

deny that the variegated Potomac clays in Maryland are continuous with those in Delaware, Pennsylvania, and New Jersey, and that the similar basal clays on Long Island, and the other islands to the eastward as far as Nantucket, are part and parcel of the same series. There is now positive proof that the southern end of this series is Jurassic, and it is certainly a fair conclusion that the remainder is of the same age. The burden of proof will rest upon those who hold to the contrary.

To place the strata in question in the Jurassic section of the Atlantic coast at once removes many difficulties that have hitherto perplexed students of the Mesozoic of this region. It completes the series, and shows in part, at least, what was done in deposition during that long interval between the end of Triassic and the beginning of Cretaceous time, when the great barrier was broken down, which, from the Devonian to the Cretaceous, shut out the waters of the Atlantic.

I must leave it to others with leisure at their command to work out the details of this well-marked series, and its relation to those above and below. I have no time to devote to the surface geology of this belt or to the earlier deposits of Tertiary time. Just now the Mesozoic interests me most of all, especially its middle section, the Jurassic, as I believe great injustice has been done, since this has been denied its rightful place, and a name not its own stamped upon it.

In a later communication I hope to discuss this question further, and especially the Jurassic beds south of the Potomac River.

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#### *VOLCANIC ASH IN SOUTHWESTERN NEBRASKA.*

In the summer of 1894 I spent two days in southwestern Nebraska in the examina-

tion of certain deposits of volcanic ash. These deposits were seen at three localities, viz: 1° near Ingham, Lincoln county; 2° near Edison, Furnas county, about forty-five miles southwest of Ingham; and 3° near Orleans, Harlan county, about twenty miles southeast of Edison. At all of these localities there are several more or less closely associated exposures of the ash. In all cases it appears in the side or near the head of a canyon-like ravine. In the ravines where it occurs it is to be seen only where the walls are essentially vertical, and in all places it is capped by loess. It is probable that the failure of the ash to appear at many points on the sides of the ravines in which it occurs is due to the fact that the loess from above has slumped down, concealing it.

*The deposits near Ingham.* The volcanic ash near Ingham is exposed at four or five points, the most widely separated of which are less than a mile apart. The first suggestion of the exposures was that the ash formed a continuous layer beneath the loess, and that it failed to appear continuously in the wall of the ravine only because it was locally concealed by the slumping of the loess above it. Further examination, however, showed that this was probably not the fact, for at one point a layer of ash was seen to thin out promptly from a thickness of twenty-two feet to a thickness of four or five.

The ash at this point varies in color from nearly white to a yellow-cream color, on the one hand, and to a light gray, on the other. It varies in grain from the grade of coarse sand to that of fine flour. These grades of coarseness do not appear to be the result of admixture with foreign substances, for no such materials could be detected on the ground, and microscopic examination confirmed the field conclusion. The ash is more or less affected by streaks or pockets of loess which appear to repre-

sent the filling of holes made by burrowing animals or by the roots of trees. In places there are thin sheets of lime carbonate, which have been concentrated by water from the loess above and deposited in the cracks in the ash.

*Deposits near Edison.* The ash of this region is four or five miles south of the station. The exposures are but two in number, but much larger than those near Ingham. Their general relations are the same. Where the wall of the valley is steep or vertical the ash appears, but where the slope is gentle, as where the loess has slidden down from above, it was not exposed. The larger of the two exposures near Edison extends along the side of the valley for a distance of several hundred yards, interrupted here and there by a mass of loess which has slumped, locally concealing it. The thickness of the bed is in places more than twenty feet. The ash is more uniform in texture than that near Ingham, there being none so coarse as the coarsest at that point. It seemed to be equally free from foreign matter. A re-entrant in the side of the ravine in which the main exposure occurs, shows that the ash runs back from the wall of the ravine where the main exposure occurs, in undiminished thickness.

The second exposure near Edison is about a-half mile from the first and in another valley. The exposure is much less extensive than the first laterally, though nearly as thick. It is very probable that the ash is continuous between the two ravines in which it is exposed.

*Deposits near Orleans.* The best of the exposures in this locality is near the head of a small ravine tributary to the valley of the Republican river. Its general relations are identical with those of the ash at the other localities. As there, it is covered by loess, and as there, it appears only where the valley slopes are steep and where the

loess has not slumped. The exposed part of the deposit here varies in thickness from five to twelve feet, and the ash is very fine and white.

Ash in lesser quantities was seen at several points in the vicinity. In some cases, especially where thin, it is more or less mixed with earthy matter.

At most of these places the ash showed more or less evidence of stratification; but in the faces exposed in 1894, the stratification was not of such a character as to make it altogether certain that the ash was deposited in water. If deposited in water, it must have been at a time when this region was covered with a lake, presumably a late Tertiary lake, to which the wind brought the ash. So far as the relationships of the ash were seen, it was only clear that the ash was deposited, and probably somewhat eroded, before the deposition of the loess, and that the loess was deposited before the valleys in the banks of which the ash is exposed were excavated.

It has long been known that volcanic ash exists in other localities in Nebraska. Some of these were noted long since by Prof. Todd and Mr. Merrill, but, so far as I am aware, no publication has been made of the ash at the localities here mentioned. It may be of interest to add that the volcanic ash from this region has already become an important article of commerce, under the name of pumice. It has been found to be available for all the various uses to which pulverized pumice is put.

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THE MODERN VERSION OF THE LAW OF  
SUPPLY AND DEMAND.

A most interesting illustration of what the writer has called 'The Modern Version of the Law of Supply and Demand' is seen in recently published statistics of the copper production of Lake Superior, given out