DESCRIPTION OF THE ASHEVILLE QUADRANGLE

By Arthur Keith.

GEOGRAPHY.

Location.—The Asheville quadrangle lies chiefly in North Carolina, but includes also a portion of Tennessee. It is situated between parallels 32° 30' and 38° 30' and meridians 83° 30' and 88°, and contains 608.70 square miles, divided between Madison, Buncombe, and Haywood counties in North Carolina and Greene, Cocke, and Unicoi counties in Tennessee.

In its geographic and geologic relations this quadrangle forms part of the Appalachian province, which extends from the Atlantic coastal plain on the east to the Mississippi lowlands on the west, and from central Alabama to southern New York. All parts of the region thus defined have a common history, recorded in the rocks, its geologic structure, and its topographic features. Only a part of this history can be read from the surface, but in the extreme southern portion of the quadrangle the surface is more readily worn down by the action of water. In the central and northern portions the eastern side is marked by broad plateaus extending from the main streams up to heights of 1500 to 2000 feet. These plateaus consist of a series of gently inclined, nearly horizontal beds of rock, which are nearly horizontal throughout the entire area of the quadrangle. The western division of the Appalachian province is drained eastward by the Broad River, which flows southward along the eastern boundary of the province. The Blue Ridge and Catoctin Mountain of Maryland and Virginia, which are also included in the eastern division of the province, are drained by the Potomac River basin, which drains the central and northern portions of the eastern side of the province. The rivers which drain the western part of the province are tributary to the Tennessee or Ohio River. The state of Tennessee is situated between parallels 35° 30' and 60° 30' and meridians 83° 30' and 88°. The state of Virginia is situated between parallels 38° 30' and 40° and meridians 77° 30' and 80°.

The southwestern portion of the province is drained by the Tennessee River. From New River southwestward to the Mississippi the Appalachian province is drained by tributaries of the Tennessee River, which have been produced by the action of the river on the surface of the province. The river has been produced by the action of the river on the surface of the province.

The Appalachian province is divided into three main divisions: (1) the Allegheny Mountains, which are drained by the French Broad and Pigeon rivers; (2) the Blue Ridge and Catoctin Mountain, which are drained by the Potomac River basin; and (3) the central division, which is drained by the Tennessee River. The Blue Ridge and Catoctin Mountain are drained by the Potomac River basin, which drains the central and northern portions of the eastern side of the province. The rivers which drain the western part of the province are tributary to the Tennessee or Ohio River. The state of Tennessee is situated between parallels 35° 30' and 60° 30' and meridians 83° 30' and 88°. The state of Virginia is situated between parallels 38° 30' and 40° and meridians 77° 30' and 80°.

The central division is the Appalachian Valley. It is the best defined and most uniform of the three. In its southern part it is characterized by the belt of folded rocks which forms the Cumberland Plateau. The plateau is composed of a series of gently inclined, nearly horizontal beds of rock, which are nearly horizontal throughout the entire area of the quadrangle. The western division of the Appalachian province is drained eastward by the Broad River, which flows southward along the eastern boundary of the province. The Blue Ridge and Catoctin Mountain of Maryland and Virginia, which are also included in the eastern division of the province, are drained by the Potomac River basin, which drains the central and northern portions of the eastern side of the province. The rivers which drain the western part of the province are tributary to the Tennessee or Ohio River. The state of Tennessee is situated between parallels 35° 30' and 60° 30' and meridians 83° 30' and 88°. The state of Virginia is situated between parallels 38° 30' and 40° and meridians 77° 30' and 80°.

The southeastern portion of the province is drained by the Cumberland Plateau, which is the eastern end of the Appalachian province. It is drained by the Tennessee River. The state of Tennessee is situated between parallels 35° 30' and 60° 30' and meridians 83° 30' and 88°. The state of Virginia is situated between parallels 38° 30' and 40° and meridians 77° 30' and 80°. The central division is the Appalachian Valley. It is the best defined and most uniform of the three. In its southern part it is characterized by the belt of folded rocks which forms the Cumberland Plateau. The plateau is composed of a series of gently inclined, nearly horizontal beds of rock, which are nearly horizontal throughout the entire area of the quadrangle. The western division of the Appalachian province is drained eastward by the Broad River, which flows southward along the eastern boundary of the province. The Blue Ridge and Catoctin Mountain of Maryland and Virginia, which are also included in the eastern division of the province, are drained by the Potomac River basin, which drains the central and northern portions of the eastern side of the province. The rivers which drain the western part of the province are tributary to the Tennessee or Ohio River. The state of Tennessee is situated between parallels 35° 30' and 60° 30' and meridians 83° 30' and 88°. The state of Virginia is situated between parallels 38° 30' and 40° and meridians 77° 30' and 80°.
line complex had therefore undergone uplift and long consequent erosion. Another great complex, the Carolina gneiss and its sedimentary rocks, are therefore classified as being of Archean age. The question is, therefore, whether there are coarsely divided into three classes of rocks. The first is the granitoid rocks, which are associated with the Carolina gneiss. The component minerals are quartz, feldspar, muscovite, and chlorite, and they are highly foliated. The second class is the schists, which are associated with the gneiss. They are finer-grained than the gneiss and have a more uniform mineral composition. The third class is the marble, which is associated with the gneiss and schists. It is composed of calcium carbonate and is highly foliated. The foliation in the marble is due to the pressure of the gneiss and schists, and it is generally parallel to the foliation in the gneiss. The foliation in the gneiss is due to the pressure of the schists and marbles, and it is generally perpendicular to the foliation in the marble.

The rocks of the Asheville quadrangle are composed of three great classes of sedimentary rocks, the gneiss, the schists, and the marbles. The gneiss is a coarse-grained, foliated rock, and the schists are fine-grained, foliated rocks. The marbles are fine-grained, foliated rocks, and they are generally parallel to the foliation in the gneiss and schists. The component minerals in the gneiss are quartz, feldspar, muscovite, and chlorite, and they are highly foliated. The component minerals in the schists are quartz, feldspar, muscovite, and chlorite, and they are finer-grained than the gneiss. The component minerals in the marbles are calcium carbonate, and they are highly foliated. The foliation in the marbles is due to the pressure of the gneiss and schists, and it is generally parallel to the foliation in the gneiss and schists. The foliation in the gneiss is due to the pressure of the schists and marbles, and it is generally perpendicular to the foliation in the marbles. The foliation in the schists is due to the pressure of the marbles, and it is generally perpendicular to the foliation in the gneiss. The foliation in the marbles is due to the pressure of the gneiss and schists, and it is generally parallel to the foliation in the gneiss and schists.
part of the quadrangle and are more common toward the west. Diorite dikes of this same series are outcoursed about the Carolina gneiss in this region and are especially prominent in the vicinity of the Roan gneiss, in many areas of the quadrangle, though very slight at the edges. The Roan gneiss is one of the same general age as the eruptive granite dikes, though probably somewhat older. The diorite is composed of quartz, feldspar, and hornblende. The quartz and feldspar are very fine grained, sometimes so fine grained that it is difficult to distinguish them with the unaided eye. Through these are scattered crystals of green hornblende, ranging from one fourth to three-fourths of an inch in length. An additional constituent is garnet, which occurs in large and small crystals. These are very irregularly distributed and may represent contact reactions of the adjacent formations. The variations in the grains of the diorite are considerable and rapid, being mainly in the size of the hornblende, which, however, is almost always less porphyritic in gneiss areas, while the other minerals in the rock are never coarse.

**Extrusive and origin of the gneiss.**—The Carolina gneiss is much larger than any other formation in this region. On account of the great uniformity of its texture it is possible to obtain, even at a distance, a fairly complete idea of its internal structure. The original thickness of this formation can not be obtained; even an estimate would be idle. Their original thickness has been repeated and increased many fold by the same processes by which they have been subjected. Their original nature is equally uncertain. What it was is of no importance. It was once a granite and that it has been metamorphosed into its present condition is certain. Some of the material is granite with a few mica-schist layers; and its local metamorphism possibly dates from the time to which it is possibly due to contact action by the granite.

Here and there the hornblende, feldspar, and quartz show distinct parallel layers. These are also found in the dunite. This occurs in the Carolina gneiss and near the contact of the Roan gneiss, and to a large extent it also occurs as a coronitic, or alternate, metamorphic rock at various localities, mostly in the vicinity of Marshall. The gneisses are well developed, with the exception of the Roan gneiss, where the foliation is very indistinct. In this region many beds of Cranberry granite cut the Roan gneiss and where the latter is very thin it is possible to see the contact. In places these are very regularly disposed and give a marked banding to the rock. An accessory mineral frequently seen is garnet. As already stated, this occurs in the Carolina gneiss near the contact of the Roan gneiss, and to a large extent it also occurs as a coronitic, or alternate, metamorphic rock at various localities, mostly in the vicinity of Marshall. 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granite are filled with iron oxide, which gives to the rock a marked red appearance. This variety is often characterized by the name of fire granite. The color is in small veins and segregated masses. Near the western border of the cratonic mass is granite that is basically white, but which is sometimes zoned or bi-colored, with a blue, green, or yellow coloration. This granite is marked by a great development of blue quartz, which appears to be an original constituent. This variety is also accompanied by secondary veins of blue quartz, which is thus given to the entire rock. In this variety the amount of quartz is considerably in excess of that present in the other varieties. The minerals of the granite are usually composed of the original minerals contained in other forms of the granite. At a number of localities in the Newfoundland gneisses. The gneisses are cut repeatedly by the granite dikes, and the beds of each vary from a few inches to a few feet, varying rapidly in thickness from a few inches to a few feet. These are sometimes found to be banded in a series of dikes of quartz-diorite and of granite, containing, as already stated. The metadiorite and metagraywacke are eroded in the granite and are undeniably of the same age as the granite. These rocks are in the same positions as are the bodies of Cranberry granite. The large granite is in a series of dikes cutting the Cranberry granite. The large granite is in a series of dikes cutting the Cranberry granite.

The granite suffered great changes by metamorphism. These changes are to be seen lines of wavy flow banding. The eruptive nature of the granite may be recognized by the presence of large crystals of biotite and hornblende. These changes are to be seen lines of wavy flow banding. The eruptive nature of the granite may be recognized by the presence of large crystals of biotite and hornblende. These changes are to be seen lines of wavy flow banding. The eruptive nature of the granite may be recognized by the presence of large crystals of biotite and hornblende.
SNOWBIRD FORMATION.

The principal exposures of the Snowbird formation are on the eastern side of the Black Mountains quadrangle just south of Hot Springs. Many smaller areas of the formation, surrounded by Archean rocks, occur as isolated intrusives. One formation, in particular, is composed of well-rounded grains of quartz sand in the vicinity of Hot Springs and southwest of the Black Mountains. The chief change that has been produced in this rock since it was deposited consists of the yellowish-gray to gray-brown color, which has replaced the red color of the original rock. The rocks of this formation do not withstand weathering as well as those of other formations in the region.

Northwest of Round Mountain, on the western border of the quadrangle, the top of the formation consists of a bed of white sandstone, which is composed of well-rounded grains of quartz sand in the vicinity of the areas. The formation consists almost entirely of slate of a bluish-gray or bluish-black color. When the slate is weathered the color becomes greenish, yellowish, and finally brownish. The rocks of this formation are not resistant to weathering except where they have been affected most of all. Alterations in this region have produced slaty cleavage in the rocks of this formation.

Some of the more feldspathic layers of the Snowbird formation have been affected by secondary quartz, as already stated, has converted many of the feldspar and slate pebbles into fine quartz grains. When these beds are considerably altered, the feldspar and slate pebbles become small, and the quartz grains are angular and show that they have been transported only a short distance from the parent body of granite.

In these situations considerable soil accumulates on the surface of the formations. Decomposition makes its way down the partings of bedding and cleavage planes, and this process causes the rocks to weather. The peculiar weathering in this region is a series of calcareous beds that are interbedded with the slates. These calcareous beds, which are of considerable size, are interbedded with the slates. They are difficult to detect the bedding planes. Only in a few rare cases has the formation been split by the adjacent harder quartzites, and these calcareous beds are usually marked by a linear hardening of the rock, which is due to the presence of calcite crystals. These calcareous beds are usually marked by a linear hardening of the rock, which is due to the presence of calcite crystals. These calcareous beds are usually marked by a linear hardening of the rock, which is due to the presence of calcite crystals.

On the other hand, the black slate Bed of the formation is characterized by a fine granular texture, and the slate is dark gray or blue. The slate and quartzite beds are sharply defined from one another in most cases. The slates are fine grained and argillaceous, some times micaceous, and seldom sandy. They are resistant to weathering, and the slate beds also received their cleavage at the same time. In places, especially on the upper part of the chalks, they are unaltered shales. In the vicinity of Hot Springs many of the slates spread out considerably and cause low ridges. These ridges are round and the slopes steep, and support a scanty growth of timber.

The rocks of this formation occupy three large and irregular areas lying north and west of Hot Springs. The area on Shiloh Laurel Creek, northwest of Hot Springs, is more than 2 miles wide in places, and the northern part is more than 3 miles wide in places. Occasionally they are found on the north slope of Shelter Rock, and in the area lying southwest of Paint Mountain. Many of the slates and quartzites are coarse-grained, and the quartzites contain visible quartz grains. The chief change that has been produced in these rocks since they were deposited consists of the yellowish-gray to gray-brown color, which has replaced the red color of the original rock. This change has been produced in these rocks since they were deposited.

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Broad River, where bold bluffs and ridges follow the course of the former streams, divide the conglomerates into great elevations, which are in some measure due to the weak-ened power of the streams. The abrupt ridges and steep slopes are filled in all places. The strata are thin, sandy, and full of bowlders, and are of practical value for few purposes. The strata are well exposed in the river. Many bluffs and ledges jut forth the cover of soil, wherever the edge of cliff is recovered with earth. The waste from these spurs forms the overhanging ledges.

**Great Smoky Conglomerate**

In the Cold Bed the range and the adjoining region two areas of the Great Smoky conglomerate are to be seen. This formation is so named from its notable development in the Great Smoky Mountains, south-west of Pigeon River. In this quadrangle it is in the middle, and in the adjoining quadrangles it is more distinctly developed. The strata range from 300 to 1300 feet, the greatest development being in Paint Mountain and the least in the vicinity of Hot Springs. The strata are very thin and sandy, and in the most altered varieties are practically pure siliceous composition makes it nearly free from any soluble constituents. The rocks gradually decompose. This is the case in the upper part of the Great Smoky conglomerate, and forms low spurs and depressions between the mountains of the better.

**Nodous Slate**

The strata of this formation that occur in this quadrangle are chiefly north and west of the Great Smoky Mountain, and in the vicinity of Hot Springs, on Chilhowee Mountain, Tennessee, where it is exceptionally exposed. The strata are very thin and sandy, and in the most altered varieties are practically pure siliceous composition makes it nearly free from any soluble constituents. The rocks gradually decompose. This is the case in the upper part of the Great Smoky conglomerate, and forms low spurs and depressions between the mountains of the better.

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in considerable thickness near the bottom of the formation. These are less prominent around Hot Springs. On those exposed in the Hot Springs district weathered outcrops is most noticeable. A considerable percentage of carbonate of magnesium is contained in these layers. This calcium and gray shale occur in a few parts of the formation, and a few beds of limestone are found in the top of the layer, and the contact is somewhat more common. This mineral usually forms nodules, or rafts, and is the least prominent near the base of the layer. The formation in this zone is less than 100 feet thick. The strata are composed of massive limestones of a bluish or gray color and are of the same character throughout these limited exposures. That part of the limestone which normally rests on the Watauga shale is not visible, nor is the upper portion of the Watauga shale. The character of their contact can not be seen, however. The limestones pass up into the Nolichucky shale with a few beds of interbedded limestones. The upper part of the Honaker consists of dark gray limestones, which weather into small slabs with black surfaces. The strata and topography of the formation in this quadrant are inconspicuous on account of the limited area of the zone.

NOLICHUCKY SHALE.

The Nolichucky shale is seen in the same region as the formation just described, only on a smaller scale. The strata here exhibited are probably 300 feet thick. It is named from Nolichucky River, along whose course in the Greenville quadrangle it was first observed. It is composed of calcareous shales and shaly limestones, with beds of massive blue limestones in its upper portion. The isolated limestones are not a very important in this region, but are developed toward the north and west. Much of the formation consists of blue-gray limestones, which weather into small slabs with black surfaces. Over this region the formation shows no variations. Its thickness of 300 feet is of good grade of graptolites. All of the strata here shown are very fine grained and this bedded, and ordinary bedding is seen. On account of the obscurity of the bedding planes and the place of the cleavage in the formation its thickness is difficult to determine. The strata here exhibited are probable 300 feet thick. The transition from the Watauga shale to the underlying Knox dolomite is a sharp one and indicates a sudden change in the relations of bedded and massive rocks on a large scale. This change is so abrupt and extent and with that which immediately preceded the deposition of the Shady limestone is not known.

The rock weathers rapidly at first by solution of its calcium carbonates, but these rocks are found only near the surface and the limestones and dolomites have been submerged under the sea bottom must originate in that area, however, as represented in the sides of a deep trench the formations as they are described in the sections of the Knox. The Knox dolomite is the most important and widespread of the Valley rocks. Its name is derived from Knoxville, Tenn., which is on the eastern margin of the state and is the place where it was first described. This formation is composed of 400 feet of dolomite. All of the strata here shown are very fine grained and this bedded, and ordinary bedding is seen. The formation is composed of 400 feet of dolomite. All of the strata here shown are very fine grained and this bedded, and ordinary bedding is seen. On account of the obscurity of the bedding planes and the place of the cleavage in the formation its thickness is difficult to determine. The strata here exhibited are probable 300 feet thick. The transition from the Watauga shale to the underlying Knox dolomite is a sharp one and indicates a sudden change in the relations of bedded and massive rocks on a large scale. This change is so abrupt and extent and with that which immediately preceded the deposition of the Shady limestone is not known.

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are scarcely altered at the border of the Valley.
The southeastern part of the Appalachian province
and even where they are distinct they are usually
original characters of the rock. Many beds that
final condition is unchanged are extremely rare, and
in Archean time, producing a portion of the
earliest-known period of compression and deforma­
tion producing great overthrust faults and some
most of the metamorphism of the present Carolina
The rocks of this quadrangle are chiefly the result of compression which acted
The structures above described
The sedimentary rocks of the Pigeon River
These features and fault planes are
They are also to see in every condition of the rock.

The great fault which passes
The second area
The talc is equaled or exceeded in amount by
It usually occurs in seams or layers between or

The talc deposits of this region are connected with the bodies of serpentine already described. The bodies of workable talc are concentrated in a belt 4 or 5 miles wide, lying along French Broad River, on both sides of the stream, between Mar­shall and Alexander. The talc, or hydrous silicate of
to the stratigraphic range in the Appalachians. The difference between the two systems is
(—p. 11), the depression of this kind took
The paleo-crust of these rocks is seen in over­lays of various importance, the last of which closed Paleozoic deposition. Since Paleozoic
together, with the Middle Appalachian graben. The

The rocks of this region of use in their nat­
ural state, as soapstone, talc, barite, marble, corun­
dowling. Into the canyons containing the main

BENDING OF THE BEDS WAS LARGELY ACCOMMODATED BY

The rocks of this quadrangle
to the stratigraphic range in the Appalachians. The difference between the two systems is

The rocks of this quadrangle have undergone many alterations since they were

The structures of the Appalachians

Larger features.
The rocks of this quadrangle have undergone many alterations since they were

The preexisting Appalachian faults, which lie for

In the effects of deformation are chiefly seen in

The compressional fault planes are uniformly
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to the stratigraphic range in the Appalachians. The difference between the two systems is
Besides the tale of this form, pure talc is found also in veins a few inches in width that pass here and there through the mass of the rock. This form of the mineral is usually fibrous or foliated and free from cleavage. The fibrous character of the veins of this character seem to be of later formation than the large bodies of talc and the soapstone. These veins found also in the charnockitic and the serpentinite and diabase masses, together with veins of olivine. The cleavage for the latter is developed half an inch and the cracks filled with nickel ore. Such a condition is probably only near the surface of the earth. Accordingly, it is stated, most of that nickel is inferred to be secondary deposits—one of the most recent in the dunite. This conclusion is supported by the freedom of the nickel ore and accompanying quartz from deformation. All occurrences thus far seen are above drainage level and appear to be due to hydration processes near the surface of the rock. From this region the depth of the deposits can not be ascertained, nor is it likely to be great. Northeast of Stockville considerable material was exposed in the search for chrome iron and cordierite; but no notable developments have been made. Extensive tests of similar deposits have recently been made near Webster, about 40 miles southeast of Canton. The best ore is stated to contain no less than 8 per cent of nickel, and the quantity in place is large. In that case it has been difficult to find a suitable commercial process for reducing the ore.

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**CHROMITE.**

Chromite is found to a depth of 3 miles northeast of Stockville and on the border of this quadrangle. It forms small grains disseminated through the dunite. Just east of this point many vast pits were dug and considerable rock was blotted, but no chromite deposit of importance was found. In many other places chromite is seen in the dunite in the same form, and, in fact, it appears to be a common and accidental part of the rock. While chromite has been noted at only five localities in this quadrangle, the same relation of the dunite to other formations are repeated in the same order. Hence it is clear that the chromite of this form is of secondary origin. The deposits thus far found are in the county rock. Since the corundum is in the dunite, and the quartz is not, the dunite is the most likely for a deposit to form.

Talc is almost entirely white, sometimes translucent, but usually opaque. It is probable that if work were pushed into the solid rock the transient material would be found predominant. Thus far mining has been confined to pits in clay and decomposed rock. In this material sand and iron oxide are common. The talc that was found varied from massive to fibrous, the latter being the most common, and it is fitted only for grinding into powder. Although the available amount of talc of this class is considerable, practically all of it has been produced now, and the industry is at a standstill.

**GARNET.**

Garnet is found in large amounts west and northwest of Marshall in chrome-iron masses, and to a lesser extent also in the charnockites. From the close association of the corundum with the veined iron, it is evident that the garnet is of later formation.

**CORDIERITE.**

Cordierite is found in Barite at Little Pine Creek. It is never found in large masses, and is disseminated throughout the dunite. The veins or plates of vein-like form, including chlorite, corundum, and feldspar. From the close association of the corundum with the veined iron, it is evident that the garnet is of later formation.

**CORUNDUM.**

Corundum is found in large amounts on the surface of the rock. From many other localities small quantities of corundum have been reported. From the close association of the corundum with the veined iron, it is evident that the garnet is of later formation.

**BARITE.**

Barite is found in a narrow zone about 5 miles long running a little north of east from Bluff, on the South Fork, to and across French Broad River. It occurs mainly in the granite gneiss and is found in two distinct localities—one in the northwestern part of the quadrangle, and the other in the northeastern part. The barite occurs in large amounts in the granite gneiss and is found in two distinct localities—one in the northwestern part of the quadrangle, and the other in the northeastern part.

**CHROMITE.**

Ones of nickel are found 3 miles northeast of the hamlet of Lenoir. In the vicinity of the town of Stockville, the three points being nearly in line with one another. The nickel occurs in the following three forms—(1) in beds or disseminations of fine-grained and fibrous silicates, probably as a result of a dilution or alteration, and is thus one of the latest formations; (2) in veins which cut through the rock at various angles; and (3) in veins which cut across the rock and are filled with nickel ore. Such a condition is probably only near the surface of the earth. Accordingly, it is stated, most of that nickel is inferred to be secondary deposits—one of the most recent in the dunite. This conclusion is supported by the freedom of the nickel ore and accompanying quartz from deformation. All occurrences thus far seen are above drainage level and appear to be due to hydration processes near the surface of the rock. From this region the depth of the deposits can not be ascertained, nor is it likely to be great. Northeast of Stockville considerable material was exposed in the search for chrome iron and cordierite; but no notable developments have been made. Extensive tests of similar deposits have recently been made near Webster, about 40 miles southeast of Canton. The best ore is stated to contain no less than 8 per cent of nickel, and the quantity in place is large. In that case it has been difficult to find a suitable commercial process for reducing the ore.

**Magnetite.**

Magnetite—Magnetite ore is found in five general localities in this quadrangle, viz: 5 miles northeast of Barite, 5 miles west of Fort William, 5 miles east of north of Alexander, and 5 miles west of Jupiter, and in Haywood County at the head of the Big Ivy River. In the latter region, however, many dikes of granite cut the mine-gossan, so that the situation is not widely different. Besides these principal localities there are others of more or less importance. The crystallographic float ore is one of these. Thes...
Among the strata of the Shady limestones are many beds which are suitable for use as marble. These occur in the lower layers of the formation near the Hesse quartzite. In the areas of this formation just west of Hot Springs and also in the central part of the Chowan Creek quadrangle, this deposit was found near at hand. In other areas they are conformed from view, although they probably underlie the surface.

The marble occurs in massive beds from 1 to 5 feet thick showing very little stratification. The marble is well foliated and is interbedded with dark-blue crystalline limestones. The grain of the marble is fine, but is coarser than that of the blue limestones of the Shady or that of the strata of the Knox dolomite. On weathered surfaces the appearance of the marble has a decidedly black color. This color does not extend into the rock, nor does it appear on surfaces which have been artificially broken and exposed for years. From the natural outcrops of the marble its durability can be inferred, and its strength is assured by the hardness of the rock. None of its other qualities are tested, nor has it been given any test of quality. When they are crushed, the fragments that result are so small that they can be easily processed and water and waste material disposed of. The beds show a good grade and are in suitable locations for quarrying.

The best granite of the region is found in the northeast part of the bloc, the country rock being mostly a variety of Dacite and Quartzite. The bed rock is so situated as to permit of its being quarried in the most advantageous manner. These granite bodies are of sufficient size for quarrying, although most of them are measured by only a few feet. Thus for this granite has been used chiefly for road material. A number of the mechanically north of Asheville have been constructed, and this has been used chiefly for road material. Its strength is assured by the hardness of the rock. Its color is light gray to nearly white, and it may be worked readily into any shape desired. These granite bodies have sufficient size for quarrying, although most of them are measured by only a few feet. Thus for this granite has been used chiefly for road material. A number of the mechanically north of Asheville have been constructed, and this has been used chiefly for road material.

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