

COAL RESOURCES OF SOUTHERN ILLINOIS
COUNTIES JUST NORTH OF THE OZARK
OUTLIER

W. G. LATHROP, JOHNSTON CITY

The Illinois coal field is a spoon-shaped basin with the Duquoin anticline at the west edge, the LaSalle anticline at the east edge, and the Ozark uplift at the south. From the foothills of the Ozarks and from the Duquoin anticline where the beds appear at the surface, the coal seams deepen to the east and north at the rate of from forty to sixty feet per mile, reaching their maximum depth of 1200 feet in White County or vicinity. It is the coal resources of the southern counties of this basin that I desire to discuss in this paper.

The coal beds of the state are all found in the Pennsylvania series of the carboniferous system and are numbered from one to seven upward from the bottom. The producing beds included in this discussion are number two, or Murphysboro, number five, or Harrisburg, and number six or Herrin. Seam number six, known as the "blueband" coal, is the greatest single producing seam in the state, having an average thickness of nine feet, five inches. Coal number five lies about twenty-five feet below the number six, and has an average thickness of four and one-third feet. Vein number two varies in thickness from one to six feet.⁽¹⁾

COMPARATIVE PRODUCTION

The bituminous coal field of Illinois underlies three-fourths of the state. Eighty-five counties share in the wealth of this, the greatest of bituminous fields. It was estimated by the State Geological Survey in 1907 that the original deposits in Illinois amounted to 136,966,000,000 tons. At that time the Survey estimated that 645,868,309 tons had been mined. Based upon an average of 62% recovery in mining, there had been mined and wasted in 1907 about 891,000,000 tons.⁽²⁾ Since 1907 there have been mined and wasted 677,747,615 tons of coal in Illinois fields.⁽³⁾ This gives a total of 2,205,858,000 tons of coal

mined and wasted (based upon 62% recovery) in Illinois up to 1919. This is a little over 1.6% of our original deposits, leaving a reserve of nearly 135,000,000,000 tons at the beginning of 1919.

In 1918 Illinois produced 89,291,105 tons of coal, more than 15.4% of the total bituminous production of the United States for this year.

The leading counties entering into production in this part of the state, in order of production, are Franklin, Williamson, Saline, Perry, and Jackson. In 1918 Franklin produced 12,373,356 tons, valued at \$29,224,580. This was almost 14% of all the coal mined in the state for that year. In the same year Champaign County, our greatest corn producer, produced corn valued at \$13,869,931, not quite half the value of the Franklin County Coal.⁽⁵⁾

Franklin and Williamson, our first and second coal counties, produced in 1918, 23,711,918 tons of coal (valued at \$55,363,559), over 26½% of the state production for this year. The five counties named above hoisted in 1918, 33,369,327 tons, 37.37% of the total hoist for the state. The value of this coal was \$77,992,252, and may be compared with the value of the corn produced by our five leading corn counties (Champaign, Fulton, McLean, Pike, and McDonough) for the same year. The value of the corn is \$60,632,678, the coal leading by more than \$17,000,000.

MINING

The coal of these five counties is produced by 181 mines, including 54 local mines, 17½% of all the mines of the state, employing 36,736 men, 38.3% of the miners of the state who in 1918 averaged over 1307 tons of coal per man. Practically all the coal is mined from shaft mines, though strip and slope mines are common near Marion and Carterville on the south, and Duquoin on the west where the Ozark foothills and the Duquoin anticline bring the coal-bearing strata near the surface. Many acres at the south edge of the basin have had the coal removed by the strip mine method. Near Carterville, it is reported that by modern steam shovel methods it is profitable to remove as much as 30 feet overburden.

Stripping unfits the land for any agricultural purposes except pasturing. The surface is left in a very uneven condition and erosion attacks it readily.

MARKETS

Illinois consumes more than 50% of her own production of coal. Chicago consumes about 14%, and St. Louis and East St. Louis use about 10%. Because of competition of eastern coals, practically no Illinois coal goes eastward, although some has reached northeastern markets in recent years. No coal goes south, and the region north of the lakes is supplied by the lake traffic with eastern coal. Our best outside markets are to the northwest, to the Minneapolis and St. Paul region. Competition between Illinois coals and those of eastern states favors the outside coals because of the better quality of the coal, cheaper labor and cheaper transportation where this is done by streams and lakes.

EFFICIENCY AND CONSERVATION

More than 98% of our vast coal resources is still beneath the surface. Using the production of 1918 as a basis, and calculating on a recovery of 50%, which I believe to be more nearly correct, there are being mined and wasted about 175,000,000 tons of Illinois coal per year. There is no evidence that the rate of removal will not increase for some years to come. On the 1918 basis of removal, the coal deposits of Illinois will be exhausted in 800 years. Operators near Johnston City and Herrin think this part of the field will be active for a period of 50 years from the present date. Of course other areas less accessible will come into prominence as the more favorably located deposits are exhausted. But is 50 years a sufficient look into the future? Is 800 years to be considered as the limit of time during which we should expect to use coal? Should we not begin now to consider more efficient uses of our coal supply in order that its life may be lengthened?

In order to do this we should begin at once to get at the root of the evils. Wastes due to mining operations,

such as mining lower veins first and leaving 50% of the coal underground, should be given up. Practice of better uses of coal should be encouraged. Smoking chimneys which waste millions of tons of coal annually should be eliminated. Engines securing a higher efficiency from coal fired should be put into use. The mechanical stoker has aided greatly in correcting the last mentioned evil. The Central Illinois Public Service Company, whose plant is located at Harrisburg, Illinois, reports through Supt. Cook of Marion, Illinois, that with stoker firing and tubular boilers, it is possible to get a kilowatt hour of electricity from each 2.75 lbs. of coal fired. The hand firing process requires 4.75 lbs. This is a saving of about 42% of coal formerly used by this company.

The Illinois Traction system, also, reports that with the Curtis and Parson turbines and with Corliss engine generators they are able to get equally good results. But the average for this company is 5.5 lbs. per kilowatt hour, on an average production of 543,450 kilowatts per day. This shows that a vast saving can be effected through the use of better machinery.

Mr. Hight, chief engineer for the Illinois Traction System, says, "The most efficient means of decreasing coal consumption is by learning more completely how the coal may be fired. A greater knowledge of the use of coal and the method of firing it and handling it will be most important steps toward efficient use of coal and a greater saving and lower consumption of it."

Coking of the coal and the substitution of gas engines for steam engines mean a great extension of the life of our coal deposits. As late as 1917 Illinois coal was classed as non-coking coal of high sulphur content. It was also mentioned that investigations along the lines of coking Illinois coals were at that time preliminary and that even small improvements might be expected at any time which would revolutionize our uses of bituminous coal⁽⁶⁾.

These words read almost like prophecy, for at this time, only five years later, 100% Illinois coals and mixtures of high percentage of Illinois coals are being coked successfully. Plants at Duquoin and Centralia, while

small, are using 100% No. 2 coal. These companies get 1200 lbs. of coke and 10,000 cu. ft. of gas per ton of coal coked.

The St. Louis Coke and Chemical Co. at Granite City are coking a mixture of 90% No. 6 coal and 10% Pocahontas. This Company uses the Roberts type of coke oven, mentioned so favorably in the Iron age for March 2 and 9, 1922. They coke 1400 tons of coal per day with a recovery of 68.14% of the coal charged. As by-products they obtain 10,840 cu. ft. of gas, 9 gallons of tar, 27 lbs. of ammonium sulphate, and 3½ gallons of light oil per ton of coal. This company gets only 25c per thousand for its gas, while the gas companies at Duquoin and Centralia get \$1.85 per thousand. The coke brings \$7.50 per ton, a little more than the coke of the other cities mentioned. Coke is the equivalent of the same number of pounds of anthracite. It is cleaner and more economical than raw coal. That produced at Granite City is used for zinc and lead smelting, blast furnaces, water gas, and household purposes.

Mr. Farrar, of the Southern Illinois Gas Company at Murphysboro, thinks most of the gas plants of the state would use Illinois coal immediately if the State Utility Commission would reduce the standard from 565 B. T. U. to 500 B. T. U. per cubic foot, since with straight Illinois coal it is difficult to get a gas of the required standard. The gas companies, he thinks, would then create a market for their gas-house coke through the education of the people to its advantages.

This seems to be the road to true efficiency and conservation. The coal should be coked near the mines, and can be sold for use in bakeries, smelting, blast furnaces, household uses, and perhaps for firing railroad engines.⁽⁷⁾ The gas produced can be sold to surrounding cities for fuel, and used on the spot in gas engines to generate electricity, for light and power. Electric energy may also be used to transport the coke to places of consumption through the use of the electrified railway, since transmission is now possible over a distance of 500 miles with slight loss. The Illinois Traction System reports a line 450 miles long in operation. Coking by means of the

by-products oven also makes available for utilization vast quantities of by-products.

I have tried in this small way to discuss a slight portion of the most important resource which nature has left us. It is ours to use, not to abuse; to consume, not waste. Let us accept it as our treasure, use it as our friend and ally, and in turn pass it on to those who are to follow us with as little impairment as possible.

REFERENCES.

1. Shaw, E. W., and Savage, T. E., U. S. G. S. Folio, No. 185, p. 7.
2. DeWolf, F. W., Ill. State Geol. Survey, Bul. No. 14. Yearbook 1908, p. 189.
3. Leshner, C. E., U. S. G. S. Mineral Resources of the United States, 1918, Part 2, Nonmetals p. 748.
DeWolf, F. W., Ill. State Geol. Survey, Bul. 33, 1916, pp. 38, 39.
4. Leshner, C. E., U. S. G. S. Mineral Resources of the United States, 1918, Part 2, Nonmetals, p. 708.
5. Ibid. pp. 747, 748.
6. Ovitz, F. K., Dept. of Interior, Bul. 138, "Coking of Illinois Coals," p. 21.
7. Ibid, p. 38.