

**THE RESOURCES OF THE COAL  
FIELD OF THE UPPER  
KANAWHA, WITH A SKETCH  
OF THE IRON BELT OF VIRGINIA**

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The Resources of the Coal Field of the Upper Kanawha, with a Sketch of the Iron Belt of Virginia by M. F. Maury

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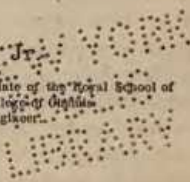
IRON BELT OF VIRGINIA,

SETTING FORTH SOME OF THEIR MARKETS AND  
MEANS OF DEVELOPMENT.

BY

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## GE O L O G Y.

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THE rocks of the Kanawha Coal Field consist entirely of the coal measures, containing all the varieties of coal (save anthracite) known, oftentimes equalling, and sometimes excelling, the most celebrated coals of other noted coal fields.

It is characterized by geological features of great simplicity. "The surface of the region is undulating. The loftiest hills rise in gently swelling outlines, no very prominent peaks towering, acute and ragged, to denote that the strata have been subjected to violent convulsive and upheaving forces. Everything bespeaks it to have been at one time an expanded plain, gently tilted from its horizontal position, so that its surface, and the beds of rocks beneath, decline with a very slight but uniform depression towards the northwest, to the valley of the Ohio.

"Its topographical features give evidence that its inequalities were caused by the furrowing action of a mighty and devastating rush of waters, which by rapid drainage scooped out numerous valleys and basins in the upper strata. It is from this deep excavation by natural causes, combined with the other important circumstance of a nearly horizontal position, that we are to draw our estimate of the prodigious resources of a mineral kind possessed by the region before us; for, whatever valuable material be inclosed in the strata, the horizontal position alluded to, keeps them near the surface, or at an accessible depth, over enormously wide spaces of country; while the trough-like structure of the valleys, and their great depth, exposes many of these deposits to the day under positions in which mining is the

Clark, Sept 21/1.

easiest imaginable, and with an extent of development not less accommodating to the researches of the geologist than to the wants of the community."\*

In his Annual Report on the Geology of Virginia for 1839, Professor Rogers divides the Kanawha coal measures into an Upper and Lower Series, the line between which is a very marked stratum of black, or bluish black, flinty rock, known as the "Black Flint Ledge," which accompanies all the subjacent strata in their various undulations, and is one of the great geological landmarks of the country.

Though both are rich in coal, the Lower Series, of which I propose treating, is by far the most so. As near as can be ascertained without actual measurement, its thickness is 950 feet. Near the Hawk's Nest, on New River, it forms the upper part of Gauley Mountains, the Black Flint Ledge being at their summits. Thence dipping to the northwest at an average rate of 100 feet† to the mile, it comes down to the level of the Kanawha, its lowest member resting upon the ledge of rocks which form the Falls of that stream. Thirty-nine (39) miles from here, following the water course, or about thirty (30) in a straight line, it sinks from view a mile below Charleston, at the Elk River Shoals.

In a formation only 950 feet thick, so great a prolongation of exposures, displaying the same division of the coal series throughout, could not have existed but for the fortunate occurrence of two broad undulations or axes, retaining the strata above the level of the river, when, by a continuation of the original northwest dip, they would have been carried entirely out of view within one-third of that distance.

These were first noticed and spoken of by Professor Rogers; being located as follows: "The first, or most easterly of these undulations, is seen to commence in the neighborhood of Hughes' Creek, the strata changing from their northwest

\* Geological Reconnoissance of Virginia (1836), by Professor William B. Rogers, State Geologist.

† Along the Kanawha it varies from 20 to 100 feet.

dip to the horizontal, and then rising as they extend west so as to present a southeast dip, which continues to the hill between Kelley's and Witcher's Creeks, where it is succeeded by a gentle inclination northwest, which in a short distance is followed by a restoration of the southeast dip. This latter continues to the Burning Spring, gradually elevating the strata so as to carry up the lower coal seams to some height in the hills, after which the counter dip to the northwest reappears and continues down the river to within two miles of the Ohio.' '\*

A resumé of what I have said is that: The Lower Series of the Kanawha Coal Measures, 950 feet thick, are formed within a belt about 36 or 37 miles wide, dip to the northwest at an angle of from 20 to 100 feet per mile, are kept above water level for this distance by two anticlinal curves, and stretch across the country in a northeast and southwest direction.

In 1853, Professor Austed, President of the Geological Society of London, made an examination of this coal basin. As so eminent an authority cannot but carry great weight in this connection, I deem it well to quote from his report, calling attention to the correspondence between his remarks and those of Professor Rogers.

"The rocks on each side of the Kanawha and its tributaries consist exclusively of the coal measures, which lie nearly horizontal, having a general dip towards the northwest of about 20 feet to the mile. \* \* \* \* Through-out the district there are no marks whatever of other disturbances than would result from the elevation of deposits, already split asunder by crevices produced by contraction during the first consolidation of the mass from the state of mud and soft sand. I nowhere saw, in any part of the coal field, the smallest indication of faulted ground, or a single slip or

\*Annual Report of the Geological Survey of Virginia for 1839, by Professor W. B. Rogers, State Geologist.



trouble that could interfere with coal working.\* \* \* There is in all a total thickness of upwards of 63 feet of workable coal in 14 seams† actually proven on the hillside, and above water level in some of the valleys. \* \* The seams are of variable thickness, occasionally affected by intervening masses of shale and grit, and it will be safe to estimate the total thickness at not less than 50 feet.‡ \* \* It will be observed that in speaking of coal, no notice has been taken of the depth at which other beds may be looked for below the water level. The fact is, that the large number of workable seams directly available above it renders it unnecessary to sink shafts at all; and a very long time must elapse before the cost of winning coals from dry levels will be so far raised, as to justify any other style of working. It is not necessary to remark here on the unusual facilities that will attend mining operations in this district, compared with similar work in most countries, or to dwell upon its peculiar advantages. The latter are chiefly in consequence of the vicinity of navigable streams and the existence of a large number of workable seams. The former arise from the absence of faults, the horizontality of the beds, the freedom of the coal from any troublesome liberation of dangerous gases, and the certainty that there can be no incidental expenses from incursions of water.”||

\*A more extended and intimate personal knowledge with this region, enables me to confirm this most fully.

†Professor Ansted evidently means that this is the aggregate thickness of the seams when they are measured from the floor to the roof, taking no account of the various partings that may be therein; otherwise, I am unable to explain what follows in his next few lines.

‡This estimate would give (taking the sp. gr. of coal at 1.3) 80,000 tons per acre, from which, if *one-fourth* is deducted for waste, &c., there would still be 60,000 tons per acre left; which, at 11 cents per bushel, \$3 per long ton of 28 bushels, (selling price at present in Charleston,) would be \$180,000 as the value of the obtainable coal in one acre of ground!

||A chapter on the Kanawha coal field from Scenery, Science and Art; or, The Note Book of a Geologist. 1854. Page 296. By Prof. D. T. Ansted, M. A.; F. G. S.; &c., &c.

It will be noticed that Professor Ansted speaks of seams below the water level. The Kanawha Coal Measures are underlaid by another coal formation, which I call the "New River Coal-field." It is over 1,000 feet thick, is not so rich in coal as the one above it, containing, so far as I am aware, only the soft bituminous coal. On New River, about twenty miles above its junction with Gauley, I have visited and examined three separate seams, and was informed of another below any that I saw, though still above water level, and, I think, another will be found above. The land on which they are, lies on the south side of New River near Dimmock Station on the Chesapeake and Ohio Railroad. My measurements were 5 feet 6 inches, 4 feet 6 inches, and 4 feet. This last showed simply in a slip on the mountain, but the person who owns it tells me that a year or so ago he cut down through the whole thickness, finding it to be 7 feet 1 inch, with 3 partings, which left 6 feet of clear coal. The other seams were all clear coal of a very soft but extremely rich and pure variety, and would have to be coked in every case for use in blast furnaces, as they are too tender to bear the weight of a charge.

The upper member of this series disappears below water level a very short distance below the Kanawha Falls, and is seen no more above the level of the river, and its coals will have to be gotten at by shafting.

Seeing that geology has made wonderful strides in the last twenty years, there may be in the minds of some a hesitancy in accepting, to the full extent, reports made in 1839 and 1853, even though by such high authorities as I have been quoting. But they are most amply confirmed by a report made by the Engineer Department of the United States to the Secretary of War, 8th February, 1871. I quote from page 49, Ex. Doc. No. 110, 3d Session 41st Congress.

"It is well known to geological men that the veins of bituminous coal which pervade the entire western slope of the Appalachian chain of mountains, have their maximum

aggregate thickness in the Kanawha Valley. From a late authentic work on the subject of Kanawha coals the following extract is made:

“The coal fields of the Kanawha region are superior to those of Great Britain or Pennsylvania. They are regarded by eminent gentlemen as *the finest deposit of coal in the world*. The quality of Kanawha cannel is equal to the best English; its bituminous is equal to the best found in Pennsylvania, and Kanawha splint, for smelting iron, is unsurpassed. The veins lie nearly horizontal, and vary from 3 feet to 15 feet in thickness, and the aggregate thickness of the various seams in some localities amounts to 40 and 50 feet of solid coal.”

Though the whole of the Kanawha Valley is remarkable for its coal deposits, there is one belt exceptionally so, seeming to constitute the heart of the coal field. Its limits have not yet been *clearly* defined, but it is *about* twenty miles wide, and Coalburg and Paint Creek lie on either side of its central line. Beginning in Clay County, it runs in a southwest direction, including portions of Nicholas, Fayette, Kanawha, Boone, Logan, &c., &c., counties. Within its limits, with the exception of the two mines now in operation on Campbell's Creek, and those which were on Falling Rock and Mill Creeks, are to be found all the mines, so far as I am aware, that are, or have been, worked on any considerable scale in the Lower Series of these measures. It is in it that lie the valuable Cannelton Coal Mines, the Old Dominion Mines, those up Paint Creek and at Coalburg, the Sebastopol seam, the Winifrede Coal Company's Mines, those at Peytona on Coal River, &c., &c.

It is generally believed in the Valley that as we recede from the Kanawha towards the heads of the many creeks which flow into it from each side, the seams become thicker. I have personally noticed this up Paint and Campbell's Creeks, and on Gauley River, 8 or 9 miles from its mouth. But more openings and extended observations will have to be made to enable