

in silence and the body burned to ashes.

(MUSIC)

1ST READER:

Beyond Greenish black pines  
Rise the Snow capped Apenines.  
A sky serene and cloudless  
Melts into waters of violet blue.

2ND READER:

On the sands a leaping fire  
A funeral pyre. It rises high and  
higher  
Ashes to Ashes and Dust to Dust, it  
burns the Brain and the Heart of  
Shelley.

1ST READER:

But what of his Soul?  
Like a cloud of fire  
Does it soar higher?  
And mount the blue  
Like his own sky lark.  
Yes, it shall rise forever and sing!

(From *Adonais*)

NARRATOR:

Dust to the dust! But the pure spirit shall  
flow,  
Back to the burning fountain whence it  
came.  
A portion of the Eternal, which must glow  
Through time and change, unquenchably the  
same. . . .  
Peace, peace! he is not dead; he doth not  
sleep—  
He hath awakened from the dream of life.  
He has outsoared the shadow of our night.  
He is made one with Nature, there is heard  
His voice in all her music. . . .  
He is a portion of the loveliness  
Which once he made more lovely.  
The One remains, the many change and  
pass;  
Heaven's light forever shines, Earth's  
shadows fly,  
Life, like a dome of many-colored glass,  
Stains the white radiance of Eternity.  
The Soul of Adonais, like a star,  
Beacons from the abode where the Eternal  
are.

(MUSIC)

VIDA R. SUTTON

## CLIMBING MASSANUTTEN

SINCE climbing Massanutten has almost become an annual tradition among Harrisonburg college girls, perhaps some information about The Peak may increase the opportunity for enjoyment. This article is written, therefore, in the hope that it may add to the worthwhile pleasure of the climbers by contributing to the development of their geographical eyes.

An outstanding feature of the Valley topography is the mountain called Massanutten, a name of Indian origin. "From the valley floor Massanutten Mountain appears as a single level-topped ridge with steep slopes and abrupt ends. It is in reality composed of two or more parallel ridges, which are unbroken by water gaps for nearly 45 miles. It has a general altitude of 2,700 feet. The northern half is composed of two parallel ridges four miles apart separated by a deep valley that drains northward, passing out through a rocky gorge between the ends of the ridges. The southern half is less simple, being composed of three and in some places of four parallel ridges, straight, others curved and sigmoid, and more or less cut into segments by small stream gaps."<sup>1</sup>

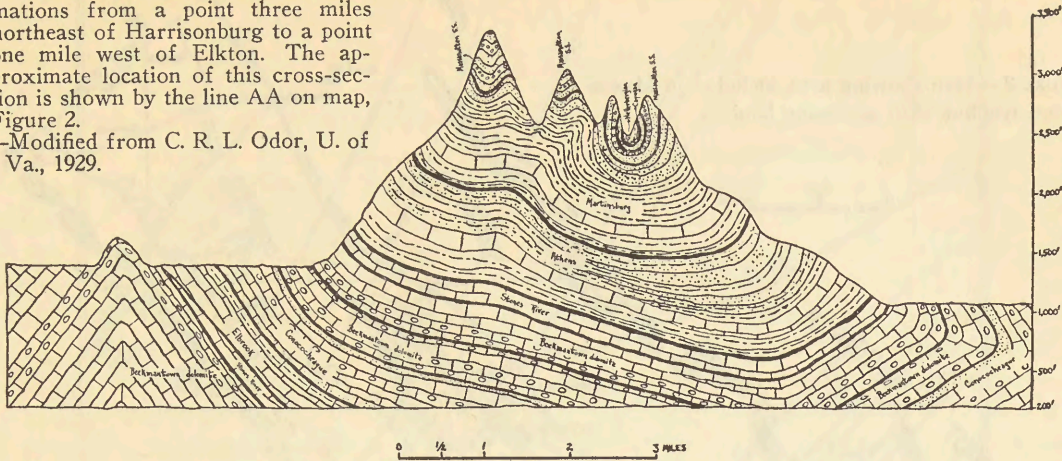
In the folding of rock strata, the arch made by rocks bending upward is called the anticline, while the trough made by rock layers being depressed is called the syncline. Massanutten "is produced by a synclinal fold of such unusual depth that the hard Tuscarora sandstone, which overlies the softer rocks, was brought so low that it was here protected from complete removal by the erosion which removed it from the rest of the region. So these hard beds form an outlying mountain (Fig. 1) in the open valley."<sup>2</sup>

<sup>1</sup>Stose, G. W., and Miser, H. D., Bulletin No. XXIII, Manganese Deposits of Western Virginia, pp. 14, 15, Virginia Geological Survey, University of Virginia.

<sup>2</sup>*Ibid*, p. 40.

FIGURE 1.—Cross-section of rock formations from a point three miles northeast of Harrisonburg to a point one mile west of Elkton. The approximate location of this cross-section is shown by the line AA on map, Figure 2.

—Modified from C. R. L. Odor, U. of Va., 1929.



“North of Strasburg the strata enclosed in this downfold or syncline have been worn down to the general level of the Valley, but south of this town a deep sag in this syncline brings the more resistant Massanutten quartzites below the general level of erosion of the neighboring mountains. Thus when, as a result of subsequent erosion, the Great Valley was formed, Massanutten mountain, on account of its hard quartzites, was left as a ridge dividing the Shenandoah Valley.”<sup>3</sup>

Without geological investigation, a person might conclude that the Massanutten syncline ended in the Strasburg vicinity. Instead it extends to the northern boundary of the state and over into West Virginia. It is found in the eastern portion of Frederick county,<sup>4</sup> and the eastern limb of the Massanutten syncline is exposed along the western edge of Clarke county and produces outcrops of Ordovician limestone in the vicinity of Wadesville (Fig. 2) in the northwestern corner of the county.<sup>5</sup> From the surface of the land, it might seem that the Massanutten syncline ended at Monte-

video just south of the Peak, but it extends at least twenty-nine miles farther to the southwest. The Massanutten mountain syncline “ceases as a geologic feature of the Valley in the region between Staunton and Greenville, the Martinsburg shale of this syncline showing for the last time at a point just north of the latter place.”<sup>6</sup>

The statement has been made that the Massanutten is unbroken by water gaps for nearly forty-five miles. However, the New Market gap is an excellent example of a wind gap. The Lee Highway crosses Massanutten through the New Market gap, and at the point at which the highway crosses the Shenandoah-Page county boundary, the elevation is 1800 feet. One-half mile farther northwest from this point, the elevation is above 2700 feet. During the Kittatinny Cycle and during the greater part of the Tertiary Cycle, a stream flowed through the present wind gap.<sup>7</sup> Other wind gaps of the boundary of Shenandoah Valley are Rockfish Gap and Swift Run Gap. Water gaps which are important in influencing present transportation routes are Buffalo Gap and

<sup>3</sup>Bassler, R. S., Bulletin No. II—A, Cement Resources of Virginia West of the Blue Ridge, pp. 41, 42, Virginia Geological Survey, University of Virginia.

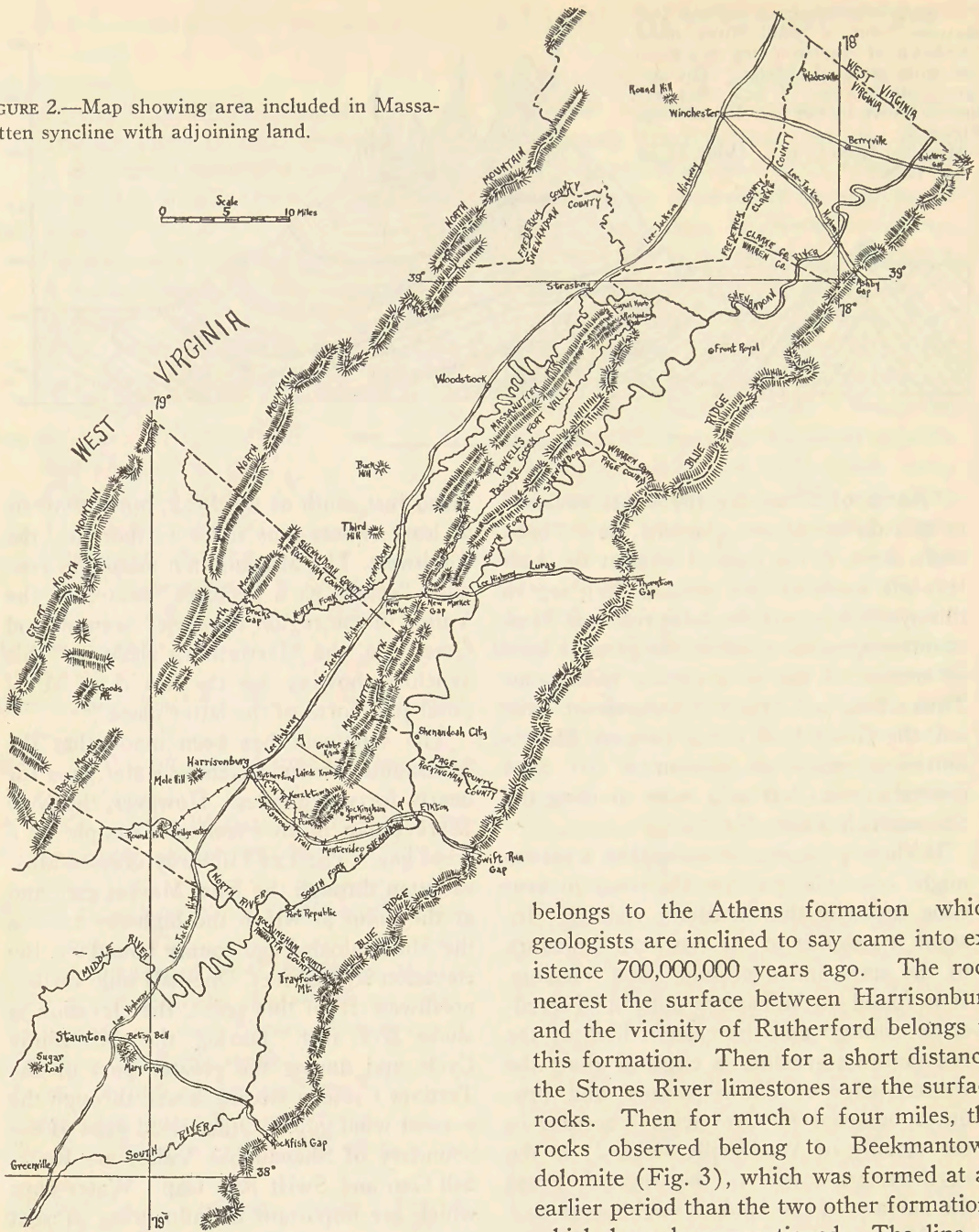
<sup>4</sup>*Ibid*, p. 67.

<sup>5</sup>*Ibid*, p. 73.

<sup>6</sup>*Ibid*, pp. 119, 120.

<sup>7</sup>Univ. of Va. Publications: Bull. of Philosophical Society, Scientific Section, Vol. I, No. 17, pp. 352, 358, 360, “Drainage Changes in the Shenandoah Valley Region of Virginia.”

FIGURE 2.—Map showing area included in Massanutten syncline with adjoining land.



Brock's Gap along the western side of this valley.

Before the student rushes from the campus to board the special Chesapeake-Western train, she may look at the Big Rock in front of Alumnæ Hall and recall that it

belongs to the Athens formation which geologists are inclined to say came into existence 700,000,000 years ago. The rock nearest the surface between Harrisonburg and the vicinity of Rutherford belongs to this formation. Then for a short distance, the Stones River limestones are the surface rocks. Then for much of four miles, the rocks observed belong to Beekmantown dolomite (Fig. 3), which was formed at an earlier period than the two other formations which have been mentioned. The line of the Staunton Fault marks the contact of Beekmantown dolomite and Elbrook limestone. During the last mile before Keezletown is reached, the Elbrook formation is the surface rock. This is the oldest rock crossed during the excursion; it belongs to

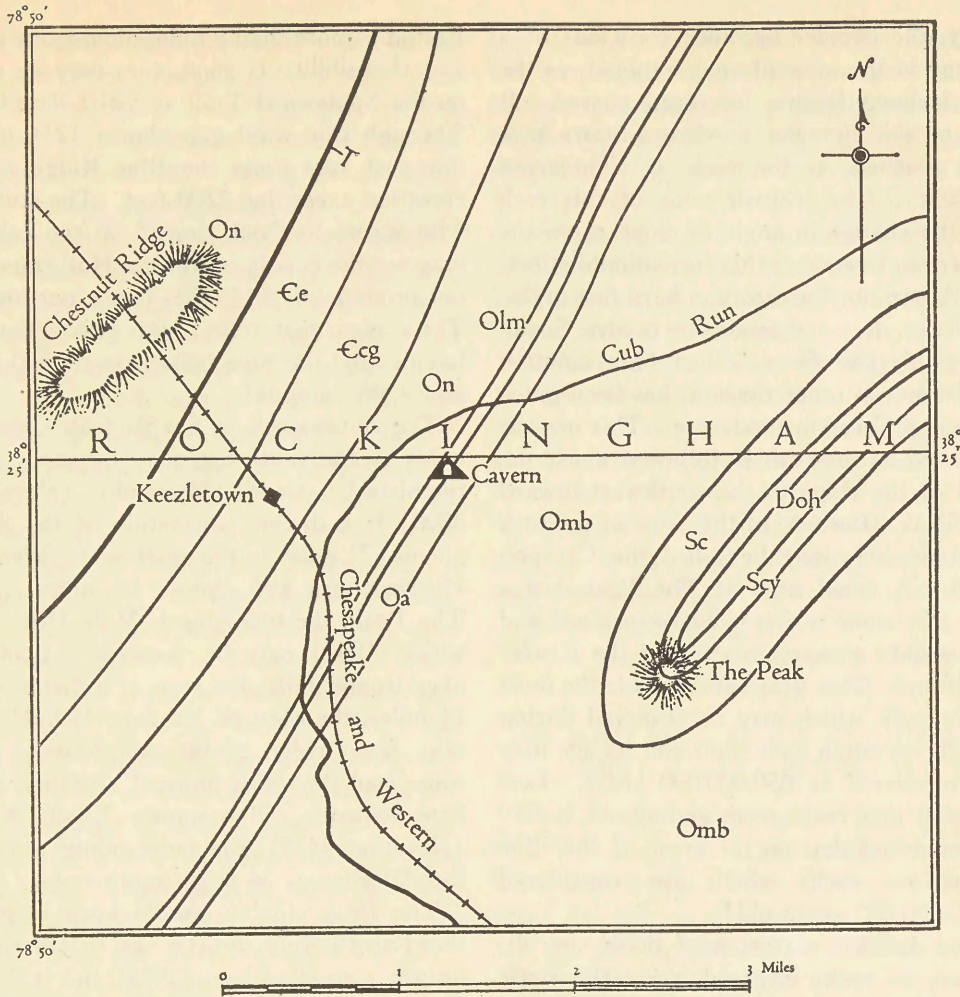


FIGURE 3.—Geologic sketch map of the environs of Massanutten Caverns. (By Charles Butts.) Ce, Elbrook limestone; Ccg, Conococheague limestone; On Nittany dolomite; Olm, Stones River (Mosheim and Lenoir) limestones; Oa, Athens formation; Omb, Martinsburg formation; Sc, Clinch sandstone and Clinton group; Scy, Cayuga group; Doh, Helderberg group and Oriskany sandstone. From *Virginia Geological Survey Bulletin 35*, Figure 17. Courtesy *Virginia Geological Survey*.

the late Cambrian system and is probably 800,000,000 years old. The vicinity of Keezletown has Conococheague limestone of the Ozarkian system, so it is a few million years younger than the Elbrook.

As one walks from the railroad to the mountain, Beekmantown dolomite is crossed. The lower slope of Massanutten is Stones River limestone and Athens formation, but since it has been covered by talus carried down from the upper slope, these formations are not exposed along the trail.

During much of the lower half of the trail, the Martinsburg formation is crossed, but this has been so much covered by rock washed from the upper slopes that surface exposures are lacking. But about half way to the top of the ridge, the trail becomes a well-worn path over continuous Martinsburg shale. If the climber will observe, the layers of shale pointing down into the side of the mountain may seem surprising unless it is remembered that the Massanutten is a synclinal fold. Rather sud-

denly, the climber becomes conscious of a change in the kind of rock exposed, as the Martinsburg Incline has been passed. It may be said that the Tuscarora Stairs have been reached, as the rock is Tuscarora quartzite. The whitish color of this rock and the change in angle of slope cause the student to remember this formation distinctly. Above the Tuscarora, a hard fine-grained, dense, deep-red sandstone occurs. Sometimes this has been called Massanutten sandstone; at other times, it has been given the name Cacapon sandstone. This may be observed as the trail is followed along the crest of the ridge to the southwest toward The Peak. Because of the name of the rock observed, this may be called the Cacapon Trail. A small area at The Peak has a gray sandstone which is coarse-grained and is probably a representative of the Keefer sandstone. This gray sandstone is the most recent rock which may be observed during the Massanutten excursion and its age may be considered as 650,000,000 years. Lest these various rocks seem unduly old, it may be remarked that on the crest of the Blue Ridge are rocks which are considered 1,000,000,000 years old!

The detailed narration of these nine divisions of rocks exposed along the route from Harrisonburg to The Peak will emphasize the variety of rocks found in a six-and-one-half mile space.

The observer arriving on The Peak is often uncertain regarding directions. On clear days he may see Round Hill (Fig. 2) near Bridgewater, a monadnock having an elevation of more than 1500 feet and approximately 12 miles directly west. The unincorporated town Montevideo is exactly south of the observer's location. If this highway junction cannot be identified, the observer may locate Trayfoot Mountain of the Blue Ridge; it is higher than any nearby peak of that ridge visible from The Peak. The summit of Trayfoot (elevation 3300) rises 12 miles straight south of The Peak.

Elkton is more than 8 miles almost due east, and if visibility is good, cars may be seen on the Spotswood Trail at Swift Run Gap. Through this wind gap almost  $12\frac{1}{2}$  miles due east cars cross the Blue Ridge at an elevation exceeding 2300 feet. The student who wants to "look down" on the college may see the cupola of Wilson Hall standing out prominently  $6\frac{1}{2}$  miles to the northwest. The student may reflect with satisfaction on having, for the time being, risen 1500 feet above the campus!

The smokestack in Shenandoah City, 10 miles to the northeast, may be easily distinguished. Goods Mountain (elevation 3700) is a distinct formation of the Alleghenies 21 miles to the northwest. West of Harrisonburg and almost 11 miles from The Peak, the monadnock Mole Hill (elevation 1900) may be located. Looking over Round Hill, one sees, at a distance of 21 miles, the crest of Narrow Back Mountain, front ridge of the Alleghenies. On some cool day with unusual visibility, perhaps someone will recognize Elliott Knob (elevation 4473), the outstanding peak of the Alleghenies 34 miles southwest.

The Peak climber should keep in mind that Laird's Knob directly east of Harrisonburg has an elevation of 3300, and is therefore 400 feet higher than the point to which the annual climb is made. Laird's Knob lies  $4\frac{1}{2}$  miles northeast of The Peak. Nearly two miles farther to the northeast, Grubb's Knob has a similar elevation of 3300. These two points are the highest points of the Massanutten Ridge and their appearance suggests a resemblance to the humps of a camel.

Especially in winter, when coniferous trees are so easily recognized, the plant life covering the sides of the ridge shows some interesting adjustments. The talus accumulation about the base of the ridge has a much larger fraction of coniferous trees than occurs higher on the slope. Some of the spurs extending out from the ridge

seem to favor the coniferous type, but at other locations, ravines have coniferous growth suggesting areas with soil of less fertility; here deciduous trees are not able to grow successfully. Along the Cacapon Trail, stunted oaks are noticed.

There are historical and literary associations which should be mentioned. In June, 1862, there was a party of signallers stationed on The Peak to observe all roads leading to the Confederate positions near Cross Keys and Port Republic. In Henderson's "Stonewall Jackson and the American Civil War," Vol. I, Chap. XI, one finds descriptions of the beautiful scenery which impressed that signal group. Nearly twenty years later, in 1880, Sidney Lanier spent a summer at the resort, Rockingham Springs, on the east slope of Massanutten about three miles northeast of The Peak. Since Lanier was ill at the time, he rode on horse-back along the trails of the vicinity. He probably never climbed to The Peak, since any lover of a horse would not risk having the animal injured by such an attempt.

Gordon, in his "Reminiscences of the Civil War," Chap. XXIV, page 333, tells how he was able to make observations from Signal Knob, the northern end of the Massanutten, one day in mid-September, 1864. It must have been a day having high visibility because of the minute details which he was able to distinguish with his field-glasses. Although he was making observations as a military man, he includes descriptions of the beautiful scenery which was spread as a panorama before him.

The Massanutten District of the George Washington National Forest includes 133,008 acres of the Massanutten Ridge, although the federal government had acquired only 65,941 acres at the close of 1934. This suggests that the federal-owned acreage includes about fifty per cent of the land now within the purchase boundaries, and that a person may be within the national forest and yet be on privately owned land. From

the beginning of the climb to The Peak by the trail which the college groups follow, the group is within the purchase boundaries of the national forest, although all during the climb, they are on land which is still privately owned. At some future time, when that part of the national forest area is offered for sale and there are funds with which to buy, it will probably be acquired by the federal government.

In the interests of easy climbing, students are advised to eat breakfast, reduce the luggage carried, wear comfortable shoes, and have their hands free; each student will have therefore to decide how much of this information she will carry while making the trip to The Peak. It may serve either as a mental breakfast or as an Alpine staff to make the climbing easier.

RAUS M. HANSON

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#### MR. AND MRS. GERM RESIDE ON VERTICAL-JET FOUNTAIN

Four studies made before 1920 proved that vertical-jet drinking fountains retain the disease germs of one drinker and serve them to the next—and yet in modern schools, offices, and public buildings vertical-jet drinking fountains are constantly being installed. This type of fountain is as dangerous as the common drinking cup.

The bubbling fountain should flow from an angle so that the water does not touch the jet after it has once spouted out. A guard should be placed above the jet to prevent a person from touching the nozzle—and the jet and nozzle should be placed higher than the top edge of the bowl so that if the bowl should clog the jet will not be contaminated by the over-flow. These precautions prevent disease germs from falling back on the jet and insure cleanliness on ordinary occasion.

Nineteen states now recommend angle-jet fountains as being more sanitary than vertical-jet ones.