

CHAPTER XC.

GEOLOGY OF BROWN COUNTY.

BY H. HERZER.

[NOTE.—The survey of Brown county was executed in 1871 by Rev. H. Herzer, and some of the facts transmitted by him are embodied in the present report.—E. O.]

Brown county is bounded on the north by Clinton and Highland counties, on the east by Highland and Adams, on the south by the Ohio River, and on the west by Clermont county.

Its geology agrees almost exactly with that of the last named county. All the general statements made in regard to Clermont county can be applied, without change, to Brown. Both of them agree in containing, beside the deposits of the Drift period, but a single geological formation, viz., the Cincinnati Group. In range they vary slightly, the very summit of the series being attained in Eagle township, Brown county, in the north-eastern corner. At a few points in this township, there is evidence of the former presence of the cliff limestone, in the characteristic red clays that result from its decomposition. It is possible that the cliff limestone (Upper Silurian) will yet be found in place in the highest lands east of Fincastle. The ground is certainly very nearly high enough to catch it. It is found in force as soon as the Adams county line is reached, but thus far no bedded rocks have been discovered of Upper Silurian age in Brown.

The upper beds of the Cincinnati Group, on the east side of the county, are distinguished from the middle and lower portions of the series by a change of name. Instead of being counted with them as *Blue Limestone*, they are called *Gray Limestone*, their color being decidedly lighter than that of the typical beds. There is no doubt that with this change of color appreciable changes of chemical constitution are associated. It is held by some that the soils of the Gray Limestone lands are somewhat more productive than those derived from the lower portions of the series.

The upper limit of the rocks of the county has been found, in the base of the Upper Silurian formation. The lower limit almost exactly coincides with the geological horizon of Cincinnati. The trilobite *Trinucleus*

concentricus that is so characteristic of the lower beds of the Cincinnati formation, is found abundantly at the base of the river hills at Higginsport and at Ripley, and extends upward from that level through the usual interval. The section, in fact, at these points, duplicates the Cincinnati section almost exactly. The same fossils are found, and in the same abundance. *Orthis lynx* and *Orthis sinuata* are no where better developed than at the summits of these sections.

The horizon of *Orthis retrorsa* Salter (*Orthis Carleyi*, Hall) is reached at Arnheim, in the banks of Straight Creek. From this point the dip is quite rapid to the eastward. All the characteristic fossils of the Lebanon beds are found in the neighborhood of Fayetteville as well as upon the eastern side of the county.

The Drift deposits of the county are the same as those already described in Clermont and Highland counties. The most characteristic feature is the compact white clay that covers the flat lands in the northern townships of the county. It is six to ten feet in thickness, and contains a great many scratched and glacially polished fragments of Blue Limestone rock, as well as representatives of the granitic series of the north. There are but very few large bowlders in the county. One of the most conspicuous is found in the immediate neighborhood of Fayetteville. Under the white clay is the seam of iron ore described in the reports already referred to. It seems to mark the epoch of the forest bed of the Drift. We are certain that there was an advance of glaciers over this region, for we find the limestone well polished in place in the adjoining townships of Highland county. No bank gravel is found in the county except in the main valleys. It is, of course, abundant there in the usual terraces. It is often cemented in immense blocks through the agency of the lime water that percolates it. An example of this Drift Conglomerate is seen in the massive and striking cliffs at the mouth of White Oak Creek, near Higginsport.

The soils of the county are of the usual character for these areas. The flat lands already referred to, are covered with a considerable depth of clays, rich in all the elements of vegetable growth, except organic matter. They are, of course, stubborn and intractable in certain seasons and under certain management; but they are rich in agricultural possibilities, and will, under a wise culture, some day be transformed into gardens. What these possibilities are, is often hinted at in the insulated portions of these white clay flats, where organic matter has accumulated. We find in such spots soils of the highest excellence and durability. As the Ohio Valley is approached, the native soils formed from the decomposition of the Cincinnati shales and limestones are quite largely repre-

sented in the slopes of the hills. These slopes have all the excellence that belong to such an origin. They constitute some of the strongest and most durable tobacco lands of the State. This crop is limited, so far as successful culture is concerned, to limestone lands. Sometimes the proper soils are found in decomposed limestone gravels, but oftener in the weathered outcrops of rocks *in situ*.

As in the other counties of this range, the water supply is not wholly satisfactory, but the condition in this respect is somewhat better than in Clermont. In the flat lands the only safe and sufficient supply must be derived from cisterns.

The surface of the county, through its central and southern townships, is highly diversified. Several tributaries of the Ohio have cut deep valleys, and descend them with a comparatively rapid fall.

The most considerable topographical feature of the county is the valley of White Oak Creek. Straight Creek and Eagle Creek rank next in size and importance.