

INTERESTING DEPOSIT OF ALUMINA OXYHYDRATE. BY GEO. W. BENTON.

[ABSTRACT.]

1. Report of trip to Southwest Missouri, March, 1894.
2. Alumina found in pool of spring water.
3. The springs brought in the deposit.
4. A careful survey of the region proved that the deposit is forming, and is not stored up in quantity.
5. The source a pure aluminum silicate which abounds in quantity in that region.
6. Some possible uses of the deposit and the silicate.
7. Theory of the decomposition.

OBSERVATIONS ON THE GLACIAL DRIFT OF JASPER COUNTY, BY A. H. PURDUE.

The writer begs to state that his experience in glacial geology, the time spent in field work on the material herein presented and the territory explored are all limited; and that he does not claim for the paper any more than its title indicates, viz.: observations on the glacial drift of the locality named. It is proper to state further that these observations have been confined mainly to that part of the county lying south of the Iroquois River.

Jasper County is situated in the northwestern part of the State, with Porter County intervening between it and Lake Michigan, and is separated from the State of Illinois by Newton County. It is, therefore, in one of the most active fields of all the glacial epochs. Mr. Collett claims (Twelfth An. Report Geol. and Nat. Hist. of Ind., page 66,) that glacial erosion has removed from fifty to two hundred feet of rock from the entire surface of the county. This great erosion, and subsequent glacial action, has left it practically level, and with poor drainage, so that numerous peat marshes abound in all parts of the county, varying in size from a half acre and less to several thousand acres. Notably among the larger ones are "Gifford Marsh," a swamp of 12,000 or 15,000 acres, lying twelve miles northeast of Rensselaer, and the "Blue Sea," a similar marsh, lying in the southeastern part of the county. Only the former of these has been visited by the writer. It is an old glacial lake filled up with peat and muck, varying in depth from three to fifteen feet, the monotony of which is broken by numerous accumulations of sand, which in form imitate drumlins.

Many wells have been drilled in all parts of the county, but no compilation of the data furnished by them has been made, so that nothing is known of the subglacial topography. It might be stated, however, that the drift varies in depth

from a few feet, as at Rensselaer, to two hundred feet. The latter extreme depth has been found nowhere, so far as I have learned, except on the moraine which extends in a northeasterly direction across the county, passing one and a half miles north of Rensselaer.

This moraine is possibly the most marked topographic feature of the county. In width it will average probably a mile, and in height it varies from twenty to eighty feet. It is said by Mr. Leverett, of the U. S. Geological Survey, to extend northeastward into Pulaski County and southwestward through Newton County into Illinois, and is thought by him to possibly be interlobate between the Saginaw-Erie lobe from the northeast and the Lake Michigan lobe from the north.

One of the first things to attract attention in the study of this locality is the great number of sandy ridges everywhere prevailing. With reference to direction it appears that there are two classes of these. One class extends almost parallel with the above mentioned moraine. I have observed them in Pulaski and Jasper counties, northwest of Monon, and in passing over the Monon Railway from two miles northwest of Rensselaer to Parr. The other class, which I have observed only south of the moraine, have an average course of about S. 30° E., and consequently run in a direction almost at right angles to it. It is the latter class to which we wish to invite attention.

These ridges are of two types, each frequently passing into the other. For convenience we will speak of them as the symmetrical and the unsymmetrical.

The most common form is the symmetrical. These are low, broad, symmetrical ridges. They vary in width from forty yards to an eighth of a mile. Though frequently running into each other they are in the main parallel, and often are crowded so close together as to give the surface a billowy appearance. The troughs between them always contain rich, black soil, formed from the decay of peaty matter, and indicating former shallow lakes. An excellent view of this type is presented along the "Line Road" from Rensselaer to Remington for a distance of five miles south of the former place. The view along this road shows them to run east and west, but a short distance to the east they swing to the south and southeast. All the ridges of this class are composed largely of sand, though they contain enough vegetable mould to prevent shifting by winds, and permit of an excellent yield to the farmer. I have never noticed any gravel in them except north of the Iroquois, in the vicinity of the large moraine. Boulders are sometimes seen along and near their bases, but seldom on the swell of the ridge, except also in the vicinity of the large moraine.

The unsymmetrical type differs from the symmetrical in size and shape, in being composed more largely of sand, and in not being so numerous. They are

much larger than the symmetrical, varying in height from five to twenty-five feet above the general level. The average is probably about ten feet. The south and west slopes are gradual and more or less broken, while the north and east slopes are steep and even. Horizontally these slopes are very sinuous, resembling the banks of winding streams; but the fact that at their bases, often stretching to the north and east for a mile or more, are extremely level expanses frequently covered with peat, forcing upon even the unobserving the recognition of old lake beds, dispels the idea of their being such. At the same time the winding course of the ridges prohibits the idea of their having been thrown up by wave action from the lakes. In many places these ridges are too sandy to be cultivated with profit, in others the soil is good, and at a few points, to be mentioned later, gravel has been found. They are frequently cut through by what apparently were escapes for the water confined by them. In these cuts, which usually reach to or near the base of the ridge, bowlders can pretty confidently be searched for. Bowlders are also occasionally found along their bases.

Only in the gravel pits above referred to has the writer seen any indication of stratification. Two of these pits are situated a mile and a quarter west of Rensselaer, near the Iroquois River. There are three others a mile and a half south of Rensselaer. Places in these show attempts at sorting by rapid and changeable currents, but the greater part of the material is unsorted, and it would seem that their deposition was effected almost wholly by direct glacial action.

Let it be repeated that the two types often grade into each other. A ridge that in places presents the most rugged aspect of the unsymmetrical, may, in the course of a mile, grade into the most feeble of the symmetrical type; and at a point about three miles north of Remington an unsymmetrical ridge grades into a low, flat ridge covered with numerous bowlders, and evidently a moraine.

Of course, the thing of interest in connection with these ridges is the question of their origin. It has been claimed (Twelfth An. Rep. Geol. and Nat. Hist. of Ind., page 66) that they are dunes formed along the northeast and east shores of former lakes, and were produced by southwesterly winds. While the examination of numerous cuts has not disclosed the least sign of lamination by either wind or water, there seems to be no doubt that the unsymmetrical ridges are due very largely to aeolian action; but it does not seem that the low, flat, symmetrical ridges, so frequently connected, or passing into each other and forming the rims of ponds could have been produced in this way. The fact that the two types grade into each other indicates a common origin at least of their basal portions. Also the fact that bowlders are more numerous along and near the bases of these ridges, especially the symmetrical type, than elsewhere, together with the fact that

bowlders are liable to be found in the cuts through the large ridges is considered significant. It would also seem that the parallelism and continuity of the ridges of both types are greater than could be expected of deposits determined alone by wind. In the gravel pits south of Rensselaer there is nothing to indicate that the adjoining portions of the ridges were formed in a manner different from those portions where gravel is found.

The above facts suggest the possibility of the symmetrical ridges having been formed directly by glacial action as the glacier receded to the northeast; and in some cases they have served as lodgment tracts for the accumulation of wind-blown sand, in that way largely determining the course and extent of the unsymmetrical or dune type. But more field work is necessary before considering this beyond a hypothesis.

There are at least two boulder belts in the county, but because of limited time I have not been able to follow them out. One of these is north of Remington and the other is east and southeast of Rensselaer. The latter I have traced from the junction of the Iroquois and Pinkamink rivers southeastward for a distance of three miles. It will probably be found to extend southeastward and eastward into White County, forming the southern border of the old lake through the bed of which the Monon Railroad passes, from Lee to Pleasant Ridge. The careful location of these boulder belts will probably throw light on the glacial phenomena of the locality.

CONCERNING A BURIAL MOUND RECENTLY OPENED IN RANDOLPH COUNTY. BY
JOSEPH MOORE.

Southern Randolph and the adjacent portion of Wayne, is in the main a level tract, the land during ordinary seasons being rather wet.

Besides a number of well-defined made mounds in the neighborhood of Lynn Station on the G. R. & I. R. R. there are frequent examples of natural mounds. These are usually much larger than the artificial mounds. They may be compared to drift islands surrounded by flat areas of dark colored soil. Some of these mounds of modified drift have been utilized by ancient peoples as burial grounds. The one of which I speak is a fraction over a mile west of Lynn Station. It is about 150 yards in circumference and 18 to 20 feet high, and is so symmetrical as to have the appearance of a made mound; but in a wide cutting made through it by the gravel haulers the structure clearly shows an aqueous deposit from top to