according to Sweet and Trimble (1982), is at the Rocky Branch prospect. This site, in the Swift Run Formation, was prospected in the 1920s. It is 0.6 mile southeast of Old Dominion, on the southeastern side of State Highway 6 along Rocky Branch. D. C. Trimble and W. F. Giannini panned small pieces of gold during the summer of 1982 in a tributary to Rocky Branch about 0.75 mile to the north-northwest.

According to Lambeth (1901) gold "streaks" were obtained from panning selected specimens of quartz from veins in the mica slates east of Southwestern Mountain.

GRAPHITE - Specimens of pure, massive, and fibrous graphite occur at the Naylor-Bruce Graphite Company's abandoned mine (Figure 8). This mine is near the headwaters of Piney Creek, on the northeastern flank of Fox Mountain, about 1.5 miles northwest of State Road 671. The graphite veins range from 13 inches to 8 feet wide and produced single blocks weighing several hundred pounds (Anonymous, 1906).

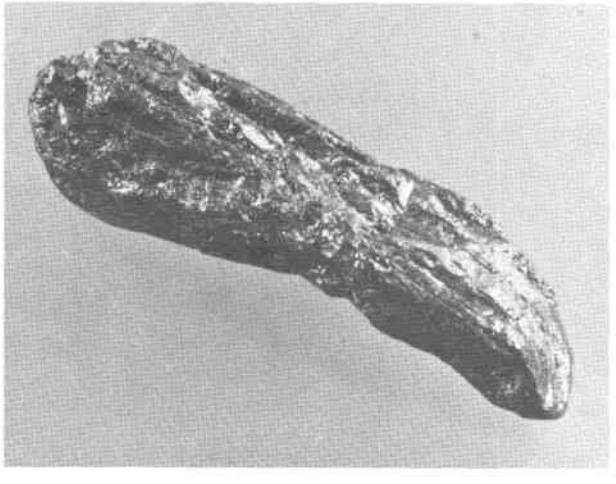

Figure 8. Pure massive graphite about 3 inches long from the abandoned Naylor-Bruce graphite mine on the northeastern flank of Fox Mountain.

Large amounts of very impure and fine grained graphite occur in the Lynchburg Formation (Johnson Mill graphite slate at its type locality at Johnson Mill) on State Road 712 on the Hardware River, 2.7 miles southeast of North Garden (Nelson, 1962). The Ohio Sulphur Mining Company's pyrite mine near Proffit is in this graphite-rich unit (Nelson, 1962).

Traces of graphite were noted in white calcite in veins found in the Red Hill quarry.

Graphite also was observed in small amounts associated with microcline, quartz, and garnet in weathered dikes in the Lovingston Formation (gneiss) along U.S. Highway 29 on the northwestern side of the south-bound lane a short distance south of Covesville.

GRUNERITE - Dagenhart and Maddox (1977) reported that the amphibole grunerite occurs as tan to white elongated blades associated with nelsonite at the iron mine west of North Garden.

GYPSUM - Microscopic gypsum crystals occur with limonite in cavities in weathered rocks at the Ohio Sulphur Mining Company's pyrite mine near Proffit.

HALLOYSITE (10A-halloysite) - A chocolate-colored homogeneous clay from an excavation on the north side of U.S. Highway 250, a short distance west of the Farmington entrance, was shown by S. S. Greenberg (personal communication, 1964), from an X-ray study, to be chiefly 10A-halloysite (endellite). (Also see metahalloysite.)

HEMATITE - Large amounts of massive specular hematite occur north of State Road 641, extending from State Highway 20 to Burnleys. Some of the material is coarsely crystalline with individual plates measuring nearly 0.75 inch across (Figure 9). Nelson (1962) mapped a pit where the ore was mined over 100 years ago. Specular hematite occurs in quartz veins associated with the Catoctin Formation at the Shadwell quarry (Giannini and Rector, 1958), and in similar rocks in Sugar Hollow and Buck Mountain Creek. The hematite is usually in the form of tabular hexagonal crystals. Vernon (1952) observed considerable amounts of specular hematite as fracture fillings in the Catoctin Formation on the eastern side of Pasture Fence Mountain along the northern boundary of the Crozet district.

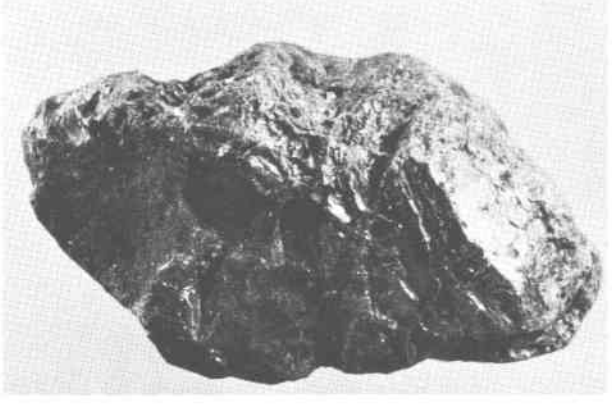

Figure 9. Specular hematite specimen 2 inches long collected 1 mile east of Burnleys.

Small disseminated masses of specular hematite were found at the intersection of U.S. Highway 250 and Interstate Highway 64, east of Charlottesville. Specular hematite also was collected in the first road cut west of the intersection of State Highway 20 and Interstate Highway 64, south of Charlottesville.

Very splendent micaceous flakes and crystals of

hematite are associated with milky-quartz veins in a road cut on the western side of Carlton Road, between Carlton Avenue and Hampton Street, in Charlottesville.

Specular hematite, as masses measuring 1 by 4 inches, occurs in the Candler Formation (phyllite) associated with the Mount Athos Formation (quartzite) on the western side of State Road 602. The exposure is in front of a house located 6100 feet (straightline) northwest of Howardsville.

Pegau and Overstreet (1941) reported martite (pseudomorphs of hematite after magnetite) in a steel-gray micaceous hematite found near Esmont. The martite octahedrons measure to 0.25 inch across.

Tazelaar (1958a) observed specular and earthy hematite at the Stony Point iron-copper mine.

Although goethite is the chief mineral in iron-oxide pseudomorphs after pyrite, Peare (1959) shows that hematite is also usually present in significant amounts. The localities are listed under goethite.

HORNBLENDE - Small (to 1 inch long) euhedral crystals of hornblende were collected from lamprophyre dikes at the southern boundary of Charlottesville (see discussion under analcime).

Somewhat weathered, dark-green hornblende crystals, to 0.5 inch long, occur in a small pegmatite dike exposed on State Road 677 northeast of Ivy. The dike also contains graphic granite.

Although present as small crystals, hornblende is an important component of the amphibolite dikes which occur in the county (Rhodes, 1954; Davids, 1960).

According to Dagenhart and Maddox (1977) black, subvitreous hornblende masses occur with the nelsonite at the iron mine west of North Garden.

HYDROZINCITE - X-ray powder patterns of a white stain, associated with sphalerite and fluorite at the Faber lead-zinc mine, match patterns of hydrozincite from Luna County, New Mexico. Under shortwave ultraviolet radiation the hydrozincite stains fluoresce a bluish white.

HYPERSTHENE - According to Vernon (1952) tiny prismatic hypersthene crystals, to 0.125 inch across, are an important component of a medium-grained hypersthene granodiorite (charnockite) which is exposed in several places near Crozet.

ILLITE - White masses of illite occur as inclusions in the lamprophyre dikes south of Charlottesville. White plastic clay consisting of illite and quartz occurs in streams on the Airslie farm near Cismont.

ILMENITE - Ilmenite crystals occur in ferroan-dolomite veins in the Alberene soapstone quarries (Giles, 1961) and in the Old Dominion soapstone quarry (Figure 10). At Old Dominion some tabular crystals, bounded by pinacoids and rhombohedrons, are over 2 inches in diameter and to 1 inch in thickness.

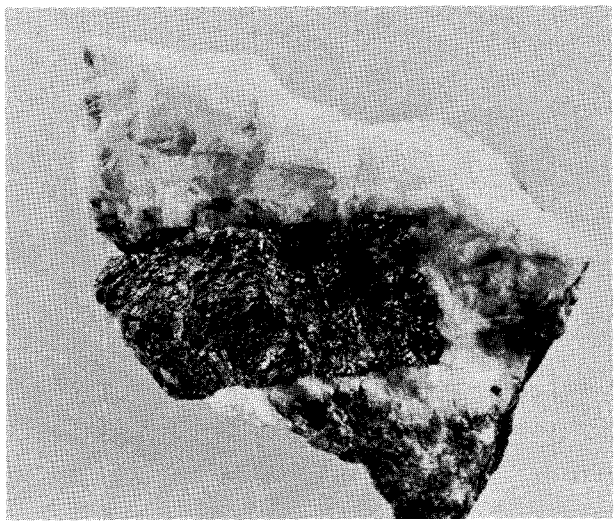

Figure 10. Portion of a 2-inch ilmenite crystal in a white ferroan-dolomite vein from the block dump of the Old Dominion soapstone quarries.

At the iron mine west of North Garden ilmenite occurs with magnetite and is a major component of a biotite nelsonite. This rock contains brownish-white apatite, dark-submetallic ilmenite, and vitreous biotite (Dagenhart and Maddox, 1977).

Euhedral ilmenite metacrysts to 0.25 inch across occur in a fine-grained mica schist at Mechums River. This material was brought to R. S. Mitchell's attention by Rene Muller of Ivy. Investigation showed that this material was apparently mined near Stockton Fork on the W. H. Blank farm, south of U.S. Highway 250 between State Road 751 and the Mechums River.

Occasionally milky-quartz float, containing striated plates of ilmenite, is found in the environs of Charlottesville and other places in the county.

Various soils of the county were shown by McCaleb (1888) and Dunnington (1891) to contain considerable amounts of titanium. No titanium minerals, however, were identified.

JAROSITE - Bright-yellow earthy jarosite occurs on rocks in the dump of the Ohio Sulphur Mining Company's pyrite mine about 1 mile northwest of Proffit. The mineral was identified by X-ray methods.

KAOLINITE - Kaolinite, as an alteration product of feldspar, occurs in many rocks in Albemarle County. Giannini (1959) observed it as an alteration product of a meta-arkose from near the Faber lead-zinc mine. It also occurs as a weathering product from a felsite dike at the Barracks Road Shopping Center in Charlottesville. Brick clays, presumably containing kaolinite, are reported at several localities in Albemarle County by Nelson (1962).

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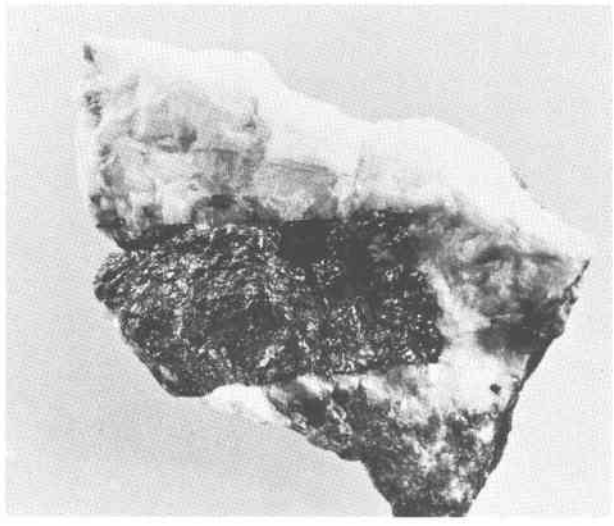

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LIMONITE - (See goethite-limonite.)

LITHIOPHORITE - This mineral occurs as crusts and dendrites on milky quartz in a vein about 0.25 mile west of Emmet Street, perpendicular to Arlington Boulevard, in Charlottesville (Figure 11). The best exposure is north of the Georgetown Apartments. The dull-black pulverulent mineral was identified by X-ray diffraction analysis by Mitchell and Meintzer (1967).

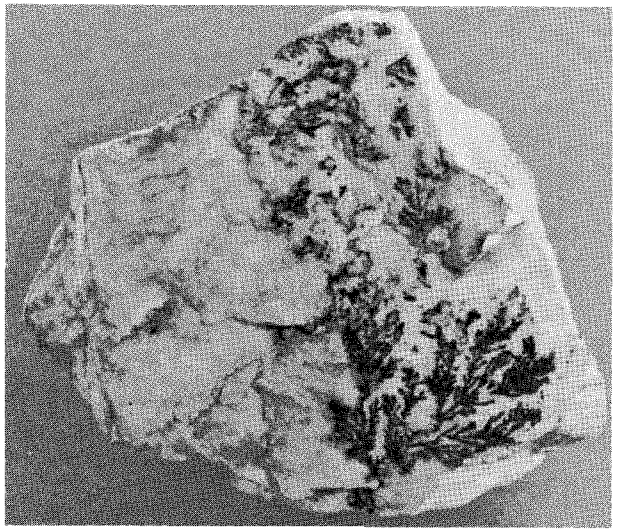

Figure 11. Dendritic lithiophorite from a milky-quartz vein along Arlington Boulevard, Charlottesville.

MAGNESITE - Yellowish magnesite rhombohedrons, to 0.5 inch across, are common in the soapstone quarry at Old Dominion. These glassy crystals, with similar white ferroan-dolomite rhombohedrons, are embedded in massive talc (Figure 12).

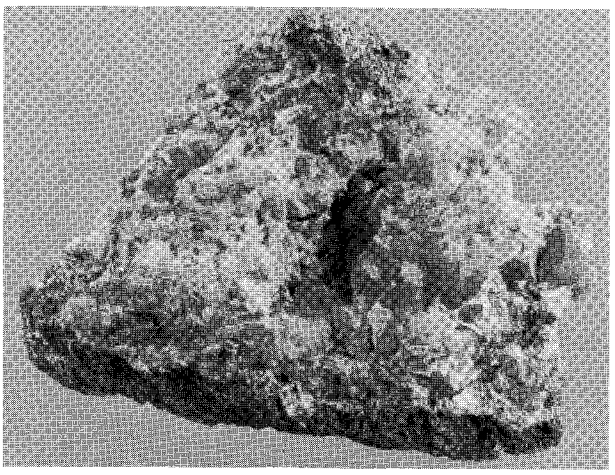

Figure 12. Glassy, yellowish magnesite crystals with white ferroan-dolomite and dark talc from the block dump of the southwestern-most group of the Old Dominion soapstone quarries.

Small masses of magnesite occur in lamprophyre south of Charlottesville (see analcime for a discussion of the locality).

MAGNETITE - Large amounts of massive magnetite occur at an iron mine just west of North Garden on the northeastern side of Cook Mountain. The locality is described by Nelson (1962) and Dagenhart and Maddox (1977). Ilmenite is associated with the magnetite. Brown (1882) reported that the ore is titaniferous and published an analysis.

Small magnetite crystals occur in the Catoctin Formation in the Shadwell quarry (Giannini and Rector, 1958), and in an excavation on the summit of Peters Mountain southeast of State Road 777.

Bright octahedral magnetite crystals, to 0.25 inch across, occur in the Catoctin Formation on the northern side, and on the bank, of the Rockfish River, 50 feet south of State Road 602 and approximately 600 feet northwest of its intersection with State Road 722 and the bridge across the river.

Magnetite, as small crystals and masses, is associated with ferroan-dolomite veins, in the Alberene soapstone quarry (Giles, 1961, 1962), and in the Old Dominion quarries (Watson and others, 1977).

Very small magnetite crystals are an important constituent of lamprophyre dikes south of Charlottesville.

Peare (1959) noticed that numerous pseudomorphs of goethite after pyrite are attracted to a magnet. A study of these indicated the presence of tiny euhedral magnetite crystals. These presumably were inclusions in the original pyrite. Giles (1961) reported pyrite crystals, from the Alberene soapstone quarry, which are attracted to a magnet because of magnetite inclusions.

Black sands, containing considerable amounts of magnetite, occur in the North Fork of the Rivanna River, especially where it is crossed by State Road 649.

MALACHITE - Malachite is associated with goethite-gossan ore at the Stony Point iron-copper mine (Tazelaar, 1958a). The mineral occurs as bright-green radiating needles, to 0.25 inch long, and as light-green to bluish-green stains.

Green patches of malachite occur along cleavage planes in some of the slate from the Esmont quarry. The malachite was identified by X-ray analysis.

Subordinate malachite occurs with chalcopyrite in veins in the Catoctin Formation in the Shadwell quarry (Giannini and Rector, 1958). Stains and small fibrous masses of malachite occur with altered chalcopyrite in quartz and epidote veins in the Catoctin Formation exposed in an excavation on the summit of Peters Mountain southeast of State Road 777.

Malachite occurs as a rare secondary alteration product of chalcopyrite in the ferroan-dolomite veins in the Old Dominion quarries.

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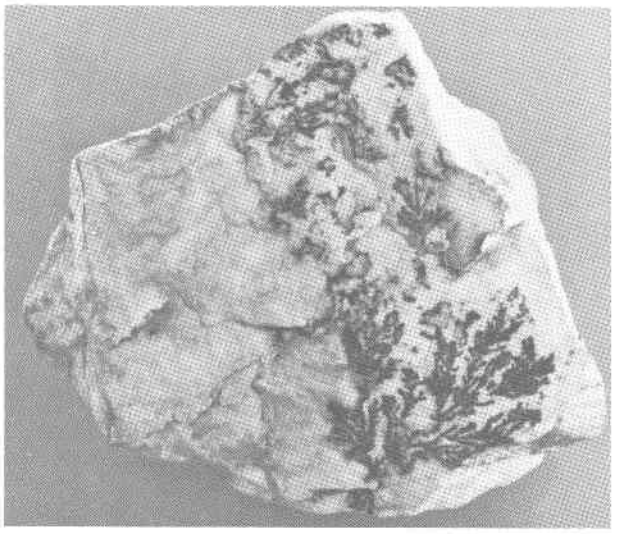

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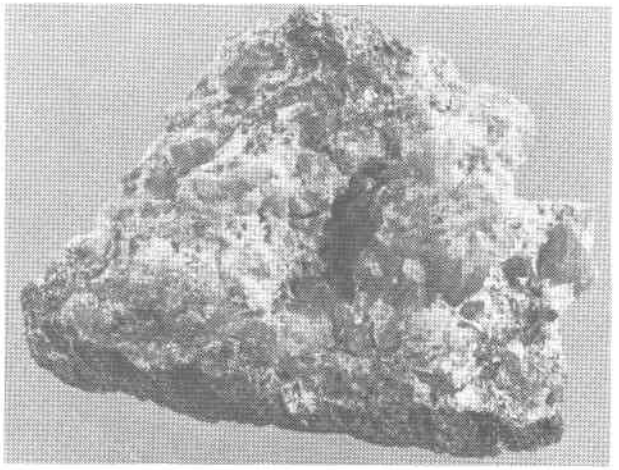

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METAHALLOYSITE (7A-halloysite) - Procellaneous, moderate reddish-brown, metahalloysite clay is associated with lithiophorite crusts north of Arlington Boulevard in Charlot-

tesville.

Minor amounts of metahalloysite were found in the lamprophyre dikes south of Charlottesville. Thin coatings associated with hematite were found south of Ivy, on State Road 637 in a road cut near The Rocks farm. Light-colored masses of metahalloysite were found in the excavation for University Hall at the University of Virginia in Charlottesville (also see halloysite).

MICROCLINE - Cleavages of microcline, over 5 inches across, were collected from a weathered dike on U.S. Highway 29 south of Charlottesville near Neve Hall. This dike was destroyed by road construction in the area, but smaller dikes containing cleavable pink microcline may be seen in cuts and in rock boulders in the same general area. A similar occurrence of microcline was noted in dikes 0.25 mile south of Covesville along U.S. Highway 29 (northwest side of south-bound lane), where it is associated with quartz and garnet.

Microcline occurs in a graphic granite in a small pegmatite dike exposed on State Road 677 northeast of Ivy. Similar graphic granite is exposed on the northeastern edge of the Charlottesville Reservoir in Sugar Hollow. A weathered, fine-grained graphic granite is abundant in an excavation north of U.S. Highway 250, a short distance west of the Farmington entrance.

Adkins (1954) reported a graphic granite composed of black microcline and quartz, from an exposure made by grading for the Charlottesville-Albemarle Airport. Under the microscope, the black color was seen to be due to small opaque inclusions, probably magnetite. Because the feldspar appeared to be optically positive it was tentatively called isomicrocline.

MORDENITE - Small white masses of mordenite were collected from the lamprophyre dikes south of Charlottesville (described under analcime). The mineral was verified by X-ray diffraction analysis.

MUSCOVITE - This mineral, especially in microscopic sizes (sericite), is a common component of some of the rocks of the area. It is especially abundant in certain units of the Lynchburg Formation (Vance, 1959), the Charlottesville Formation (Nelson, 1962), and the Loudoun Formation (Milici and Greenberg, 1963).

Sericite is associated with pyrite and quartz veins in the abandoned Martin-Marietta quarry north of Charlottesville.

NONTRONITE (chloropal) - Although an exact locality was not indicated, nontronite was reported in Albemarle County by Chappell (1885). It is earthy, light yellowish-green, and occurs in a disintegrating rock as leaflike pieces in sizes from fine grains to 3 inches in diameter and about 0.5 inch thick. A chemical analysis was given.

Yellow-green waxy crusts of nontronite occur on nelsonite at the iron mine west of North Garden (Dagenhart and Maddox, 1977).

Small green masses of nontronite were found in the lamprophyre dikes at the southern border of Charlottesville.

Irregular bright-green masses of nontronite occur in cavities in vein quartz at the mine on the Hickory Ridge farm on the northwestern side of State Road 665, east of Free Union.

OLIVINE - X-ray diffraction studies show that small crystals of olivine occur in some of the lamprophyre dikes south of Charlottesville (see analcime for a discussion of these rocks).

Olivine is an important constituent of an olivine diabase dike which cuts across the Everona Limestone, on Limestone farm, about 7.5 miles east of Charlottesville and 1 mile south of U.S. Highway 250 (Rowan, 1955). The rock contains microscopic olivine grains which are partly altered to serpentine.

OPAL - Small glassy spheres of hyalite opal on quartz with goethite were collected at the Stony Point iron-copper mine, about 1.5 miles northeast of Stony Point on State Road 640.

ORTHOCLASE - Deep-pink orthoclase is associated with quartz and other minerals in veins and amygdules in the Catoctin Formation. Specimens were collected in the Shadwell quarry (Giannini and Rector, 1958), in Sugar Hollow, and along Buck Mountain Creek. Granular to cleavable masses to 1 foot across have been found in an excavation on Peters Mountain southeast of State Road 777.

Orthoclase is a common rock-forming mineral throughout the county, notably so in the gneiss of the Lovingston Formation (Rowan, 1955).

A felsite dike that outcrops behind the stores of the north wing of the Barracks Road Shopping Center in Charlottesville, and extends to north of Hydraulic Road, is composed of orthoclase and quartz. The mineralogy, determined by X-ray diffraction analyses, was reported by Stumpf (1979).

PARAGONITE - According to X-ray studies by Milici and Greenberg (1963), paragonite is an important component of phyllite occurring in some units of the Loudoun Formation in the eastern part of the county.

PLAGIOCLASE FELDSPAR SERIES - Cleavages of light-gray plagioclase, to 1 inch across, occur with quartz, microcline, and biotite in dikes in the Lovingston Formation (gneiss) along U.S. Highway 29 south of Charlottesville and north of Red Hill.

Relatively large albite metacrysts occur in the Catoctin Formation at the Shadwell quarry (Giannini and Rector, 1958).

White albite is the mineral that usually forms rims around the amygdules that are common in the Catoctin Formation, especially in Sugar Hollow.

White, fine-grained masses of plagioclase to 6

inches thick occur in a lamprophyre (lamproschist?) dike in the northeastern portion of the abandoned Martin-Marietta quarry north of Charlottesville, west of U.S. Highway 29, and just northwest of State Road 643.

Plagioclase is an important constituent of many of the rocks of the county: oligoclase in the Lovingston Formation (gneiss) (Rowan, 1955), andesine in amphibolites (Rhodes, 1954; Davids, 1960), labradorite in olivine diabase (Rowan, 1955), and diabase (Roberts, 1958).

PUMPELLEYITE - Dark-bluish-green fibrous pumpelleyite was identified, by X-ray diffraction, in amygdules in the Catoctin Formation in Sugar Hollow. The mineral is very rare.

PYRITE - Bright striated pyrite cubes, to 1.5 inches on an edge, are abundant in gray slate in the Esmont quarry.

Pyrite masses occur in the Catoctin Formation in the Shadwell quarry (Giannini and Rector, 1958).

Masses and crystals of pyrite occur in the Lynchburg Formation (Johnson Mill graphite slate unit). This material was mined near Proffit by the Ohio Sulphur Mining Company. Granular pyrite in similar rocks may be seen at the Barracks Road Shopping Center in Charlottesville behind the stores of the north wing.

Pyrite, as masses and small crystals, is associated with chalcopyrite and pyrrhotite in quartz veins in the active Red Hill quarry.

Very distorted crystals and masses of pyrite are associated with soapstone at the Alberene (Giles, 1961, 1962) and Old Dominion quarries. At the latter site these mostly distorted, euhedral pyrite crystals occur in talc veins that cut soapstone blocks (Figure 13). They are most abundant in the dump 500 feet northeast of the last quarry of the northeastern-most series of the five abandoned quarries.

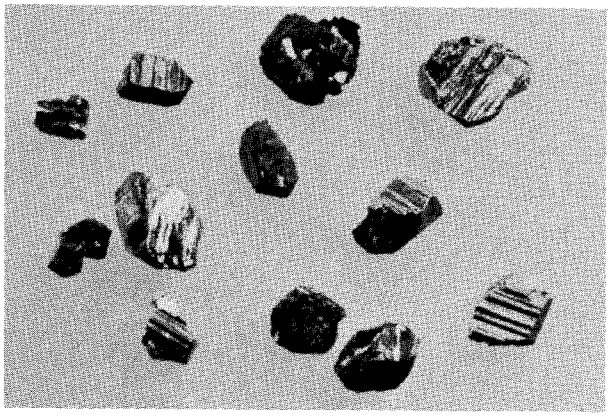


Figure 13. Distorted pyrite crystals to 1 inch across from the block dump of the northeastern-most group of the Old Dominion soapstone quarries.

Masses and crystals of pyrite occur in quartz veins that cut the Robertson River Formation in the Martin-Marietta quarry, off State Road 643, north of Charlottesville, and west of U.S. Highway 29.

Very small pyrite crystals occur on calcite crystals found south of Charlottesville at the intersection of U.S. Highway 29 and U.S. Highway 29 Bypass along the exit ramp south onto U.S. Highway 29. Many of the crystals are cubes modified with octahedral faces.

Pyrite crystals are found with chalcopyrite and covellite in a quartz mine about 200 feet north of U.S. Highway 250 near the Fluvanna County line.

Pyrite is reported at the Rivanna Reservoir dam site off State Road 643.

A large pyrite crystal was found during the construction of Interstate Highway 64 at Old Lynchburg Road in Charlottesville. This area has produced numerous pseudomorphs of limonite after pyrite.

According to Giannini (1959) pyrite occurs sparingly at the Faber lead-zinc mine.

Some massive pyrite occurs at the Stony Point iron-copper mine (Tazelaar, 1958a).

Unoxidized pyrite occurs in the centers of many of the pseudomorphs of goethite after pyrite described by Peare (1959). The localities are listed under goethite.

The Everona Limestone, described by Mack (1957, 1964), contains disseminated pyrite.

PYROMORPHITE - Olive-green crusts and hexagonal crystals of pyromorphite occur in quartz at the Faber lead-zinc mine. The crystals are often hollow (Giannini, 1959).

PYRRHOTITE - Pyrrhotite masses to 3 inches across and poorly-shaped crystals measuring 1 inch occur in quartz veins in the Red Hill quarry.

Pyrrhotite also occurs sparingly at the Faber lead-zinc mine (Giannini, 1959).

QUARTZ (amethyst) - Pale-lavender to deep-violet amethyst, to 3 inches for single crystals, and to 6 inches for clusters, are found in a road cut near Ash Lawn, just off State Road 795 (Figure 14). The crystals are commonly doubly terminated. They are sometimes attached to colorless, smaller quartz crystals, to form a scepter development. The violet coloration is usually unevenly distributed, and phantomlike developments are encountered. Inclusions of clay, liquid with bubbles, and goethite needles are numerous. One of the writers (R. S. Mitchell), using X-ray methods, determined that the goethite needles have a c-axis elongation. Amethyst was first found in the area over 50 years ago (Nelson, 1962). In May, 1962, new veins of crystals were brought to the attention of R. S. Mitchell by residents of the area. Bland, Gatlin, and Johnson (1963) have described the occurrence.

Amethyst crystals occur on the farm of Jerry Mawyer west of U.S. Highway 29, about a mile south of Covesville. The crystals sometimes exceed 1 inch across and are pale violet, with an uneven distribution of color. They contain needlelike inclusions which are presumably goethite. The south-bound lane of U.S. Highway 29 now covers this site.

inches thick occur in a lamprophyre (lamproschist?) dike in the northeastern portion of the abandoned Martin-Marietta quarry north of Charlottesville, west of U.S. Highway 29, and just northwest of State Road 643.

Plagioclase is an important constituent of many of the rocks of the county: oligoclase in the Lovingston Formation (gneiss) (Rowan, 1955), andesine in amphibolites (Rhodes, 1954; Davids, 1960), labradorite in olivine diabase (Rowan, 1955), and diabase (Roberts, 1958).

PUMPELLEYITE - Dark-bluish-green fibrous pumpelleyite was identified, by X-ray diffraction, in amygdules in the Catoctin Formation in Sugar Hollow. The mineral is very rare.

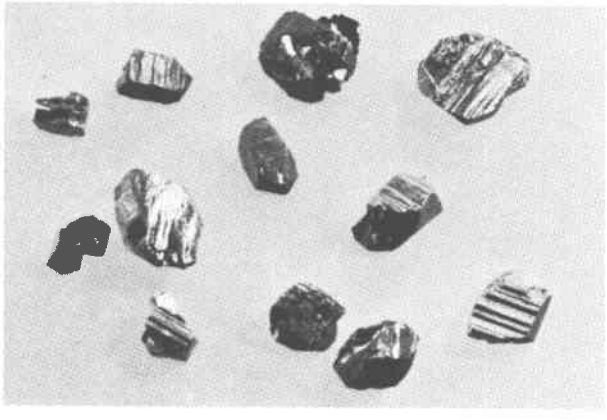
PYRITE - Bright striated pyrite cubes, to 1.5 inches on an edge, are abundant in gray slate in the Esmont quarry.

Pyrite masses occur in the Catoctin Formation in the Shadwell quarry (Giannini and Rector, 1958).

Masses and crystals of pyrite occur in the Lynchburg Formation (Johnson Mill graphite slate unit). This material was mined near Proffit by the Ohio Sulphur Mining Company. Granular pyrite in similar rocks may be seen at the Barracks Road Shopping Center in Charlottesville behind the stores of the north wing.

Pyrite, as masses and small crystals, is associated with chalcopyrite and pyrrhotite in quartz veins in the active Red Hill quarry.

Very distorted crystals and masses of pyrite are associated with soapstone at the Alberene (Giles, 1961, 1962) and Old Dominion quarries. At the latter site these mostly distorted, euhedral pyrite crystals occur in talc veins that cut soapstone blocks (Figure 13). They are most abundant in the dump 500 feet northeast of the last quarry of the northeastern-most series of the five abandoned quarries.



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In the same area, amethyst crystals to 1 inch long were collected from a site just north of the Massie house and U.S. Highway 29 in Covesville by W. F. Giannini in 1955.

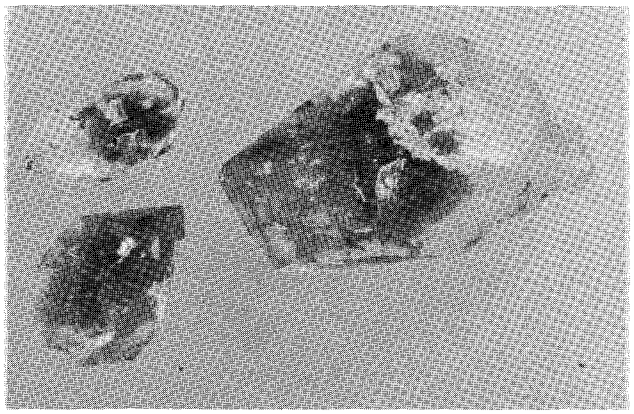

Figure 14. Amethyst-quartz crystals collected near Ash Lawn.

Very-pale, amethyst-quartz crystals, with iron oxide inclusions, are found northwest of the intersection of Angus Road and U.S. Highway 29, in northern Charlottesville.

Amethyst crystals are found near Yellow Mountain in the Crozet area.

Pale amethyst-quartz crystals were collected at a location south of Stockton Fork and north of State Road 683, southeast of Crozet.

Brown (1882) reported transparent amethyst-quartz crystals, loose in soil, near Mechums River. He described a twin with {0558} as the twinning plane and composition face. Frondel (1926) has expressed doubt regarding the twin law.

Froehling and Robertson (1904) state that amethyst occurs in Albemarle County, but give no definite localities.

QUARTZ (milky and clear) - Columnar to acicular milky- and clear-quartz crystals, averaging 1 inch long, occur in red soil approximately 300 feet south of U.S. Highway 250, about half-way between Charlottesville and Shadwell. The crystals usually occur in clusters and are attached to a quartz matrix (Figure 15).

Stubby, milky-quartz crystals, over 0.25 inch in diameter, are found along a private road just behind Michie Tavern, which is located on State Highway 53.

Occasionally quartz crystals are seen in cavities in massive milky-quartz veins and float which are common in the county.

Short, stubby, and crowded long-prismatic, quartz crystals occur in a brecciated zone on Hydraulic Road, west of the intersection with U.S. Highway 29. Also found in the breccia are black, manganese oxide, mineral coatings.

Clear to milky-quartz crystals, and crystal crusts with goethite, were collected at the bridge-construction site on Alderman Road about 200 feet north of the intersection with Ivy Road in Charlottesville.

Milky-quartz crystals to about 2 inches long were collected from the Catoctin Formation in a road cut west of the intersection of State Highway 20 and Interstate Highway 64, south of Charlottesville.

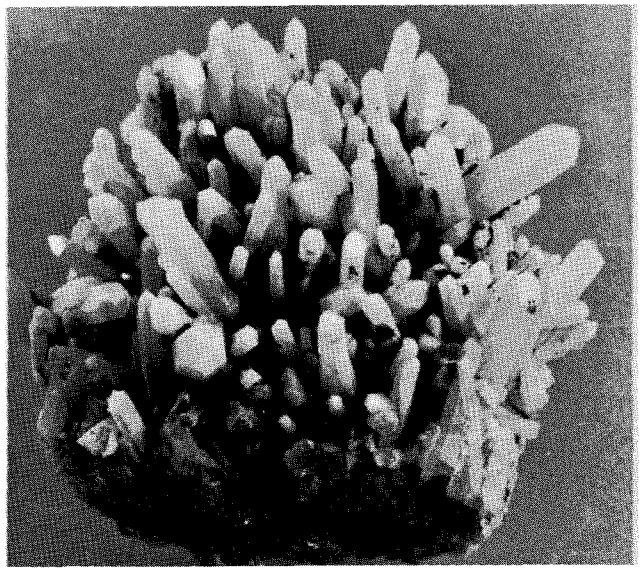

Figure 15. Milky-quartz crystals to 1 inch long from a location 1 mile west of Shadwell.

Large milky-quartz crystals occur on Harold Spainhour's property 3.35 miles southwest of Batesville and 0.55 miles northwest of the intersection of State roads 691 and 635. The crystals measure as much as 20 inches along the c-axis and 8 inches across. Some are doubly terminated. Several have greenish interior phantoms with white exteriors. They lie on the surface above the Lovingston Formation (gneiss) and cover a zone along a hillside approximately 200 feet long and 200 feet wide. Some of the quartz crystals contain goethite pseudomorphs, after ilmenite crystals probably, to 3 inches long.

Six large milky-quartz veins, from one to eight feet wide, occur in the Martin-Marietta quarry in the Robertson River Formation off State Road 643, north of Charlottesville and west of U.S. Highway 29.

Massive rock-crystal quartz measuring at least 2 inches across occurs in a dike with microcline 0.25 mile south of Covesville on the northwest side of the south-bound lane of U.S. Highway 29.

Massive, transparent rock-crystal quartz was observed as veins in a road cut on State Road 743, near its junction with State Road 606, north of Rivanna. Similar rock-crystal and smoky-quartz masses outcrop on the road to the iron mine just west of North Garden.

Milky-quartz veins and float occur many places throughout the county. For example, in a railroad cut west of Mechums River, in a railroad cut south of State Road 640 at Gilbert, and on U.S. Highway 29 north of Covesville. Massive milky-quartz veins are common in the Catoctin Formation (Giannini and Rector, 1958). Quartz forms a major gangue mineral at the Faber lead-zinc mine (Giannini,

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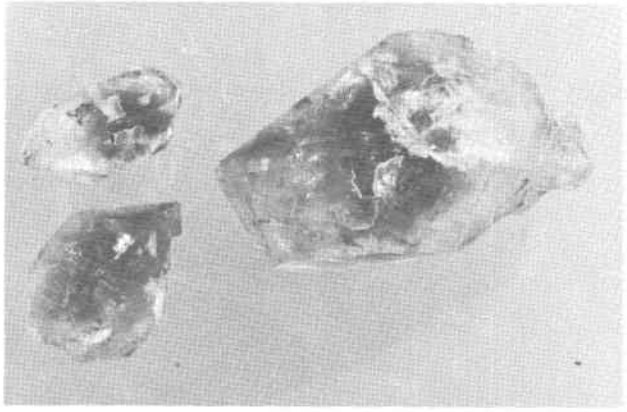

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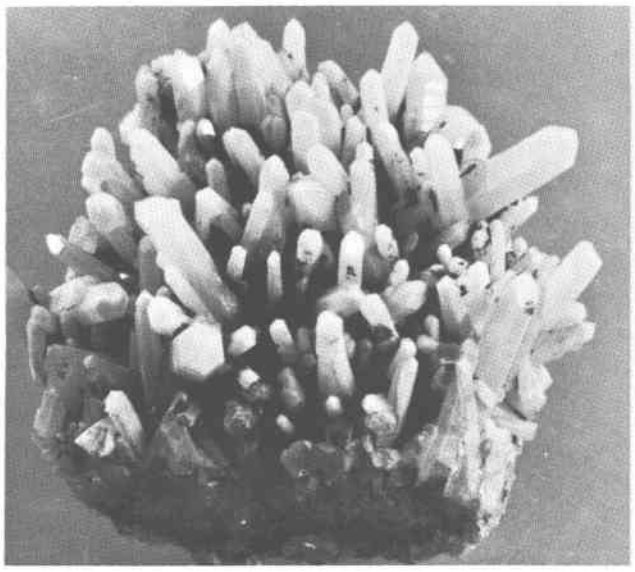

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1959) and at the Stony Point iron-copper mine (Tazelaar, 1958a). Quartz is also common in quarries at Esmont, Old Dominion, Red Hill, and Alberene.

Frequently the milky quartz contains polyhedral cavities of rhombohedral shape. These no doubt represent the shape of a carbonate mineral, probably dolomite, which has dissolved. The milky-quartz veins near Gilbert illustrate this.

Saccharoidal-quartz masses were observed in association with quartz crystals from south of U.S. Highway 250, between Charlottesville and Shadwell. This material may represent a weathered felsite dike.

Masses of opalescent, milky-white quartz, were observed on The Rocks farm south of State Road 637 and Ivy.

In recent years milky quartz was been mined from two large veins in the county. One quartz vein is north of U.S. Highway 250 near the Fluvanna County border and the other vein is on the Hickory Ridge farm northwest of State Road 665, east of Free Union. Another milky- to saccharoidal-quartz vein, from 2 to 4 feet wide and over 425 feet long, occurs about 0.25 mile west of Emmett Street in Charlottesville. The vein runs perpendicular to Arlington Boulevard. Considerable amounts of lithiophorite occur with the quartz (Mitchell and Meintzer, 1967).

QUARTZ (blue) - Occasionally massive blue quartz may be found. Much blue quartz occurs associated with gneiss at an abandoned quarry located where State Road 684 crosses Stockton Fork south of Yancey Mills (Hillsboro). It also occurs in a road cut on State Road 601 between the bridges over Mechums River and Moormans River. A vein a few inches wide has been observed near the end of State Road 629, not far from Browns Cove. Blue quartz is a component of several rocks in the county, such as the metagraywacke that forms the basal member of the Swift Run Formation, which outcrops along the old Lynchburg road just south of the Charlottesville city limits (Rader, 1959).

Blue-quartz gravels and sands occur along the Rockfish River, especially along the banks and on islands. This area is in southern Albemarle County, where the county line projects to the center of the river and then along it to Howardsville and the confluence with the James River. High terraces along the Rockfish River in the same area also contain blue-quartz specimens.

QUARTZ (green) - Massive green quartz is associated with the Catoctin Formation. Specimens were collected in the Shadwell quarry (Giannini and Rector, 1958), in an excavation on Peters Mountain, and in Sugar Hollow along Moormans River. The color of the quartz is probably due to included amphibole or chlorite. Some of this green quartz, containing scales of chlorite, is called aventurine.

QUARTZ (miscellaneous varieties) - Commonly one may find veins of milky quartz, in the Catoctin Formation, which have a cross-fibrous structure. Although the quartz may actually be fibrous at times (Thiesmeyer, 1937), the structure is commonly a result of an association with fibrous minerals (chlorite or amphibole or both). These frequently are removed by weathering. Specimens of this are common along Moormans River in Sugar Hollow.

Light-gray agate, with a somewhat grainy texture, occurs with Catoctin Formation pebbles and cobbles in Buck Mountain Creek.

A small piece of waxy, botryoidal, yellowish chalcedony was found loose on a trail on Little Flat Mountain in the northwest corner of the county.

Dark-red, opaque-jasper masses and amygdule fillings occur in the Catoctin Formation, especially along Moormans River in Sugar Hollow and along Buck Mountain Creek. Various colors of jasper are found at different places in the Rivanna River.

ROZENITE - The mineral rozenite, identified by X-ray methods, is associated with altering pyrite in a graphitic slate at an exposure behind the stores of the north wing of the Barracks Road Shopping Center, Charlottesville. It probably forms from the dehydration of melanterite, although this mineral was not observed. Rozenite and melanterite commonly form as alteration products of pyrite on specimens in the collection at the University of Virginia. Rozenite has also been found on decomposed pyrite at the pyrite mine near Proffit by Wiggins and Horne (1967).

SERPENTINE - Serpentine is an important component of some of the rocks in the soapstone belt of Albemarle County (Spiker, 1960; Burfoot, 1930). When serpentine and tremolite predominate over talc the rocks are sold as serpentine (Nelson, 1962). Although serpentine is reported to occur in the country rock bordering the Old Dominion quarry (Fairley and Proska, 1958), it was not observed in the immediate quarry area (Watson and others, 1977).

SIDERITE - Medium- to fine-grained masses of light-brown siderite occur in the Stony Point iron-copper mine. Tazelaar (1958a) believes the goethite gossan was formed mainly by oxidation and hydration of this carbonate mineral.

An X-ray analysis determined that tiny brown metacrysts in slate from the Esmont quarry are siderite.

Siderite and hematite were identified in dark-brown crusts along joint planes in the abandoned Martin-Marietta quarry near State Road 643, north of Charlottesville and west of U. S. Highway 29.

SIDEROTIL - White crusts of the sulfate, siderotil, occur on goethite at the Stony Point iron-copper mine. The identification was verified by X-ray diffraction analysis.

SILVER - Native silver specimens are not found in Albemarle County, but according to Seamon (1885), Watson (1905), and Jones (1932) the galena which occurs in the Faber lead-zinc mine is silver bearing. A specimen of galena with fluorite from the dump at this mine tested 0.55 ounces

of silver per ton. This testing by fire assay, was conducted for the Virginia Division of Mineral Resources in 1984.

SMITHSONITE - Seamon (1885) and Watson (1905) have reported smithsonite at the Faber lead-zinc mine.

SPHALERITE - Granular aggregates and larger cleavage masses of dark- reddish-brown sphalerite occur as the chief ore mineral in the Faber lead-zinc mine. This mineral has included specks of an unknown mineral which fluoresces a brilliant green under short-wave ultra-violet light (Giannini, 1959). The occurrence of sphalerite at this locality is also mentioned by Seamon (1885), Bain (1904), Watson (1905), and Van Mater (1906).

Small amounts of cleavable brown sphalerite in quartz were observed in the Red Hill quarry.

Greenish-yellow crystals and masses of sphalerite fill small cavities in barite occurring near the intersection of U.S. Highway 250 and Interstate Highway 64, east of Charlottesville (see barite).

Sphalerite also occurs in the abandoned Martin-Marietta quarry in the Robertson River Formation just northwest of State Road 643, located west of U.S. Highway 29 north of Charlottesville. Black sphalerite masses to 0.5 inch across occur in a quartz vein exposed on the northeastern quarry wall. Tiny native sulfur crystals occur on the surfaces of some of these masses. Sphalerite occurs with the dark lamprophyre (lamproschist?) dikes in the quarry.

Crystals of sphalerite, to 0.5 inch across, were observed in rocks of the Robertson River Formation from material excavated for the Rivanna River Reservoir dam off State Road 643.

SPHENE - Small, pale-green, flattened sphene crystals, with pyrrhotite, chalcopyrite, and epidote, occur in quartz veins in the Red Hill quarry. Microscopic sphene crystals also occur as an accessory mineral in the Lovingston Formation from this quarry (Rector, 1958).

White patches of earthy sphene were found with biotite in granite near Red Hill on U.S. Highway 29 during road construction.

SULFUR - Microscopic euhedral crystals of native sulfur occur on the surfaces of dark sphalerite crystals from quartz veins on the northeast quarry wall of the abandoned Martin-Marietta quarry north of Charlottesville (west of U.S. Highway 29 and northwest of State Road 643). The crystals are colorless to light yellow and were identified by X-ray diffraction.

TALC - Talc is the main constituent of soapstone in a belt just west of Green Mountain. Burfoot (1930) and Hess (1933) have described the deposits. In addition to talc the soapstone contains fine-grained chlorite, serpentine, tremolite, dolomite, magnetite, and pyrite (Burfoot, 1930). Quarries at Old Dominion and Alberene did yield this type of rock.

Foliated and fibrous, dark- to light-green talc occurs in ferroan- dolomite veins at the Alberene (Giles, 1961, 1962) and Old Dominion quarries. Individual folia over 1 inch across were noted.

TINTICITE - X-ray analysis of a light-yellow, earthy material, occurring as patches in a weathered graphitic slate from the Ohio Sulphur Mining Company's mine near Proffit, gave data which closely match those for tinticite (Stringham, 1946). It is conceivable that this hydrated basic phosphate of ferric iron could form from the weathering of pyrite in the presumably phosphatic and graphitic slate (Gravatt, 1920).

TOURMALINE (schorl) - Black masses of small schorl crystals in milky quartz occur as float associated with quartz veins in the Candler Formation, at a locality 800 feet east-southeast of the intersection of State roads 735 and 602 and 175 feet northeast of a small stream at the edge of a woods.

TREMOLITE-ACTINOLITE SERIES - Microscopic crystals of tremolite occur in rocks associated with soapstone in a belt west of Green Mountain (Burfoot, 1930).

Tremolite is an important constituent of soapstone, composed essentially of white chlorite, that occurs near the specular hematite locality at Burnleys and on the Nick Evans property in the same area.

Tremolite, as fibrous masses over 8 inches long, was found in veins in large soapstone blocks quarried at Alberene. Giles (1961, 1962) has observed this mineral in veins and cavity fillings in the Alberene soapstone quarry. A similar mineral, of green color, in the vicinity of Alberene was recorded by Watson (1907), and a chemical analysis for the mineral, closely corresponding to actinolite, was reported by Merrill (1895). Gray-green actinolite, with fibers to 1.5 inches in length, occurs in the talc veins in the Old Dominion quarries (Watson and others, 1977).

Greenish tremolite-actinolite, with fibers to at least 2 inches long, occurs in veins in the Catoctin Formation. Specimens were collected at the Shadwell quarry (Giannini and Rector, 1958) and at various places in and near the Blue Ridge Mountains, including Buck Mountain Creek and Sugar Hollow.

VERMICULITE - Giannini and Rector (1958) found vermiculite in the Catoctin Formation at the Shadwell quarry.

WAD (soft manganese oxides) - Manganese-rich stains and impregnations are common in rocks in the county. Although good indications of manganese are obtained using bead tests, usually X-ray studies fail to reveal the specific mineral involved. X-ray studies of black stains on milky quartz, occurring in a railroad cut west of Mechums River, indicated a cryptomelane-like structure.

McGill (1936) indicated that workable deposits of manganese occur in the county, but no locality was given.

According to Froehling and Robertson (1904)

cuprian wad (lampadite) occurs near Howardsville, but the mineral is not described. The source of this mineral may have been the Cabell manganese mine, or one of the mines located nearby, in Nelson County. (Also refer to lithiophorite.)

WAVELLITE - According to Dagenhart and Maddox (1977) wavellite is found as a cream- to tan-colored crystalline crust on nelsonite at the iron mine west of North Garden.

ZEOLITE GROUP - Although his data did not allow for an exact determination, Merrill (1897) observed "in considerable quantity, a soda-potash bearing zeolite" in fresh micaceous gneiss collected from near North Garden. The mineral was observed only under the microscope, and was in the form of dense aggregates and radiating masses. Analcime and mordenite, listed earlier, are also in the zeolite group.

ZIRCON - Dark-brown zircon crystals are in a medium-grained pegmatite dike at Trinity Methodist Church on State Road 692 east of Cross Roads. The crystals which measure as much as 0.25 by 0.75 inch are prismatic and terminated with simple pyramids (Figure 16). The zircon fluoresces orange under short-wave ultraviolet radiation. The crystals were discovered by Robert S. Merkel of Charlottesville (personal communication, year unknown).

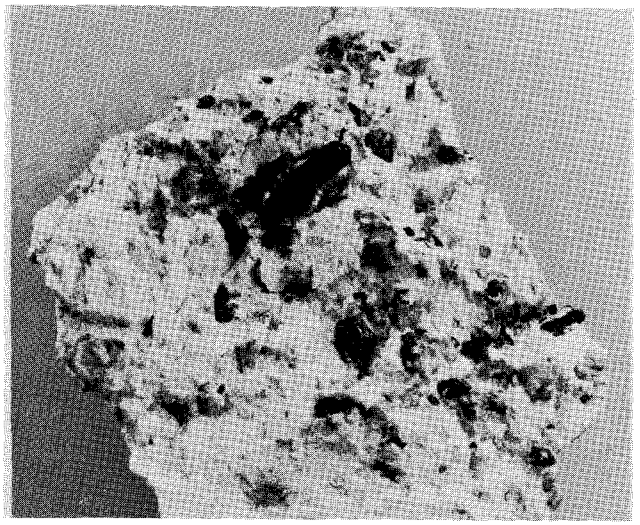

Figure 16. Dark-brown, prismatic zircon crystals, some to 0.75 inch long, found in a pegmatite dike near Trinity Church east of Cross Roads.

Small, slender, dark-brown, prismatic zircon crystals to 0.125 inch long occur with microcline and quartz in weathered dikes 0.25 mile south of Covesville on the northwestern side of the south-bound lane of U.S. Highway 29.

Small, brown, translucent-zircon crystals occur in rocks associated with the iron mine west of North Garden (Dagenhart and Maddox, 1977).

Tiny zircon crystals may be found in black sands in the North Fork of the Rivanna River, especially where the river is crossed by State Road 649.

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cuprian wad (lampadite) occurs near Howardsville, but the mineral is not described. The source of this mineral may have been the Cabell manganese mine, or one of the mines located nearby, in Nelson County. (Also refer to lithiophorite.)

WAVELLITE - According to Dagenhart and Maddox (1977) wavellite is found as a cream- to tan-colored crystalline crust on nelsonite at the iron mine west of North Garden.

ZEOLITE GROUP - Although his data did not allow for an exact determination, Merrill (1897) observed "in considerable quantity, a soda-potash bearing zeolite" in fresh micaceous gneiss collected from near North Garden. The mineral was observed only under the microscope, and was in the form of dense aggregates and radiating masses. Analcime and mordenite, listed earlier, are also in the zeolite group.

ZIRCON - Dark-brown zircon crystals are in a medium-grained pegmatite dike at Trinity Methodist Church on State Road 692 east of Cross Roads. The crystals which measure as much as 0.25 by 0.75 inch are prismatic and terminated with simple pyramids (Figure 16). The zircon fluoresces orange under short-wave ultraviolet radiation. The crystals were discovered by Robert S. Merkel of Charlottesville (personal communication, year unknown).

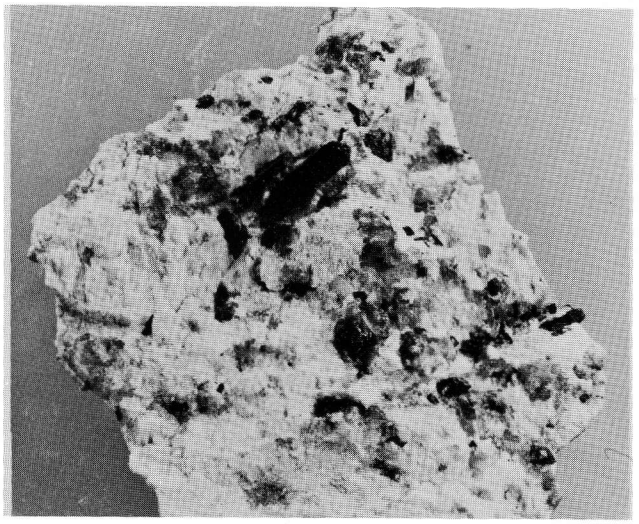

Figure 16. Dark-brown, prismatic zircon crystals, some to 0.75 inch long, found in a pegmatite dike near Trinity Church east of Cross Roads.

Small, slender, dark-brown, prismatic zircon crystals to 0.125 inch long occur with microcline and quartz in weathered dikes 0.25 mile south of Covesville on the northwestern side of the south-bound lane of U.S. Highway 29.

Small, brown, translucent-zircon crystals occur in rocks associated with the iron mine west of North Garden (Dagenhart and Maddox, 1977).

Tiny zircon crystals may be found in black sands in the North Fork of the Rivanna River, especially where the river is crossed by State Road 649.

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