

AN ELEVATED BEACH AND RECENT COASTAL PLAIN NEAR PORTLAND, ME.
NOTES OF AN EXCURSION WITH A PARTY UNDER CONDUCT OF PROF.
WM. M. DAVIS, JULY, 1898. BY WM. A. MCBETH.

[Abstract.]

Evidence pointing to the existence of such beach and recent plain in southern Maine as observed in the region of Portland are a belt of sand and gravel deposits closely following the three-hundred-foot contour line around an arm of the Casco Bay depression. The belt is quite continuous through the distance traced and apparently much further, and it slopes gently down toward the inclosed valley. Exposures along streams and in gravelpits, wells, etc., show depth and character of deposits. What are apparently sandpits modify the course of some of the streams crossing the deposits. Several drumlins stand on the upper border of the belt with bluff frontages upon it, which resemble the wave-cut drumlins in Boston Harbor. Undercut cliffs of rock also front upon it with heavy water-worn talus fragments at their base. The country falls off abruptly in places from the lower edge of the belt to the basin below. The floor of this depression is covered with a light gray marine clay, the drainage channels of which are narrow and steep-sided, showing recent origin.

The deposits of sand and gravel are thought to be a beach line elevated about 300 feet above the sea. Postglacial age is indicated by the wave-cut drumlins and undisturbed conditions of deposits. The much later age of the lower plain is indicated by the immature drainage lines and slight weathering. The order of movements evidently has been sinking of the region, deposition of clays in basin and formation of beach, elevation of from three hundred to four hundred feet, redrowning of the lower levels of the basin.

WASTED ENERGY. BY PROF. J. L. CAMPBELL.

A VESUVIAN CYCLE. BY C. A. WALDO.

Ordinarily Vesuvius is in a state of mild activity. A single visit, however, does not show the periodical aspects of its manifestations. It was the fortune of the author of this note to visit Naples in the summers of 1890, 1891, 1894 and 1896, and on each of these occasions to make the

ascent of the volcano. The cinder cone has a diameter at its base of about one and one-half miles. It rests on a gently sloping hill, while its own angle of elevation is about 30°. This cone or new mountain is about 1,200 feet high and terminates in a comparatively level top, varying in diameter from 500 to 1,000 feet, and now about 4,200 feet above sea level.

In 1890 as we approached the summit we felt that it was shaken at intervals of about thirty seconds. Soon we noticed that the tremors were accompanied by a peculiar sighing and explosive sound. At the summit a cone of freshly-ejected material had been formed, forty or fifty feet high and 150 to 200 feet in diameter at the base. At each explosion a fountain of semi-fluid lava was projected to the height of 100 feet above the top of the crater. Most of this material rained back into the crater's mouth, into which we could not look, but much of it fell in fragments on the outside.

In 1891 the top of the cinder cone had undergone a complete change. The small cone surrounding the crater had entirely disappeared. In its place was a cavity 200 feet across and of unknown depth. The mouth of this cavity was filled with vapors and dark sulphurous gases which completely hid the boiling lava far below, and which, streaming into the air, gave to the mountain the appearance of smoking. But standing on the edge of the chasm a continual din deafened us and an occasional heavier explosion smote our ears.

In the Atrio del Cavallo, a deep valley to the north, between Monte Somma and the cinder cone, we could see the glow of fresh lava as it flowed from the mountain's side. During the previous year the hydrostatic pressure of the molten, liquid mass rising so high in the crater had forced an exit through the base of the cinder cone.

In 1894 lava no longer issued from the recent vent towards Monte Somma. During the intervening period, after the great pressure of 1890 had been removed, it had flowed more and more slowly until it began to clog the opening and finally sealed it completely. This vent, which in 1890 was in the direction of least resistance, must now be one of the strongest parts of the mountain. Thus one by one the weaknesses of the cinder cone are patched up until the conditions of strength are prepared which will compel the lava to flow out of the very top. Soon thereafter will follow a great eruption. Just as in 1891, there was in 1894, an open central crater, but by its continual "working" the mountain had filled up the bottom of the cavity, and the surface of the molten lava had risen

to a point about 150 feet below the edge of the crater. We now saw repeated the conditions of 1890 with this exception, that the building-up process had not reached the summit. From a secure position we could look down upon the molten lava and observe all the phenomena of the immature eruptions.

In 1896 the rising column of lava had once more forced a way for itself through the mountain's base. Again the crater was a dark, roaring cavern. But this time the vent was in the direction of the observatory to the west of the summit. The liquid lava had covered many acres, destroying a part of Cook's carriage road, and piling up a new hill a hundred feet high. A few inches beneath the surface this hill was still red hot, while from its summit two or three streams of live lava flowed sluggishly down its side.

In about five years Vesuvius had passed through one constructive cycle. These must succeed each other until the walls of the crater have sufficient resistance to allow the accumulation of an explosive energy. Then comes the short destructive period during which the retaining walls are seamed and shattered. In general the number of elementary cycles between great paroxysms will be in direct proportion to the work of restoration necessary, and this in turn will depend directly on the violence of the eruption immediately preceding.

X-RAY TRANSPARENCY. BY ARTHUR L. FOLEY.

[Abstract.]

Many experiments have been made to determine, and many tables given to show, the relative transparency of bodies to the X Rays. No two have been in agreement. The varied results cannot be attributed to uncertain methods or experimental errors, or, indeed, to the size, shape and general construction of the different tubes used. The degree of the vacuum seems to be the chief factor.

Two of the tubes used in this investigation were of the usual type—non-adjustable vacuum. At first they increased in efficiency, then decreased, and finally almost entirely lost their power of affecting a fluoroscope or photographic plate. At first the rays possessed little penetrating