VIRGINIA MINERALS

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
Richmond, Virginia

Published by the DIVISION OF MINERAL RESOURCES, James L. Calver, Commissioner
Box 3667, University Station, Charlottesville, Virginia

Vol. 10 NOVEMBER, 1964 No. 4

EVERONA FORMATION IN THE NORTHERN PIEDMONT, VIRGINIA[1]

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The Everona Formation occurs in north-central Virginia, and its outcrop area is restricted to the Piedmont province. The formation extends northeastward from the Rockfish River across parts of Albemarle, Louisa, Orange, Culpeper, Fauquier, and Loudoun counties to the Potomac River on the Virginia-Maryland boundary (Figure 1), a distance of approximately 120 miles.

Throughout much of the highly weathered Virginia Piedmont, outcrops of Everona carbonates are difficult to locate. The carbonates weather more rapidly than the associated slates, and in many areas, especially those of greater topographic relief, solution activity has removed much of the limestone. The weathered limestone is further obscured by debris from the more resistant slate. Only along streams are outcrops of the limestone well exposed; this lack of good exposures makes it appear that the Everona is discontinuous in many places.

The Everona was named by Jonas (1927) for exposures of limestone and slate in the type locality near Everona, Orange County, Virginia. Northeast of Everona in the abandoned Campbell and Cooper quarries, 130 feet of the lower part of the formation is exposed. Both of these quarries contain dark-blue, thin-bedded, slaty limestone that has concentrations of black graphitic material along the bedding planes. Approximately 70 feet of the middle part of the formation is exposed in the abandoned Walker quarry located 200 yards east of the intersection of State Roads 627 and 617. This part of the Everona consists of dark-blue, massive limestone that contains irregularly shaped particles of quartz and stringers of white calcite. On Hawfield Farm south of Everona exposures of blue to dark-gray, thin-to medium-bedded limestone crop out for a distance of 1.5 miles along Mountain Run. Dark bands of graphitic material occur along bedding planes, and veins of white calcite intersect the bedding planes. The Everona is considered to be of Upper Cambrian age and has been correlated with the Frederick Limestone in Maryland (Jonas, 1927) and the Arch Marble in the area near Lynchburg, Virginia (Brown, 1951).

The Everona Formation contains six major lithologic types:

Lithologic Type	*Percent of Formation*
Banded limestone	60%
Massive limestone	10%
Slaty limestone	8%
Ferruginous limestone	4%
Marble	9%
Black slate	9%

The *banded limestone* (Figure 2) is thin bedded to thick bedded and is dark blue to light grayish

[1] Description and chemical analyses of Everona Formation from "Geology of the Everona Formation," unpublished M.A. thesis, University of Virginia, 1957.

[2] U. S. Dept. of Agriculture, Richmond, Va.

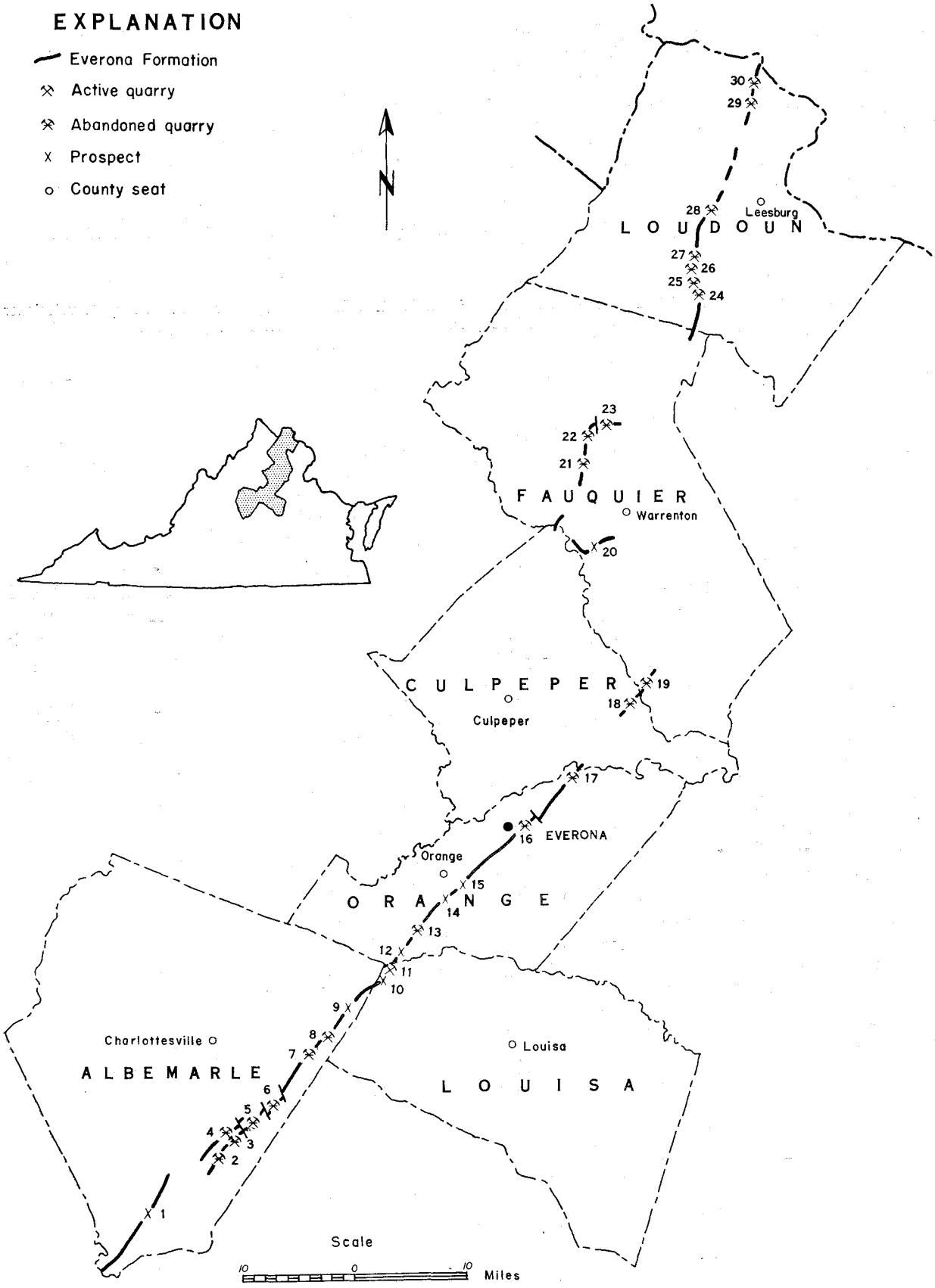

Figure 1. Outcrop area of the Everona Formation in the northern Piedmont, Virginia showing locations of quarries and prospects.

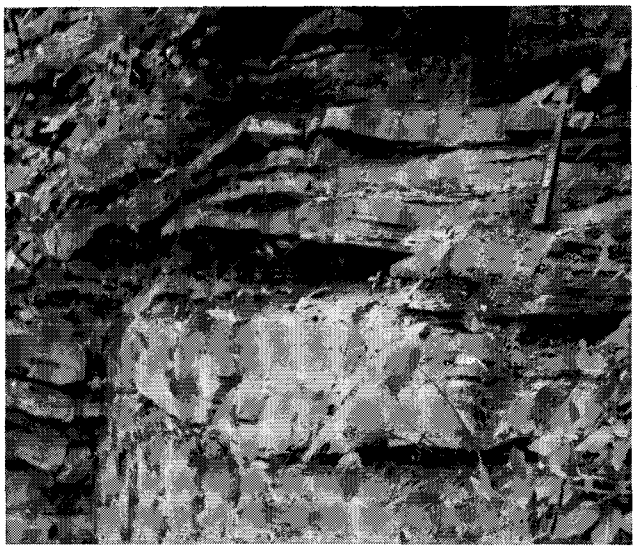

Figure 2. Banded limestone exposed in an abandoned quarry in Fauquier County, 2 miles southwest of Old Tavern and 450 yards south of State Road 703.

blue. Weathered surfaces are light gray to dark gray. Banding in this limestone is due to concentrations of bluish-black graphite or organic matter along bedding planes. In some places the bands have a wavy appearance because of minor folding. Veins of white calcite, some more than 1 inch wide, intersect the bedding planes. Many of these calcite veins are perpendicular to the bedding. Scattered grains of gray quartz are generally present in this limestone, and in some places quartz grains constitute up to 25 percent of the rock. Where the banded limestone is impure, flakes of sericite and chlorite occur along bedding-plane surfaces. Cube-shaped limonite pseudomorphs after pyrite, which are up to 0.25 inch on a side, are also present.

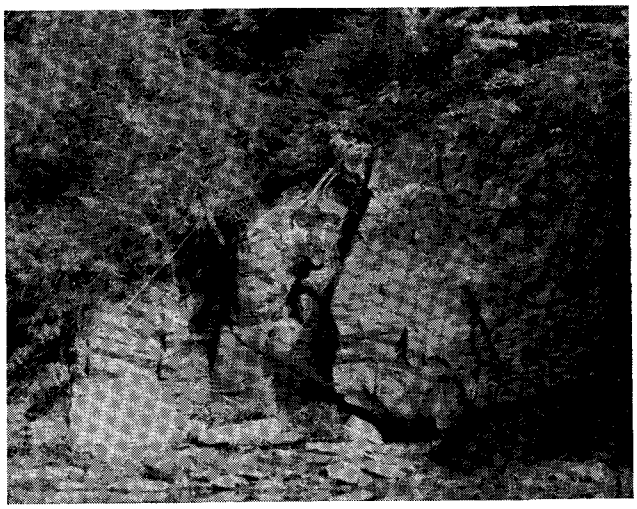

Figure 3. Massive limestone exposed along the Rapidan River in Orange County 0.5 mile north of the junction of State Roads 620 and 681.

The *massive limestone* (Figure 3) is fine grained and is dull bluish black on fresh surfaces. It weathers to a bluish-gray color. The dark color of the limestone is caused by the presence of graphite and carbonaceous material. Calcite is the predominant mineral, and dolomite is present in minor amounts. Grains of gray quartz, up to 0.25 inch in size, occur in veins of white calcite. Scattered grains of magnetite and pyrite are also present.

The color of the *slaty limestone* (Figure 4) is related to the non-carbonates that are present. Where the predominant non-carbonate is sericite,

Figure 4. Slaty limestone exposed along a small creek in Albemarle County 1.5 miles northwest of Woodridge and 0.2 mile south of State Road 620.

the rock is gray; where graphite is the major non-carbonate constituent, the rock is dark blue or black. Calcite makes up 45 to 65 percent of the rock, and dolomite forms less than 3 percent; these minerals make up the dark-gray bands between the slaty layers. Small, rounded quartz grains, that constitute 20 to 45 percent of this lithologic type, tend to be aligned along the slaty planes. Sericite occurs as flake-like wisps; graphite is present in fine thread-like patches and wavy lines.

The *ferruginous limestone* is generally composed of bands of red and pink ferruginous material interlayered with bands of gray carbonate. In some areas this type occurs as a massive brown limonitic limestone containing narrow veins of secondary calcite which cut the bedding planes at right angles. Calcite, the predominant mineral, forms 45 to 70 percent of the rock; iron-bearing minerals (hematite or limonite) constitute 10 to

30 percent. Fine-grained quartz, which is generally dispersed throughout this rock, makes up 15 to 35 percent of it. Sericite, that is associated with the ferruginous material, is also present.

The *marble* (Figure 5) is predominantly white and light blue, although some of it is pink and light green. The various colors are due to the

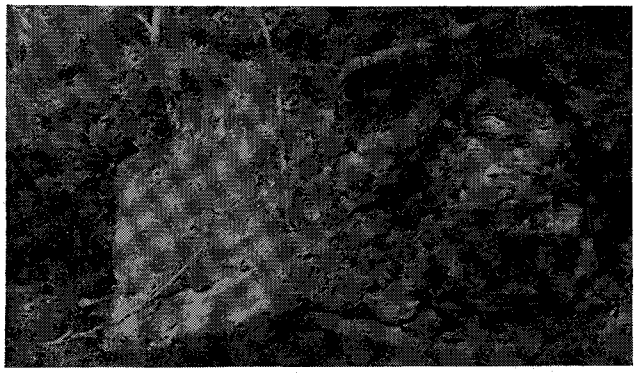

Figure 5. Light-blue and white marble exposed in an abandoned quarry along Goose Creek in Loudoun County, 2.6 miles northwest of Stoke and 0.75 mile northeast of State Road 734.

presence of hematite, chlorite, or graphite. Calcite and dolomite are the main mineral components. In some localities dolomite forms up to 90 percent of this rock type; where dolomite predominates, the calcite grains occur in scattered patches. Quartz is present in only minor amounts.

Sericite is the main constituent of the *black slate*. The black color is due to the presence of graphite. Quartz veins and veins composed of calcite, commonly at right angles to each other, are present in the slate. Quartz also occurs as scattered rounded grains. In some areas the black slate grades into a slaty limestone.

Everona limestone is being produced by the Superior Stone Company at their quarry (Figure 6) in Louisa County. The quarry is located on the

Figure 6. Superior Stone Company quarry in Louisa County. (Photograph taken in 1958).

south side of the Chesapeake and Ohio Railway about 1.5 miles southwest of Gordonsville, Orange County. In this area the Everona Formation is approximately 1100 feet thick and is composed of dark-blue, thin-bedded, crinkled, slaty limestone.

Samples from 35 quarries and prospects in the Everona Formation have been analyzed chemically. Results of these analyses are shown in Table 1.

Table 1. Chemical analyses of samples taken from quarries and prospects in the Everona Formation.

Analyses by Tinsley Mack (except where noted)

Location[1]	Lithology	% $CaCO_3$	% $MgCO_3$	% Impurities
1	Limestone	* 87.8	4.4	7.8
2	Limestone	63.3	16.4	18.4
3	Limestone	73.8	5.4	19.2
4	Limestone	54.2	8.8	37.0
5	Limestone	58.8	4.2	39.9
6	Limestone	66.1	4.1	30.2
7	Limestone	74.8	4.5	19.1
8a	Limestone	* 67.4	3.7	28.5
8b	Limestone	* 73.8	5.5	20.7
9	Limestone	* 77.8	3.1	19.1
10	Limestone	* 74.1	4.3	21.6
11	Limestone	69.8	7.1	22.8
12	Limestone	78.1	5.5	16.0
13	Limestone	72.5	1.3	20.8
14	Limestone	* 78.5	4.5	17.0
15	Limestone	* 75.9	6.3	18.8
16a	Limestone	75.6	5.8	18.1
16b	Limestone	66.8	5.5	28.7
16c	Limestone	71.2	1.2	28.6
16d	Limestone	73.2	1.0	25.8
17a	Limestone	95.8	0.5	3.4
17b	Limestone	79.4	3.7	17.9
18	Limestone	60.4	5.2	33.0
19	Limestone	† 75.6	12.4	11.0
20	Marble	* 42.2	4.3	53.5
21	Marble	* 53.8	40.8	5.4
22	Limestone	57.6	35.1	7.3
23	Limestone	47.1	34.8	18.4
24	Marble	* 60.3	26.7	11.9
25	Marble	* 56.8	40.2	3.0
26	Marble	56.2	41.0	2.8
27	Marble	65.3	26.4	7.4
28	Marble	* 56.6	40.2	3.2
29	Marble	* 57.4	40.3	3.2
30	Marble	* 57.2	42.4	1.4

[1] Numbers are the same as those used on Figure 1.

* Analysis by the Virginia Division of Chemistry

† Analysis by W. B. Rogers, 1840

References

Brown, W. R., 1953, Structural framework and mineral resources of the Virginia Piedmont: Kentucky Geol. Survey, ser. 9, Spec. Pub. No. 1, p. 88-111.

Jonas, A. I., 1927, Geologic reconnaissance in the Piedmont of Virginia: Geol. Soc. America Bull., vol. 38, no. 4, p. 837-846.

INDEX TO VIRGINIA MINERALS

Vol. 1, No. 1 - Vol. 10, No. 4

Compiled by Donald W. Hutcheson

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New Publications

Information Circular 8. DIRECTORY OF THE MINERAL INDUSTRY IN VIRGINIA by D. C. Le Van and R. F. Pharr. 32 p.

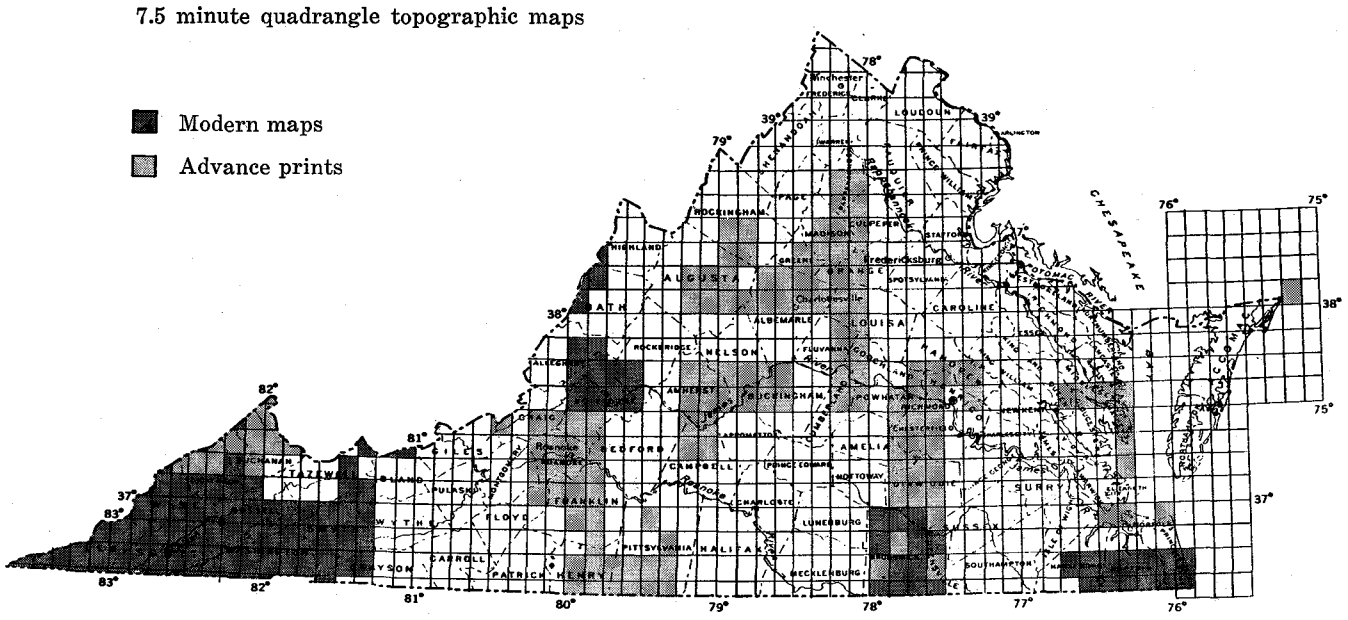
Price: $0.25

This directory lists the rock and mineral producers and processors in Virginia; 240 companies and individuals were on record as of June 1, 1964. The companies are listed by raw material or commodity under the appropriate county or city, and the location of the plant, pit, mine, or quarry is given with respect to a nearby city or town.

GEOLOGIC MAP OF VIRGINIA (1964). Color edition; scale, 1 inch equals approximately 45 miles; size, 8½ x 11 inches. Price: $0.15

This map contains an outline of the rock distribution by geologic period. Listed for each period are the main rocks and minerals that are used as industrial raw materials.

TOPOGRAPHIC MAPS



ADVANCE PRINTS

Advance prints (blue line) are available at 50 cents each from the U. S. Geological Survey, Topographic Division, 1109 N. Highland St., Arlington, Va.

PUBLISHED MAPS

State index is available free. Published maps are available at 30 cents each from the Virginia Division of Mineral Resources, Box 3667, University Station, Charlottesville, Virginia.