

ART. LIV.—*On the Quartzite, Limestone and associated rocks of the vicinity of Great Barrington, Berkshire Co., Mass.; by*
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(Continued from page 370.)

3. *Stratification.*

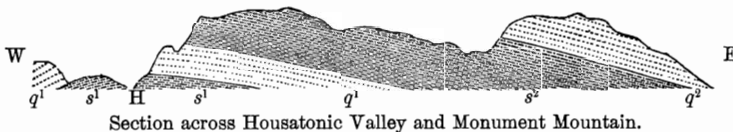
(A.) *Monument Mountain, and the Housatonic Valley adjoining it on the west.*

Monument Mountain has a precipice of hard quartzite on its eastern front,* and a wall of the same rock along the sides facing southwest and west, while through the interior the rock is mica schist and gneiss.

The hard quartzite of the walls is without bedding, but is jointed in various directions. The most regular and profound of these joints have approximately a north-and-south direction (N. 10° E. to N. 10° W.),† and are nearly vertical. Another system of divisional planes in the eastern mass of quartzite is strikingly apparent in a view from the Stockbridge road along the eastern foot (see map); the planes through the northern half dip northward 15° to 35°, increasing to the northward; and in the southern, southward 10° to 20°, the northern bending over into the southern. The former are also well seen along the mountain path near the western foot of this crest of quartzite, but the dip here in view is 45° to 50°. The strike on this western side is nearly east-and-west; at one place it was N. 70° E. The divisional planes of this system look as if due to bedding, and an anticlinal fold; and yet they are simply joints,—perhaps a result of contraction on cooling after consolidation.

The accompanying figures, 1 and 2, give a general idea of the stratification. The first is a section drawn through the mountain near its southwestern side.

1.



* This eastern quartzite crest or ridge of Monument Mountain is the part usually ascended by tourists. A path leaves the Stockbridge road near *p* (see map) and passes up the interior of the mountain, near the western foot of this ridge, to its north end, where is the best place of ascent; a branch path leads off also to its south end. The view takes in the Catskills on the west, Graylock to the north, Mount Everett and the Taconic range to the southwest, and, nearer by, the beautiful valley of the Housatonic, with its lakes and villages.

† The courses given in this paper are compass courses. The variation in the Barrington region is about 8½° W., which would make N. 10° E. compass course correspond to N. 1¼° E. true course.

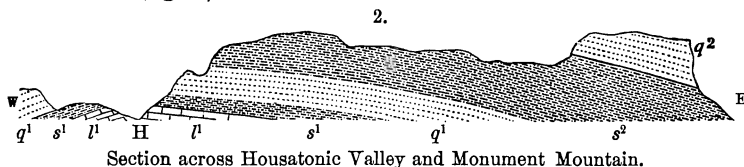
H is the position of the Housatonic river, and a little south of the line of the section is the village of Housatonic. Near q^2 (p on the map) passes the road, first northeastward, then northward, to Stockbridge. As shown, there are in Monument Mountain two strata of quartzite, q^1, q^2 , with two of schist, (mica schist and gneiss) s^1, s^2 , all dipping southeasterly, the average slope 25° .

The thickness of the upper quartzite of Monument Mountain is 200 or 250 feet; that of the schist under it at least 500 feet; and that of the lower quartzite about 250 feet.

The schist (s^2) over the interior of Monument Mountain varies much in strike and dip, as is common in beds that are little inclined. The dip is for the most part to the east of southeast 20° to 25° , the strike being about N. 25° E. Just west of the eastern quartzite the amount of dip varied from 15° to 25° , and the direction was generally that just stated: yet in some places the strike was N. 50° W. and N. 70° W. At the quarry (s on the map), where there is a large quartz vein containing some black tourmalines (and a trace of copper pyrites) the bedding was much obscured by joints, but where best exhibited the strike was N. 25° E., and the dip 45° to 60° —an exception in its large amount to the general dip in the mountain.

There is no good outcrop of the lower schist (s^1) at the west end of Monument Mountain east of the Housatonic river; but the smooth surface of the foot hills or slopes in that part, and the sudden transition from numberless quartzite fragments to occasional masses of gneiss which is found on the descent of this side of the mountain, are evidence of its existence. Besides this, the stratum of schist is well exhibited on the opposite or west side of the river, where it first dips eastward at an angle of 20° , and then, farther from the river, westward 10° to 25° , the strike nearly north; a change of direction which indicates the existence along the valley of a low anticlinal, as represented in the section (fig. 1). A little farther west there is a bold ridge of quartzite, which is evidently the western side of the fold of the quartzite (q^1). A narrow depression or valley intervenes between the schist and this quartzite, so that the actual superposition of the former was not visible; but the dip of the schist was not only toward the quartzite on the east (as shown in the section), but also on the west of it in the Williamsville valley; and hence the quartzite is the course of a shallow synclinal. The quartzite was of the hard jointed kind, indistinct in its bedding. At one place I observed a westward dip of 20° —the strike N. 20° W.—in divisional planes which appeared to be those of the bedding.

The following section of Monument Mountain (fig. 2) represents the stratification along a line half a mile north of that of the first (fig. 1).



On the *west*, it passes the Housatonic river, near an old dismantled iron furnace, (*f*, on map), about three-fourths of a mile north of Housatonic village. On the *east*, it comes out in front of a limestone quarry, just west of the road to Stockbridge.

The upper quartzite, q^2 , forms a bold precipice of 200 feet along the eastern front of the mountain. Below this and its talus, the slope is made up of great blocks of gneiss, many like houses in size, but all displaced, owing evidently to the wedging action of growing trees. This line of junction between the schist and quartzite, along the front, rises going *northward*; and at the northern limit of the quartzite crest, where this crest loses rather abruptly 150 feet or more of its height, it meets the stratified schist which is there in place as the top rock of the mountain; while *southward*, the upper line of the schist falls gradually in height, corresponding with the southeasterly dip of the strata. The schist of the interior of the mountain here passes through to the east face, beneath the bed of quartzite.

In addition to this evidence as to the true stratification and position of the quartzite, there is *distinctly stratified quartzite conformable beneath the gneiss*, at the west end of the mountain, toward the summit. The locality where I observed this bedded quartzite is just above the level of the hard bedless quartzite, and about a hundred yards to the east of it, at a point marked *t* in the map;* a weathered bluff of it much resembles in its regular lines of nearly horizontal stratification the bluff of gneiss that forms the western brow of the mountain a hundred feet above it. This bedded quartzite is a somewhat crumbling rock, and the decomposition of the lower layer is undermining the bluff. It lies conformably beneath the schist; the dip of the quartzite is 15° to 20° , the strike N. 25° E., and the dip of the schist above and a little farther east 25° , with the same strike. The depression on the east side of the hard western quartzite (indicated in both sections), varying in depth from 40

* The point *t* may be reached by taking a quarry road at *r* (see map) and following it beyond the quarries (*s*) until the road becomes a mere path (at *t*). The bluff of bedded quartzite is to the right of the path, a little distance from it.

to 80 feet, is probably due to the abrupt change in the rock from the hard jointed to the softer bedded kind.

Traces of similar bedding, and of like softness in the rock where bedded, occur at the northern margin of the *eastern* crest of quartzite, along the path descending northward; also in some places near the hard quartzite of the southwestern wall, where, at places, I passed isolated masses of great size undergoing deep disintegration, that bore evidences of the great amount of degradation which had taken place around them.

Descending the western slope, toward the Housatonic river and village, the quartzite is passed; and then a region of schist, indicated (as stated above) by a sudden substitution over the slopes of loose masses of schist in place of quartzite; and, finally, within less than a hundred feet of the base, on the path leading northwestward toward the old furnace, there is an outcrop of *limestone* with a slight easterly dip. West of the river the same limestone is exposed in the slopes beyond the road, and it there has a *westerly* dip (10° to 25° , the strike north) as shown in the section; and this limestone, at a point just west of a quarry, is visibly and conformably overlaid by mica schist, dipping 25° to the westward. Neither the limestone of section 2 nor the lower schist (*s*¹) (mica schist and gneiss, one passing into the other) of section 1 is exposed to view in the river banks, on account of the deep covering of stratified drift, so that the thickness of the schist was not ascertained; it probably does not exceed 50 feet. The limestone is the true Stockbridge limestone.

The same low anticlinal is here apparent that is represented in figure 1; and it is further evident that the anticlinal has an inclined axis dipping southward, inasmuch as the limestone, an inferior stratum in the fold, is exposed on going north, while covered to the south.

The mica schist of the interior of Monument Mountain, and part of the gneiss layers, decompose rapidly and deeply, and by this means much of the region is deeply covered with earth, which is partly clayey.

The main propositions stated at the commencement of this paper on the Great Barrington region—that the quartzite occurs interstratified conformably with the Stockbridge limestone and the accompanying mica schist and gneiss, and that the quartzite is one of the newer rocks in this part of the Green Mountains—appears to be well established by the facts already adduced. But others no less decisive are afforded by the country adjoining on the west, south, and east.

[To be continued.]