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GEOLOGICAL SURVEY OF KENTUCKY.

N. S. SHALER, DIRECTOR.

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TOPOGRAPHICAL REPORT

OF A PART OF

GREENUP AND LAWRENCE COUNTIES

FOR

THE YEAR 1874.

BY C. SCHENK.

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TOPOGRAPHY OF A PART OF GREENUP COUNTY.

On the 7th of May I received orders to prepare myself for a journey to Springville, Greenup county, for the purpose of surveying that part of the county the survey of which was left incomplete by the Geological and Topographical Survey under Prof. Owen in 1861. This territory lies close to the Ohio river, between Tygart's and Indian creeks. I made my arrangements as quickly as possible, reached the ground, and was ready to work on the 13th of May. Previous to other work, I took a hasty reconnoitre of the country, that I might reach a decision as to the best method of surveying to be pursued.

I had hoped that, by the measurement of a small base, and following a triangulation resting upon this base, I might at any rate establish particular points by means of which I might ascertain the exact position of each particular region which was to be surveyed in detail. I did not succeed in establishing to my satisfaction a sufficient number of prominent points of reference. This could only have been done by cutting off the timber on different mountain tops. There were not funds sufficient to have the wood cut from these heights; that is, there were not funds enough for executing work preparatory to a triangulation. Nevertheless, the work was to be completed as quickly as possible. Thus I decided, since there was no other way, to master the survey of details without previous triangulation, by means of polygonal lines drawn through the whole country. For the measurement of angles I had a theodolite, with a telemeter attachment, which latter I

applied to measure lengths by means of a graduated staff. The measuring of distances by measuring-rods or by a chain would have gone on but slowly, owing to the unevenness of the ground, and the many obstacles to progress. My instructions were to begin work where Prof. Owen had left off. But as, in my opinion, there were no desirable fixed points to be got, I decided to begin at the Ohio itself.

The portion of Greenup county to be surveyed has a surface of about fifty-five square miles, and, as previously said, is so situated with respect to the Ohio that this river bounds it on the north, while it is bounded on the east by Tygart's creek, partly on the west by Indian creek, and, finally, on the south by Brushy creek.

The principal part of the rain which falls on this surface goes directly or indirectly to Tygart's creek, and thence to the Ohio, while only a small part is brought to the Ohio by Indian creek, and other still smaller rivulets. The principal stream in this region is Schultz creek, with its affluents, Dry Fork and Wingo, which both flow from north to south into Schultz creek. The smaller affluents have but little length, and the mass of water which flows in them is inconsiderable. Almost all the streams run in a more or less easterly direction toward Tygart's creek. They come in order as follows, commencing with the one most to the north: White Oak, Schultz creek, Plum Fork, Beechy and Brushy Fork of Tygart. Indian creek is the only one that runs northward. The amount of water in all the above-mentioned creeks, except Tygart's creek, was, during my stay in the country, small, so that their water-power is not of much importance. On the other hand, Tygart's creek offers a mass of water sufficient to obtain a considerable water-power.

The whole country is hilly, and very much eroded. The many deep valleys which cut through the country occur owing to the proportionately soft material of the Waverly section, which generally forms the main bulk of the hills.

Generally the hills are connected by high ridges. Lost Hill alone, which stands near the junction of White Oak

and Tygart's creeks, is isolated from the surrounding country by a deep gap. There is also a somewhat larger hill round which Tygart's, Schultz, and White Oak creeks flow, and so pretty much isolate it.

Springfield Hill is about six hundred and twenty-five feet higher than the summer level of the Ohio river. The row of hills that run for a certain distance parallel to the Ohio has an extremely abrupt slope towards the north—*i. e.*, towards the Ohio—so abrupt that it is often impossible to scale these hills on that side. On the other hand, the southern slope is much more gentle, and is divided by long ravines that run off towards White Oak creek. The valleys are generally very narrow; Schultz creek occupies the broadest; the area favorable to cultivation is consequently very restricted. This, however, is not true of Tygart's creek, where one finds very finely situated farms. The ridges are generally narrow; still, small plateaux very favorable to cultivation are found on the hills, as, for example, close behind Springville and south of Schultz creek. The land fit for cultivation by the plow is already more or less cultivated. Fruit seems to thrive very well here. I found a young vineyard three years old, belonging to Mr. Nippert, whose grapes looked as sound and full as could be wished. This vineyard is on the sunny side of Schultz creek.

The hills are mostly sandstone. Hence the earth fit for cultivation is mostly sandy; and, as the weather is constantly loosening débris of sandstone from the hills, and the rain washes this débris down into the narrow valleys, the latter are often covered over for quite a distance with a great mass of detritus. This is especially the case with White Oak creek and Wingo, an affluent of Schultz creek. The stream flows often for a certain length under this débris. Water-course and road often occupy here the same ground. It was very difficult to center the instruments here. The crest of the ridges is still mostly covered with timber, which, when I was there, was being cut down in many places to be converted into charcoal and sent to the iron works of the neighboring town of Portsmouth. In the southeastern and western

portion of the territory that I surveyed the Hampshire Furnace is, and Globe Furnace was, situated; the iron industry was fairly active. Iron and even fire-clay is found in this district, and the latter is quarried and shipped.

In this connection, the so-called Indian forts of the Ohio valley should also be mentioned. There is one of the Indian forts below Springville. The earthen walls, eight to ten feet in height, which surround the fort, have a parapet of eight feet, and several gates of issue. On the west side the traces of a protected way are clearly perceptible. The fort has the form of a square with rounded corners, and covers a surface of twelve acres. A very small fort, in good preservation, with only one issue, is found above Tygart's creek on a farm owned by Mr. Wm. Biggs.\*

I began mapping out my results while I was still surveying. I finished surveying by the beginning of July. I then went home to work at the map. At the beginning of August I received orders to proceed, with assistants, to Louisa, in Lawrence county, and to begin the topographical survey of that county. Accordingly I went thither with two assistants—C. Jeancon and E. Wolff. By the 5th of August we had reached the ground and were ready to work.

The same difficulties presented themselves here, with respect to triangulation, as in Greenup county; and as it was necessary to do the map of this district quickly, there was no other way of going to work except the one already employed in Greenup county—*i. e.*, polygonal lines were drawn over the district, the angles were measured with a theodolite, and the distances with the telemeter.

Lawrence county is bounded on the north by Carter and Boyd counties, on the east by Big Sandy river, which divides it from the State of West Virginia, on the south by Johnson, and on the west by Elliott and Morgan counties.

The principal stream of Lawrence county is Blaine creek. Near it are Cat creek, with its three forks, Irish creek, Cher-

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\* Figures of these forts have been prepared for the second volume of *Memoirs of the Survey*.

okee creek, Brushy creek, Little Blaine creek, Hood's Fork, and Keaton Fork, the two Laurels, Rich, Elk, and Morgan creeks, Twin Branches creek, etc.

At Louisa, county seat of Lawrence county, Tug Fork and Louisa Fork unite to form the Big Sandy or Chatterawha river, which flows thence into the Ohio, at Catlettsburg. Tug Fork forms the boundary between Lawrence county, in the State of Kentucky, and West Virginia. Louisa Fork runs within the State of Kentucky, and divides Lawrence county.

Blaine creek rises on the border line of Lawrence county, carries along in its bed a great part of the water-fall of this county, and empties into Big Sandy river about seven miles below Louisa.

The principal affluents of Blaine creek come partly from a greater distance than Lawrence county, as, for example, the two Laurels, Hood's Fork, Brushy, and Keaton's Fork.

A fork of Blaine creek, Cat creek, has itself three branches—Cooksey, Thompson, and Jordan forks. It rises in Lawrence county at one fountain head. At this fountain head the following streams also rise: Irish creek, Daniels' creek, Cane Fork (a fork of Dry Fork, which is a fork of Little Sandy creek), and Dry Fork, Bell's Trace of Dry Fork, and other smaller streams. Blaine creek itself flows principally in a northeasterly direction. It is first formed by the union of its right and left forks, and then receives on its left the following streams: Cane's creek, Cherokee creek, Irish creek, Daniels' creek, Cat creek, then Long Branch, Newcombe's Branch, and several other small streams, with more or less water.

Beginning at its source, the tributaries of Blaine creek, on the right hand, are Keaton's Fork, Upper and Lower Laurel, Hood's Fork, Brushy creek, Rich creek, Little Blaine creek, Green Briary, Deep Hole Branch, Horsford creek, and other smaller streams. All the tributaries of Blaine creek that have been mentioned are weak in proportion to the territory they drain—they flow abundantly only during rainy seasons. The rain-water runs, for the most part, quickly down the steep hillsides; comparatively little sinks in the ground, and the springs

are therefore but scantily supplied. This affords an explanation of the fact that there are here comparatively few abundant permanent springs; but the water of all of them is excellent.

All the streams carry a great deal of sand, and hence Blaine creek itself carries a great deal. It is thus that sand enough is brought to Big Sandy river to justify its name. The depth to which sand lies in the beds of the streams may be surmised from the fact that I could, without any trouble, sink a rod of seven feet to its entire length in the bed of Blaine creek. When it was raining, at the end of the dry season, in the autumn of 1874, and water was flowing in considerable quantities at the head of Hood's Fork, a small distance below no water could be found in the bed of the stream—the sand soaked it all up.

Geologically speaking, this county belongs to the Carboniferous. The rocks of the country are—besides coal and iron beds—for the most part sandstone; limestone occurs only very rarely. Sandstone in general does not offer much resistance to the disintegrating influences of frost and water; so that the hills could not offer much resistance to erosion, and the form of the country is rapidly broken up and ravined.

The hills are about from three hundred to four hundred feet high; they slope downwards with an angle from eight to twenty degrees, and are mostly connected together. On the hills there are very few plateaux, and these are of very small extent. Generally there is only a small ridge on the top of a hill, often scarcely broad enough for an ordinary road. The ridges, furthermore, run in all possible directions, and undergo all sorts of turnings and windings. As rain tears up the roads very much, owing to the light sandy materials out of which they are made, roads have been laid mostly on the ridges or sides of the hills. Recently work has been done in this county towards making better roads, and towards building bridges over Blaine creek.

Since, as has been said, the few plateaux that occur are of insignificant extent, it follows that but little water can sink,



and, as the material of the hills is mostly sandstone or sand, the water is not retained as if the soil was clay. Hence the streams are all more or less liable to dry up during the summer, and therefore their water-power is not of much value. Nevertheless, Blaine creek itself receives so many streams that there is always water enough in it to turn a couple of mill-stones even in the dry season, provided the dams are kept close. There is a very good place for a mill at the so-called Falls of Blaine. Everything has been prepared here by nature to facilitate the utilization of water-power. The place is about two miles from Big Sandy river. Blaine creek receives almost all its tributaries before reaching this spot. At this point, therefore, it has plenty of water in its bed. Furthermore, there occurs here, for a short distance, in the bed of the creek, a harder sandstone, which, at its outcrop, forms the so-called Falls of Blaine. There is already a small mill here, but the position deserves a better one. There is a good foundation for water machinery; there is building material—with the exception of limestone, and even that would not be very hard to procure—inclination enough, and a sufficient mass of water.

The course of Blaine creek is a winding one, and often remarkably so. Especially below the falls, turnings occur. The rocks here opposed the moving of the waters, and so the stream had to force a crooked way for itself. The water often flows back almost to some earlier point of its course. Thus, for example, if you follow the stream, it is ten miles from the falls to the mouth of the stream, while in a straight line the distance is only three and a half miles. At the time when I surveyed this stream the water was uncommonly low, so that it was not very difficult to advance in the sandy bed of the stream. According to what the inhabitants of the country said, there is great danger of sinking into the sand at different places, when the level of the water is higher.

The valleys are narrow as a general rule. The earth, although somewhat sandy, is pretty fertile, and if greater care were given to cultivation, and especially to manuring, it could be kept forever as fertile as new land—that is, land just

tilled. All the agricultural products that grow here seemed to me good. The fruit was particularly pleasant to the taste. The hills are still mostly covered with wood; still one often finds hill-sides cultivated way up to the brow of the hill. As for the trees, the ridges of the hills are often partly covered with fir trees; in the valleys we found sycamores, beech trees, maples, the different oaks, such as black oak, white oak, post oak, chestnut oak; on the hill-sides most of the above kinds are found, and also hickory, chestnut, poplar, gum, ash, and black walnut. The use of this timber for fences, houses, instruments, and furniture is limited mostly to the consumption of the country itself. The oak timber is felled, split into staves, and the latter are piled up near the streams; when the rainy season sets in they are floated down to a place where they can be loaded on vessels. In this way a great quantity of staves are brought to Big Sandy river. It is said that Blaine creek has a sufficient mass of water to float down saw-logs through many months of the year.

I discovered a mistake in the management of the timber, which I will here mention. It is natural, for example, that a walnut tree cannot prosper if it is surrounded by great beech trees. Now the inhabitants cut down the great trees, whose timber is of use to them, without ever cutting down, at the same time, trees whose value is comparatively less, but which, in growth, are already ahead of the young, belonging to species whose timber is quite valuable. The consequence is, that all the timber that is worth anything finally disappears from the forest, and a new growth comes up very slowly. Some attention should be turned towards giving the young trees of valuable species space to spread in. The region where the two Laurel creeks run over rocks which geologists call Conglomerate, and have cut deep beds for themselves in these rocks, is overgrown with evergreen trees and shrubs, such as spruce pine, holly, ivy, etc., to such a degree that it is almost impenetrable. Very few of the inhabitants know this thicket region thoroughly.

The two above-mentioned streams run partly incased by perpendicular rocks from thirty to fifty feet high. At times one comes on corn mills situated down in the bed of the stream. The road to these has to be more or less hewed out in the rock. The Conglomerate that comes to light here is soon covered up again by overlying rocks. Although the country, taking a bird's-eye view of it, looks pretty ragged and torn, there are no serious obstacles to constructing railroads through it, because the gaps make it possible to build a railroad with only a few tunnels. In Lawrence county there are already several railroads passing through this sort of country.

Besides Blaine creek, Bear creek, in the northern part of the county, carries some water to Big Sandy river. East Fork, an affluent of Little Sandy creek, which rises in Lawrence county, carries its water to Little Sandy creek, a small river which flows into the Ohio at Greenup, in Greenup county.

My work did not extend as far as the other streams which flow into Big Sandy river above Louisa; I cannot, therefore, report anything of them.

Towards the end of November bad weather made its appearance and I suspended field operations. The field notes were then utilized, and a map of the surveyed district made. This map was drawn on the scale of five eighths of an inch to a mile, in order to agree with the map constructed by a previous Geological Survey.