

WEST VIRGINIA'S
Resources and Development.

AN ARTICLE BY
GOVERNOR A. B. FLEMING,

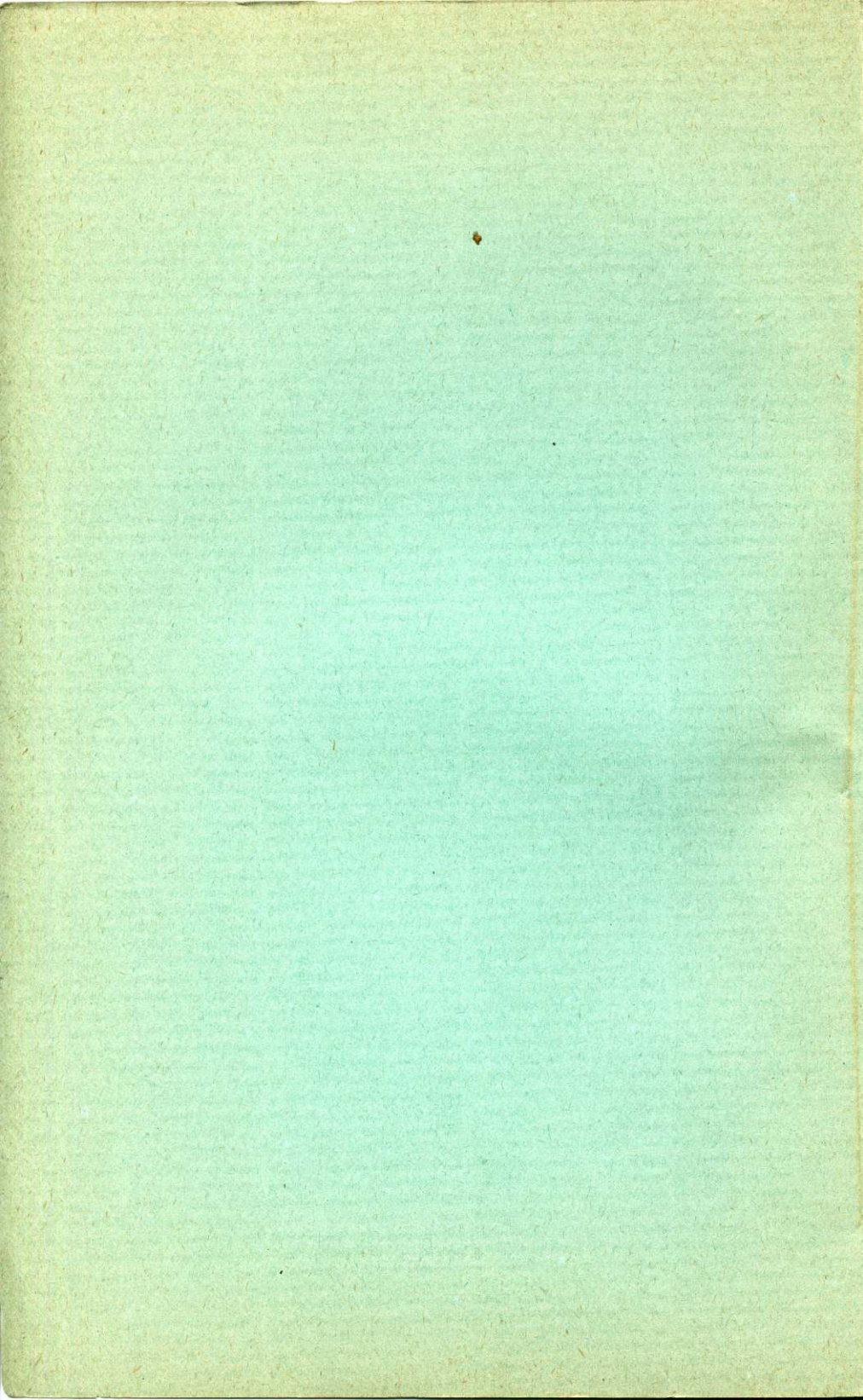
RE PRINTED FROM
THE MANUFACTURERS' RECORD

BY DIRECTION OF THE
WEST VIRGINIA LEGISLATURE.

JANUARY, 1891.



CHARLESTON :
MOSES W. DONNALLY, PUBLIC PRINTER.
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THIS pamphlet is published pursuant to the following joint resolution of the Legislature, adopted January 17, 1891:

Resolved, That the Clerk of the House be directed to have 3,000 copies of Governor Fleming's letter to the Manufacturers' Record, describing the natural resources of this State, printed and that twelve copies be furnished each of the members of the Legislature, and that the remainder be placed in the hands of the Secretary of State, for distribution.

WEST VIRGINIA'S
Resources and Development.

(Manufacturer's Record, Jan'y 3, 1891.)

EXECUTIVE OFFICE, CHARLESTON, W. VA., Dec. 24, 1890.

Editors Manufacturers' Record:

Until within the past few years little was known by the outside world of the marvelous natural resources of West Virginia. The great avenues of commerce and travel lay along the northern and southern borders of the triangular-shaped State, and population and trade swept heedlessly by, unaware of the capabilities of her soil, the extent and value of her forests or the inexhaustible wealth of her vast mineral deposits.

While this is not now true to the extent it was a score of years ago, while capital and industry have recently penetrated even to the heart of the State and are now developing her hidden riches with tremendous energy, the vast possibilities of the State are as yet scarcely realized, her richest mineral regions are practically unexplored, her great stores of iron and coal are comparatively untouched, and of the 16,640,000 acres of land in the State, probably 8,000,000 acres are still in the original forest. This in a State whose eastern border is only 81 miles by rail from Baltimore, 179 miles from Philadelphia, 286 from New York; whose western border is 7 hours distant from Cincinnati, 14 hours from Chicago, and whose products can be put into Cincinnati in 20 hours by river, Pittsburg in 30 hours, New Orleans in 5 days.

It would, in truth, be impossible to exaggreate the unequalled opportunities which West Virginia presents, therefore, to capital and every kind of manufacturing and commercial enterprise. I

would emphasize this fact. No other State in the Union, in my judgment, possesses to-day such cheap and abundant raw materials or offers such conspicuous opportunities for safe and profitable investment of capital.

I cannot, in the limited time at my disposal for the task, give more than a general view of the present development and material advancement of the State and touch upon some of her chief sources of wealth, present and prospective.

Below I give in tabulated form such data as I have at hand bearing directly upon the growth of the State in the past decade, and which clearly evidence the remarkable progress made. The figures relating to population and wealth are taken from United States census reports; those relating to tax values and railroad mileage are from State reports. Not having before me the census reports of 1880 touching farm animals and farm products, the statistics under that head show a comparison between 1870 and 1888, the first as reported in the ninth census, the latter as given by the Secretary of Agriculture in his report of last year.

POPULATION, RAILROAD MILEAGE, ASSESSED PROPERTY AND TRUE WEALTH.

	1880	1890.	Increase. per ct.
Population.....	618,000	762,794	23½
Assessed value of property.....	\$147,011,740	\$187,165,344	27½ ^a
Wealth, true value.....	307,000,000	*462,000,000	30
Railroad mileage.....	691	1,343	95

*Estimated.

FARM ANIMALS AND FARM PRODUCTS.

	1870.	1890.	Increase.
Horses.....	90,479	146,667	} 33 ½ ct.
Mules.....	2,130	6,867	
Cows.....	104,434	179,979	} 33 ½ ct.
Oxen and other cattle.....	197,246	286,538	
Sheep.....	554,327	508,654	} 65 ½ ct.
Hogs.....	268,031	486,226	
Corn, bushels.....	8,197,865	16,149,000	} 65 ½ ct.
Wheat, bushels.....	2,483,543	2,899,000	
Oats, bushels.....	2,413,489	2,495,000	} 77 ½ ct.
Potatoes, bushels.....	1,053,507	1,849,000	
Hay, tons.....	224,154	397,345	} 120 ½ ct.
Tobacco, pounds.....	2,046,452	4,496,000	

RAILROADS.

It is of interest to note the increase in railroad mileage within the last ten years as shown above, and to briefly consider the tremendous momentum which this must give to the State's progress during the next decade. The figures mean more than a mere doubling of West Virginia's transportation facilities. The mileage of 1880 was made up almost wholly of the Baltimore & Ohio and the Chesapeake & Ohio railroads—the first an east and west line running along the extreme northern border of the State; the latter an east and west line traversing the southern border. The policy of both roads was to handle through business at the expense of local traffic, a policy which each has since wisely abandoned under new management.

The newly built railroads are chiefly cross lines penetrating the interior of the State, and constructed primarily to reach and throw open to capital those sections of the State particularly rich in coal and iron deposits and varied agricultural capabilities. The traffic developed by these roads within a year or two is often surprising. The coal and coke shipments, for instance, over the West Virginia Central railroad since the beginning of the present year alone aggregate in excess of 1,100,000 tons; the Monongahela River railroad (a part of the Camden system), which was put in operation only last Spring, in its movement of coal and coke from two collieries near Fairmont, averages 100 cars daily, besides having a general freight and passenger traffic far exceeding the expectations of its projectors.

The development of our railroad interest is still going on with increased activity and in the same general direction. Before the close of another twelvemonth the Norfolk & Western will have pushed its New River division through a virgin territory to the Ohio river, practically placing the famous Elkhorn coal region 500 miles nearer the markets of Chicago and the Northwest. Senator Camden is rapidly extending from Fairmont the lines of his railroad system through a rich belt of country toward the south and will soon tap the Chesapeake & Ohio railroad. Senator Davis and his associates are extending the West Virginia Central as rapidly as possible south toward the iron fields of the State, and north through the great coal beds of the Monongahela river to a connection with the Pennsylvania Railroad system at the State line. The impetus which these lines building and the new roads constructed will give to the growth and material advancement of the State is incomputable.

COAL AND COKE PRODUCTION.

Perhaps the industry that will be most advanced is that of coal and coke production. Rapid as has been the expansion of this industry in West Virginia, it is manifestly but in its incipiency. The great Appalachian coal measures are known to embrace the entire State, with the exception of the lower Potomac counties. One-thirteenth of the aggregate coal area of the country is contained within the borders of West Virginia, and taking into account the greater thickness of her workable seams the State easily outranks all others in the extent and value of her coal beds. Her coal area is computed at 16,000 square miles. A great portion of it is easily and cheaply mined, all of it is of the highest grade of excellence, much of it lies in close proximity to vast deposits of iron ore and limestone, and is admirably located in point of accessibility to the best markets.

In 1880 the State produced 1,568,000 short tons of coal, ranking seventh among the coal-producing States of the Union—Pennsylvania, Illinois, Ohio, Maryland, Missouri and Iowa having each in the order named a larger production. In 1889 she produced 4,726,047 long tons of coal and 665,193 tons of coke, advancing to

fourth rank in coal production and second in production of coke. From the official report for 1890 of Mine Inspector Spruce, of the second district, just received, I may safely estimate the State's output of coal in 1890 at 5,359,000 long tons and the coke production at 1,000,000 tons. If the report from the first district of the State shall verify this estimate, the increase in West Virginia's coal production during the current year will be over 13 per cent., and in coke production over 68 per cent. Comparing the output of 1880 with that of 1890 shows an increase of 285 per cent., or an average annual increase of 28½ per cent.

While this ratio of increase exceeds that of any other coal-producing State, a combination of peculiar advantages and high merit in favor of West Virginia coals must bring about a much more rapid increase in the production during the next five years. There is, indeed, at this time unprecedented activity in the coal-mining industry. Within the year the Monongah Coal & Coke Co., which owns large bodies of coal between Fairmont and Clarksburg, has opened mines in the vicinity of Fairmont at two points, with an output daily capacity approximating 2,000 tons and is constructing a plant of 500 coke ovens. Several other large operators—Pennsylvanians who recognize a superior quality of coal when they see it—purchased a large boundary of coal in the same field a few months ago, and will open mines on an extensive scale. The Davis syndicate has also recently purchased and will operate two extensive tracts of coal there. The vein operated is the Pittsburgh seam, 9 feet thick, the one persistent and important seam of our coal series. The coal is unequaled as a gas coal, and the coke product sells readily in the markets in competition with the famous Connellsville coke. The U. S. Geological Report contains the following comparative analyses of these two cokes, pages 379-428:

	Fixed carbon.	Ash.	Sulphur.	Authority.
Connellsville—Bradford mines.....	80.576	9.113	0.821	A. S. McCreath.
Fairmont—Montana mines.....	91.85	6.820	0.480	D. T. Day.

In the Kanawha and New River district, with a large area of undeveloped coal field, the demand for coal continues to exceed the output, notwithstanding the rapid increase in the production, hence we may look for greater percentages of increase every year. By reason of cheap river transportation the markets of the great Ohio and Mississippi valleys are open beyond any controlling competition to the Kanawha coal trade, while over the Chesapeake & Ohio railroad it has access to the tidewater wharfs at Newport News, distant only say 365 to 398 miles. The Kanawha and New River coals exceed the Pittsburgh, Youghiogeny and Hocking Valley coals in per cent. of fixed carbon, have a less per cent. of ash and sulphur, and are quite as rich in volatile matter. They are second to none in the world as steam raisers. New River coke gives off an intense heat, leaving only a nominal quantity of ash, and its excellence is freely admitted and commands for it the best prices in the market.

But perhaps the most notable developement in this State is taking place in the Pocahontas and Elkhorn district. This field, extending from Webster and Nicholas counties in this State to Tazewell and Russell counties in Virginia, is opened up by the extension of the Norfolk & Western railroad. It was only in 1883 that shipments began, but last year the output had already reached 1,592,435 tons of coal and 253,170 tons of coke. This growth is phenomenal. That it will continue, if not indeed increase, is beyond doubt. The coal is of superior quality and thickness. The Norfolk & Western, as stated above, will complete its road to the Ohio river during the next year, giving to this district, rich in timber as well as coal, a direct western outlet that will stimulate its operations to a wonderful degree.

As illustrative of the remarkable coal deposits found in this State, I may refer to a conspicuous development on Pond Fork of Little Coal river, in Boone county. There may be seen no less than ten seams of coal, ranging from 2 feet 7 inches to 12 feet in thickness, and aggregating 68 feet 11 inches of coal from top to bottom. One vein is pure cannel coal 42 inches thick, overlaid with 34 inches of splint.

By way of a hint to foreign investors, I may mention that undeveloped areas of coal of the best quality and of good workable seams are still buyable in interior counties at from \$10 to \$20 an acre, surface and all, and timbered at that! Thousands of acres of coal, too, lying immediately on the line of the Baltimore & Ohio, in character, quality and thickness the same as the Connellville coal, can be purchased at from \$25 to \$40 per acre.

THE IRON ORES OF THE STATE.

There has been comparatively no development of the iron ores of West Virginia. A few small blast furnaces have worked the native ores which belong to and are found in the coal measures in the northern part of the State, but lack of cheap transportation facilities at the time caused the abandonment of these enterprises, and but little attention has since been paid to our iron ore deposits. The furnace at Irondale, in Preston county, is, I believe, the only one remaining in operation. It has for many years successfully worked a seam of ore 16 to 20 inches thick, and the plant has lately been improved and its capacity increased. The rapid development of our coals, however, and the extension of our railroads into the interior of the State, will certainly excite a more active inquiry into the extent and value of our iron ores. The present knowledge concerning them may be presented by a brief mention of the varieties of ore found, grouping them under the heads of carbonates and oxides.

Carbonates, more or less oxidized by exposure, extend across the entire State from and including Preston county to Big Sandy river, the Kentucky State line. They are found in many forms—kidney, nodular, beds of different colors, from greenish gray to black of

the black band; of varying thickness, from 6 inches to 6 feet, and yielding from 30 to 40 per cent. of iron of high grade, especially when made with charcoal or high grade coke. These carbonates, particularly the limestone ore, can be mixed to great advantage with the oxides. Elk river and sixty miles of the Great Kanawha may be said to divide the State into two nearly equal parts, and among iron men it is well known that the valley of Elk from head to mouth, a distance of 190 miles as the river runs, has almost throughout its whole length carbonates in workable beds of high quality, including some valuable beds of black band ore. No iron in the market, I may add, was in better demand or commanded a higher price than the iron made a few years ago at the Savage furnace, in Braxton county.

In considering the oxides, however, we come to what may be properly styled the Iron Region of West Virginia. Beginning at Harper's Ferry and running with the Virginia line to Tazewell, through the West Virginia counties of Jefferson, Berkeley, Morgan, Hampshire, Hardy, Grant, Pendleton, Pocahontas, Greenbrier, Monroe and Mercer, we find the true Eastern oxides—red and brown hematite ores in large and persistent veins or beds, and inclining at a good angle for mining. Through Hampshire, Hardy and Pendleton both kinds are abundant—the red ore of more than ordinary quality and quantity. This is generally called the Clinton ore (red fossil and red shale), and is identical with the great ore bed of the Red Mountain District, Birmingham, Ala. There runs from Greenbank, in Pocahontas county, to Anthony's creek, in Greenbrier county, 10 miles northeast of White Sulphur, a mountain some 40 miles long, which we may collectively call the "Beaver Lick." This mountain has throughout its whole length fine veins of red fossil and red shale, and, intermittingly, pipe ore. These red ores are understood to be equal in quality and quantity to the red ores of East Tennessee. It is claimed also by those who ought to know that the brown hematite ore is found in very thick beds in this mountain.

Of the extraordinary value of this ore field there is now most conclusive evidence, and it is likely at no distant day to be penetrated by both the Camden and Davis railroad systems, bringing the New River coking coal, only twenty miles away, into the region, when these ores will be most keenly sought after. The lower Helderburg limestone, used so much as a flux, is found in this mountain everywhere.

The brown hematite ore extends through the eastern part of Monroe county. Some half dozen chemists of character and reputation have analyzed it, and while not proving a Bessemer ore, it is the very thing for the basic process, with the magnesian limestone right at hand. Two tons of this ore will make a ton of iron in everyday furnace work year in and year out. As to quantity, I have it at first hand from those who have been on the ground, that it lies in continuous beds and outcrops from 20 to 50 feet thick. In East River mountain, the line between Mercer and Giles counties, thick beds

of this brown ore are found, being, in fact, but a continuation of Peter's mountain, southwest of New river.

The manufacture of iron has as yet received little attention, because until quite recently the extent of our resources and the favorable conditions have not been generally understood. West Virginia is destined in the near future to take high rank as a producer of pig iron. Indeed, I have the best authority—the report of an English expert of known character and ability, who has made a report for an English syndicate who contemplate making large investments—for stating that pig iron can be made in the northeastern part of the State for \$7 a ton, which is the lowest point yet reached in the cost of production. Even this remarkable statement does not show the full measure of advantage enjoyed by this portion of the State, because the product of the furnaces and mills will be so near to the great markets and to tidewater that the item of transportation will be insignificant. Many large enterprises have lately been organized to utilize these extraordinary advantages, notably a company to build an industrial town, based on iron and steel production, at Shenandoah Junction. The same conditions have led to the organization of a company at Charlestown, and other similar enterprises are reported in various stages of progress.

THE OIL PRODUCTION.

Rich as is West Virginia in coal, iron and timber, the past two years have demonstrated that she is no less rich in deposits of petroleum oil. There are now three well-defined producing fields along parallel lines having a general northeast and southwest direction, and the activity of the operators, the millions of capital already invested, the extent and character of the territory make the State the chief rival of Pennsylvania as the source of the future oil supply of the country.

The newer developments embrace the Eureka and Belmont field in Pleasants county, and the Mannington and Doll's Run field in Marion and Monongalia counties, respectively. The two last named are an extension of the Mt. Morris (Pa.) field. The source of production is the "Big Injun" sand rock, found at a depth of about 1,900 feet. The first important well in the Mannington pool was struck early last spring, since which time over 40 producing wells have been brought in, yielding a monthly production of over 60,000 barrels. The development is going on at the same rapid rate. The oil is a good grade of light premium, commanding 20 cents per barrel above quoted market prices. The amount of capital now invested in the industry at Mannington is estimated to be little short of \$1,500,000. The "Big Injun" oil line is supposed to extend south to below the Kanawha river. Test wells have been drilled and are drilling along this belt of territory with more or less favorable results.

The Belmont and Eureka district in Pleasants county derives its oil from the Berea grit, an extremely rich sand, at a depth of about 1,200 feet, though a good grade of "heavy" oil is also found in limited quantities in the shallow sands. In this field the development

has been even more rapid than in the Mannington region, and the production much greater. The average cost of the wells is \$3,000, and the average yield is unusually good, many of the wells coming in with a flow of from 500 to 1,000 barrels per day. The head wells in this field are now as far north as the town of St. Mary's. I am unable to report the production of this district. It probably exceeds several times that of the Mannington field.

A very important development is that in the horizon of the well-known Gordon sand along a line extending southwest from the Little Washington and Ninevah pools in Pennsylvania through Wetzel and other counties in this State. Experienced oil men predict that this will be the great oil field of the future. The first producing well in this sand within the State was brought in a month or more ago near Littleton, Wetzel county. It is variously reported at from 300 to 600 barrels. A rapid development may be expected to follow, and if the prolific character of the Gordon sand rock is maintained, an enormous production from the new field may safely be anticipated.

WHAT WEST VIRGINIANS ARE DOING.

Let it not be assumed that West Virginians are awaiting in idleness the influx of foreign capital and enterprise to develop the immense natural resources I have attempted to describe, nor that the State has made no considerable progress in that direction, and is in many respects what might in popular phrase be styled "a back number." The industrial channels into which they could direct their energies are so many that they have found it impossible to occupy all, but they are leading in every enterprise of magnitude. They have brought to a condition of fine cultivation a great portion of the State, built railroads, cities and towns, established manufactures, created a splendid system of schools, erected creditable public buildings and have kept out of debt. The State tax rate has averaged but a fraction over 30 cents on the \$100 valuation since the birth of the State, and in the past year (1890) the sum of \$1,293,164.98, realized from State and local school levies and the invested school fund, was disbursed to the public or free schools.

I have mainly confined this article to the natural advantages and resources of the State, and have omitted to refer to her prosperous manufacturing industries, intending to make them the basis of a future article. Our steel, iron, nail, glass, pottery, fire-brick and tiling, salt, tanning and brewing interests are extensive and have increased with surprising rapidity in the past ten years. The city of Wheeling is a center of the iron trade, and the largest nail market in the world. Nearly all of the large and prosperous towns in the State have their electrical plants, street railways and daily newspapers.

The State in every quarter is wonderfully prosperous, and to the attractions of its varied treasures of forest and mine its people add a cordial welcome to all who may come to aid in their development.

A. B. FLEMING.



