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Ohio Mining Journal

Title: The Coal Fields of Texas

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Issue Date: Nov-1890

Citation: Ohio Mining Journal, no. 19 (November, 1890), 98-104a.

URI: <http://hdl.handle.net/1811/32591>

Appears in Collections: [Ohio Mining Journal: Whole no. 19 \(November, 1890\)](#)

The Coal Fields of Texas.

“The Geological and Mineralogical Survey of Texas,” was organized the latter part of September, 1888. Through this source and geological work done for private parties and companies, prospecting by drilling and digging and some actual coal mining, considerable knowledge of Texas coal fields has been gained.

But that there still remains much more to be learned on this subject than what is at this time known, will hardly be denied by those who may be familiar with all the facts, and who also know what labor is generally required to gain even a reasonably full knowledge of such subjects. The State Survey has been organized and at work but a short time, and its labors have been spread over the entire State. A territory almost exactly seven times as large as Ohio; the geologizing and prospecting for and by private parties and companies, like all such work everywhere, has been done by different parties, at different times and in different sections, and not orderly, systematically nor connectedly; and furthermore the knowledge thus obtained is regarded and treated (and rightfully too,) as it generally is elsewhere, as the private property of those who pay for it; the actual mining done has been so very limited; these are the

reasons that lead me to the conclusions I have reached, as to the relative amount of information now had and still to be had, of the Texas coal fields.

"The First Report of Progress" of the State Survey, was published last year, and embraced only the work done by it for the first two months after its organization. This report says, "There are in Texas, three distinct Coal Fields—the Central or Bituminous, the Neuces or Semi-Bituminous and the Lignitic." Of the Central or Bituminous field the report says, "It is a continuation of the Missourian or fourth coal basin of the United States, of which it is the southern extremity." Its approximate boundary is defined, and it covers in whole or in part, twenty-five counties, with an area of not less than twelve thousand square miles. Prof. W. F. Cummins, Geologist for Northern Texas under the State survey, and whose field of labor covered a large part of the Bituminous field, shows the thickness of the formation to be not less than 2,000 feet, with at least 9 seams of coal (and possibly others) ranging in thickness from 2 to 36 inches; of which, two at least, (Nos. 1 and 7) and probably three, are workable. Prof. Charles Ashburner made a partial examination of these coals in 1879, but saw no coal stratum lower than that found $4\frac{1}{2}$ miles north-west of Crystal Falls, in Stephens County, which he named the Brazos Coal Bed. Prof. Ashburner says, "The coal strata proper are 85 feet thick, and are included between an upper sandstone and conglomerate, and a lower gray limestone. The coal strata contains two beds of workable thickness; the upper, named Belknap, ranges from $2\frac{1}{2}$ to 4 feet, and the lower, named Brazos, from 4 to 6 feet in thickness. The coals are high in ash and sulphur, but they have never been thoroughly tested. The Brazos bed underlies a great area, and will, no doubt, prove to be a valuable commercial coal in some localities." Chief Geologist Dumble, thinks it possible that these two seams may be still higher than those reached by Prof. Cummins, or that they may belong to his (Cummins) No. 7 and 8.

The dip of the strata is north-westerly; Prof. Cummins says it is north-west, 30 feet per mile; my own investigations about Strawn, in the south-west corner of Palo Pinto County, and in the western part of Parker County, (the two localities being from 30 to 35 miles apart,) make the dip considerably greater, at least two to three times that given by Prof. Cummins. I expect to determine soon, by the use of transit, chain and level, more accurately, both the direction and amount of dip, in the western part of Parker County at least, in which locality, I might add, all the exposed strata show very

great regularity and persistency in dip, indicating to my mind, that normal conditions prevail there.

The amount of coal mining heretofore done in the Central Field has been, and is yet, quite limited. Prof. Cummins names only eight different places worthy of mention; and of these eight different places, three, and probably four, are, and have been for some years, abandoned, and only three of the eight places ever reached that point that entitled them to be dignified with the name "coal mine." These three are, First:—the old Gordon mine, located about 3 miles north-east of Gordon, in Palo Pinto County, and about 70 miles west of Fort Worth, on the Texas and Pacific R. R., with which it was connected by a short spur track. Here there were two or three different drift openings; the mines were operated 3 or 4 years and a considerable quantity of coal was taken out, all, or about all of which, was taken by the Texas and Pacific R. R., (by and for whom the mines were operated as I understand,) for locomotive fuel.

These mines were shut down and abandoned a few years ago, for the reasons given me, that the miners were so contentious and troublesome, and the price paid for mining so great that fuel could be gotten from elsewhere with less trouble and annoyance, and for less money.

Second:—The Texas and Pacific Coal Co.'s mines, (successor to the Johnson Coal Mining Co.,) located about 4 miles south-west from Gordon, and just in the edge of Erath County. This Company own about 24,000 acres of land, have two mines, both shafts, over 61 feet deep and the other 74 feet deep, each very well equipped with hoisting machinery, and the balance of their plant is very good. They are connected by spur track with the Texas and Pacific R. R. They are now producing about 600 tons of coal per day, about all of which is taken by the Rio Grande Division, (from Fort Worth to El Paso,) of the Texas and Pacific R. R., for locomotive fuel.

Third:—The Palo Pinto Coal Co.'s mine, located upon the same spur track as the Texas and Pacific Coal Co.'s mines, but $2\frac{1}{2}$ to 3 miles farther on. This is a shaft opening also, but only about 45 to 50 feet deep. They have about 2,000 acres and a very fair, small plant, and are producing about 100 tons per day. The system of mining at the old Gordon mines, and also at the Texas and Pacific Coal Co.'s mines and the Palo Pinto Coal Co.'s mines, was and is longwall. The present prices paid are \$1.15 per ton when the floor is fire-clay, and \$1.40 per ton when the floor is sandstone; day wages \$1.75 to \$2.25 per day. The Texas and Pacific Coal Company and the Palo Pinto Coal Company, prepare their coal for market by

screening over $\frac{1}{2}$ inch to $\frac{3}{4}$ inch mesh screens. The other abandoned mines besides the old Gordon mine already mentioned, are the Lake mine and the Carson and Lewis mine, located only about $\frac{3}{4}$ mile apart, in the western part of Parker County, and about 46 miles west of Fort Worth, and just in the eastern margin of the bituminous field. They were opened up and operated about 1884, and considerable coal was taken from each place, but their equipment was very crude, their location 4 to 5 miles from railroad, over which distance their coal had to be wagoned, and the experience of the operators very limited, hence the result was a failure, and a shut down and abandonment of the mines. The Lake, Carson and Lewis, Gordon, Texas and Pacific and Palo Pinto Companies' mines are all placed by Prof. Cummins upon the same Geological horizon, viz., No. 1 seam, and in this I think he is correct. This seam when opened and operated at the above named places and mines, ranges from 18 to 30 inches thick, and has one persistent band of slate from $\frac{1}{2}$ to 1 inch in thickness. The roof is either slate or soapstone, and the floor is generally fire-clay, although in places the coal rests upon a sandstone floor. The State Report does not give any analysis of this coal, and the only published analysis I have ever seen of it, shows it to be pretty heavy in ash and sulphur, and corresponding very closely, in all the important elements, with the Leavenworth coal of Leavenworth, Kansas. Ten miles west of Decatur, in Wise County, a mine was opened up a few years ago by a mining company formed at Decatur for the purpose of prospecting and developing the coal at that place. They did considerable prospecting by sinking shafts and driving tunnels. The coal taken out was hauled to Decatur in wagons and sold to the citizens there for domestic and other purposes. Prof. Cummins thinks this is also seam No. 1, and reports it to be 30 inches thick and of good quality. He says the mine is still kept open and coal enough taken out to supply the local demand.

Four miles west of Bowie, in Montague County, is a mine; the seam is 36 inches thick with a clay parting 3 inches thick. The horizon of this seam is unsettled, but is believed to be above No. 1, and it is thought that further prospecting in this neighborhood will develop a good workable bed of coal.

What I have herein said of the Decatur and Bowie mines, is from Prof. Cummins' report on Northern Texas, as found in the "First Report of Progress." Prof. Cummins also reports considerable coal taken out at different times from coal seam No. 7, at various places at and near Cisco, on the Texas and Pacific R. R., about 115 miles west of Fort Worth, but does

not have much faith in this seam being of any value in this vicinity.

For what I may be able at this time to say of the other two Texas coal fields, I am indebted entirely to the State's "First Report of Progress," for I have neither personal knowledge nor other source of information concerning them at this time.

The Nueces or semi-bituminous field lies in the south western part of the State, bordering on Mexico. It has an area of not less than 3,700 square miles. Its northern boundary is not yet determined. It contains two workable seams of coal, and locally at least three. The upper seam (or middle one as I understand from the report, where the three seams exist) is 18 to 58 inches thick, with a 2 inch slate parting in the center and is being worked at San Thomas, the capacity of the mines being about 8 car loads per day. Mr. J. Owen, who had charge of the State survey in this section, says of this coal: "This coal does not belong to any of the other classes of coal found in the United States, that is so far as I know. It is a very firm, solid coal, and breaks with a glossy, conchoidal fracture, and is not easily pulverized. It is very clean and free from dust, and has the appearance of hardened asphaltum. It contains but few plant impressions, is remarkably free from sulphite of iron, burns with a vigorous bright flame and oily appearance, contains a considerable quantity of ash, but will not make clinkers if separated from the slate in the center of the stratum. It has some of the characteristics, but not the slaty fracture of Cannel coal. It has been unwittingly called lignite by some, but it has none of the characteristic features of lignite, and is much superior to it in quality. This ought to be a good gas coal, and for use in stoves and grates it is superior to the common variety of the bituminous. It will answer very well for making steam where the ash boxes are properly constructed and will make an excellent fuel for use in reverberatory smelting furnaces, but has not enough fixed carbon to be used in a blast furnace or for blacksmith work."

The lower seam in this field outcrops $4\frac{1}{2}$ feet thick at Eagle Pass, several miles north-west of San Thomas, and up the Rio Grande River. This outcrop shows along the Texas and Mexican sides of the Rio Grande River for a distance of ten miles. The abrupt inclination of the stratum at this place soon carries it below the surface, so that its eastern boundary could not be determined. The stratigraphical position of this seam is 600 to 700 feet below the Nueces or San Thomas seam. The only place where this coal is worked, is at the Hartz mines, at Eagle Pass, where it is mined quite extensively. Mr. Owen reports measuring the seam at 3 different places in the Hartz

mines; at one place he found 4 feet 6 inches of good coal without any slate parting; at another place 5 feet 4 inches with 3 divisions of slate aggregating 5 inches in thickness, and at the other place he found 7 feet 3 inches with 5 divisions of slate aggregating 5 inches in thickness. Of this coal, Mr. Owen says: "This is a good commercial article, and appears to be a very firm, hard coal. Albretite is also reported found in this field in some quantity. It is north-east of the San Thomas exposure and it is believed it will prove valuable. No analysis is given of the coals in this field.

The lignitic field is quite large, although its approximate area is not given. It includes in whole or part 54 counties. Four, and possibly five strata of lignite have been recognized, one of which attains a thickness in many places of 15 to 20 feet. The others vary in thickness from a few inches to 5 feet. The quality of the lignite is very variable, being in places good and clean and in other places containing a great deal of sulphuret of iron. Very little work has been done in this field because it has hitherto been regarded as of little or no value. Chief Geologist Dumble attributes this impression to two causes. First—the quality it possesses of rapidly crumbling and slaking when exposed to the air, and Second—because nearly all who have attempted to use it have done so without first studying its character and the best methods of burning it, and they have in most cases endeavored to use it under the same conditions which apply to a heavy bituminous coal containing little water. He asserts that in Europe, lignites of much poorer quality than the average of those of Texas, are successfully used for domestic purposes and for smelting, and further, that at San Antonio, Texas, where fire wood is somewhat scarce, and bituminous coal expensive, very satisfactory results have been secured in burning lignites by using grate bars close together. It contains from 15 per cent. to 20 per cent. of moisture, and varies considerably in chemical composition, containing 16 per cent. to 50 per cent. of volatile matter, 20 per cent. to almost 60 per cent. of fixed carbon, and 4 per cent. to 14 per cent. of ash.

The State survey seem to think the lignites may yet prove to be quite valuable, and are making efforts to determine their greatest utility—for what purposes and in what manner.

In conclusion I would say, that Texas is rapidly awakening to the importance of cheap fuel; her citizens are beginning to see in it the key to manufacturing, and that manufacturing means wealth, prosperity and happiness. King Cotton has already begun to abdicate, and ere long will have fully yielded his scepter and crown to its rightful owner—Coal.

This being the last paper on the list, the following resolution was adopted unanimously :

Resolved, That we extend our most sincere thanks to the Hon. Anthony Howells, our President, to Mr. Robert Bell and the people of Massillon for the excellent programme arranged, the provisions made for our comfort and the unbounded hospitality extended to the members of the Institute during our visit to their thriving and beautiful city.

After the adoption of the above resolution, the institute adjourned to a banquet prepared for them by the Citizens' Committee at Hotel Conrad. The menu was in perfect accord with the hospitable entertainment extended the members of the Institute and was all that the most fastidious epicure could have desired.

The banquet is best described by the *Massillon Daily Independent* below :

The Institute met for the last time at 9 o'clock in the Hotel Conrad dining room, where Manager Vincent provided good cheer, and the individual members the intellectual food. The more substantial feast was first removed and was in keeping with the event. There were two long tables bright with flowers, around them forty members of the institute and a few invited guests arranged themselves. Senator Howells sat at the head of the first table, Senator Zimmerman at his right, and Joseph Corns at his left. At the opposite end of the table was Chief Mine Inspector Haseltine, with the five assistant mine inspectors at his left. The toasts were as follows :

Massillon as it is and should be,	Joseph Corns.
The Ohio Mining Institute,	R. M. Haseltine.
Our Sister State,	W. A. Ballard.
The Ladies,	F. R. Shepley.
The Ohio Man as a Greaser,	Capt. J. L. Morris.
The Ohio Senate,	Senator Zimmerman.
Stark County,	Frank Willenberg.
Life of the Miner,	George Atherton.

Some of the shining lights expected could not come, but those who did speak felt in the mood, and the flow of soul was all that could be desired.

CRUMBS FROM THE BANQUET.

Senator Zimmerman said that when people selected business men for legislative work, the people got more practical sense than could be obtained by choosing all the lawyers in Ohio.

No senate, he continued, had more faithfully labored for the best interests of the people than the existing one.

Captain J. L. Morris dropped into poetry and described greaser mining life in rhyme.

The banquet was tendered by the coal operators and a number of business men of Massillon.

Frank Willenborg eulogized Massillon stone last night and gave even the oldest inhabitant some points as to its good qualities.

Postmaster Shepley made the greatest effort of his life, too. P. S.—It was his maiden speech, but he struggled through eloquently.

Mr. Corns said a good many fine things about Massillon in response to his toast and fixed the population ten years hence at something like 20,000.

Chief Haseltine thinks that if from nothing else, the Ohio Institute of Mining Engineers deserves a long life for having originated the school of mines, in connection with the Ohio State university. He himself had pushed through the first state appropriation for this purpose, and the school is doing finely, being the only one of its kind in the country. He hopes that in time Ohio will wake up to the possibilities of its university and make it the Ann Arbor of the State.

Senator Howells, who, as the toastmaster bubbled over with humor, caused a rosy flush to overmantle the Chief Mine Inspector and his five assistants, who all happened to be Republicans, by pointing to them as having been saved from the hands of the rippers. Lots of people, said the Senator, wanted them kicked out, but the Democratic Senators concluded that the mining department could be most effectively administered by being let alone and officers permitted to serve out their full terms to which appointed. Chief Haseltine, who is as good at repartee as anybody, led in the applause that followed Mr. Howell's effort.

