

NOTE ON OCCURRENCE OF INDIANAITE IN MONROE COUNTY, INDIANA.

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During field work in 1917 the writer's attention was attracted to an outcrop of reddish colored clay containing fragments of a white clay near the public road in Section 3 of Indian Creek Township. A later examination of the white clay showed it to be Indianaite, a variety of halloysite.

In the spring of 1918, Mr. Dick Hall located a number of outcrops of the same kind of clay in the township. One of these outcrops is on the public road near the John Koontz place in Section 10. The section exposed consists at the bottom of a shale containing sandy layers near the upper part, overlying this is a layer of mahogany-colored clay of a thickness of thirty inches, containing fragments of Indianaite, and above is a five-foot layer of sandstone. The Indianaite occurs under and in most cases immediately in contact with the sandstone. Where the sandstone is compact and unfissured the Indianaite is more abundant. The thickness of the mahogany clay is variable, pinching and swelling. In some places it may have a thickness of four feet and pinch down to less than half that amount in less than ten feet.

At one point in Section 28 of Van Buren Township, in a sandstone layer, there is a thin layer made up of the fragments of Indianaite. This occurrence shows that the Indianaite had been formed, eroded and redeposited. Below the sandstone there occurs a layer of mahogany clay which contains small fragments of Indianaite. The mahogany clay rests on a thin bed of sandstone, which in turn rests on a bed of greenish colored shales. In the shale there are irregular, lens-like masses of limestone. Where exposed at the surface these limestone masses are surrounded with mahogany clay in which fragments of the white Indianaite were found.

Distribution.—In Van Buren Township, Indianaite has been found in Sections 27, 28, 33 and 34. The outcrops occur on the slopes of a ridge which rises about 900 feet above sea level and forms a part of the divide between Clear Creek on the east and Indian Creek on the southwest. On the road which connects West pike with the Rockport pike, passing through the center of Section 28 and intersecting the above-mentioned ridge, there are a number of outcrops of Indianaite. On the northern slope of the ridge, at the point where the road crosses it, there



Fig. 1. Outcrop of mahogany clay with white kaolin at top. Sandstone above and shale below. Coal blossom just below note book and below mahogany.



Fig. 2. Sandstone forming ledge above the mahogany clay of Fig. 1. This sandstone forms a ridge-capping extending in a northeast-southwest direction through the southeast quarter of Section 28 in VanBuren Township.

is an outcrop of mahogany clay which contains a considerable quantity of Indianaité. Underlying the clay and separating it from a bed of shale is a thin layer of sandstone. A bed of sandstone having a thickness of twenty-five feet overlies the clay. The clay has a thickness of four feet at the outcrop, but pinches down to about half that in a distance of six feet. The Indianaité occurs in hard, irregular fragments and also as white plastic streaks in the red-colored clay. On the same slope, below this outcrop, there are some greenish gray shales containing irregular masses of limestone surrounded by mahogany clay. This clay also contains some fragments of the white Indianaité.

On the same ridge, farther east on the north side, there is an outcrop of Indianaité six feet thick on the side of a sinkhole. On the south side of this ridge, in the southeast quarter of Section 28, Indianaité occurs under the sandstone, capping the top of the ridge, at about the same elevation as that on the north side. West of the road above mentioned, in Section 33, there is an outcrop of mahogany clay containing considerable Indianaité. The clay occurs between layers of sandstone of very fine grain. The overlying sandstone has a thickness of about thirty feet. The mahogany layer is irregular in thickness, pinching and swelling. Similar outcrops have been found in Section 27, on the southwest side of the ridge, and in Section 34, on the east side.

Indian Creek Township.—Indications of the presence of Indianaité have been found at several places along the ridge which forms the divide between Indian Creek and Clear Creek in this township. In Section 3 outcrops occur in the west half of the section. In Section 10 outcrops of mahogany clay occur at several points, also in Sections 9 and 17. In the northwest corner of Section 10, near the public road, there is an outcrop of a layer of mahogany clay having a thickness of about thirty inches in places, but thinning down to about half that in other places. White Indianaité occurs in the clay in small, irregular fragments, which are most abundant under the compact and unfractured portions of the roof of sandstone. The underlying rock is shale, which passes into very sandy shale and lenses of sandstone just below the mahogany clay. The geological section exposed at this point is as follows:

	Feet.
No. 8. (Top.) Shale	5
No. 7. Sandstone in thin beds.....	5
No. 6. Shale, sandy	6
No. 5. Sandstone	5
No. 4. Shale	20
No. 3. Sandstone, thick layers.....	10
No. 2. Mahogany clay and Indianaité.....	2½
No. 1. (Bottom.) Shale, sandy toward top.....	12



Fig. 3. Tunnel of Hall and Timberlake kaolin mine in Section 27, VanBuren Township. White masses in front are fragments of kaolin taken from mine.

This mahogany clay lies near the unconformity in the Mississippian system of rocks. The shales above and below the mahogany belongs to the Mississippian.

State of Development.—Small pits have been dug at several places on the outcrop of the mahogany clay, but no serious attempt at development has been made. In order to determine whether the Indianaite occurs in sufficient quantities to warrant commercial development will require the drilling of wells along the sandstone ridge at some distance from the outcrop. Near the outcrop the clay is nearly always stained with oxides of iron.

The number and thickness of the outcrops offer promise of workable beds of the white clay. A tunnel has been driven at one point to a distance of 130 feet. Six feet of fairly white kaolin was found in this tunnel, and the indications are that a marketable quantity exists.