MINING IN IOWA

Iowa is widely known for its agricultural interests — its production of corn and cattle and hogs. But before this area was renowned as an agricultural region, it was widely known for its mineral resources. When Albert M. Lea wrote his *Notes on the Wisconsin Territory; Particularly with Reference to the Iowa District* in 1836, he mentioned bituminous coal, oxides and sulphurets of iron, limestone, sandstone, and fire-clay, but declared that the chief mineral wealth of the "Iowa District" was to be found in the lead mines near "DuBuque". In this Lea was only partially correct. Lead and zinc were at one time of widespread interest in Iowa but in later years coal, cement, clay, gypsum, limestone, sand, and gravel have been the more important mineral products.

LEAD MINES

As early as 1634 Europeans exploring what is now southern Wisconsin came almost, if not quite, to the Mississippi River. In order to stimulate the hunting of fur-bearing animals the French introduced the use of firearms among the Indians. With the coming of firearms there was a strong demand for ammunition and as the traders gathered furs they also kept a sharp lookout for mineral suitable for moulding into bullets. This they found in abundance in the area which embraced some 3000 square miles in what is now southwestern Wisconsin, northwestern Illinois, and northeastern Iowa.

The first white man to leave a record of the lead region was the French explorer Jean Nicolet. In 1634, Nicolet entered Green Bay and passed up the Fox River to the

portage to the Wisconsin River. Although it appears that he did not actually descend the Wisconsin to the Mississippi, he made the Indians acquainted with the use of firearms, and stimulated an interest in the development of lead mines which lay so extensively in the region just beyond his explorations.[1]

The first white men to descend the "Great River" and to set foot upon the lead mine area were, perhaps, Pierre Radisson and Médard Groseilliers. In the spring of 1659 these travelers, having spent the previous year around the shores of Lake Huron, decided to visit the Mascoutins, or Five Nations, who dwelt to the southwest. Passing up to the head of Green Bay they entered the Fox River, crossed the short portage to the Wisconsin River, and paddled on down into the Mississippi and thence into the lead mine area near the present site of Dubuque. In describing this area Radisson said: "In their country are mines of copper, of pewter, and of lead. There are mountains covered with a kind of Stone that is transparent and tender, and like to that of Venice."[2]

In 1673, Marquette and Joliet, following Nicolet's route to the grand portage of the Fox River, passed over to the Wisconsin River and thence down the Mississippi. They passed the lead mine region, and Marquette's journal makes numerous references to minerals in that region.

[1] Albert M. Lea's *Notes on the Wisconsin Territory,* reprinted in *The Book That Gave Iowa Its Name,* pp. 12, 13; Charles R. Keyes's "Earliest Explorations of Iowa-Land" in *The Annals of Iowa* (Third Series), Vol. X, pp. 267, 268; Charles R. Keyes's "Spanish Mines: An Episode in Primitive American Lead-Mining" in *The Annals of Iowa* (Third Series), Vol. X, pp. 539, 540; A. G. Leonard's "Lead and Zinc Deposits of Iowa" in *Iowa Geological Survey,* Vol. VI, p. 18.

[2] Charles R. Keyes's "Spanish Mines: An Episode in Primitive American Lead-Mining" in *The Annals of Iowa* (Third Series), Vol. X, pp. 540, 541; "Radisson and Groseilliers in Wisconsin" in *Collections of the State Historical Society of Wisconsin,* Vol. XI, p. 93.

Nicolas Perrot came into this region of the Upper Mississippi in 1675. A little later he developed what came to be known as Perrot's Mines. Indeed Perrot has sometimes been credited with making the first discovery of lead in that area. It is clear, however, that it was discovered and mined to some extent at an earlier date.[3]

For some time previous to the year 1788, one of the most important villages of the Fox Indians, occupied by Kettle Chief's band, was situated at the mouth of Catfish Creek, a short distance south of the present city of Dubuque in the center of the lead district. On September 22, 1788, at a council held at Prairie du Chien, Julien Dubuque obtained consent from the Fox Indians to work the lead mines which they controlled. The written instrument by which this consent was obtained stated that the Indians sold and transferred to Dubuque the mine discovered by the woman Peosta (or the wife of Peosta) "so that no white man or Indian shall make any pretention to it without the consent of Mr. Julien Dubuque". Because of this statement "Peosta" has sometimes been given credit for discovering the mines. In reality they were discovered at a much earlier date. It is important, however, to note that in 1788 the lead mines came into possession of Julien Dubuque, who worked them extensively during the next two decades.[4]

At that time this region was within the Province of Louisiana, a part of the Spanish dominions on this continent, France having parted with her claim to this area west of the Mississippi by the terms of the treaty of 1762. And so, in 1796, Dubuque applied to Baron de Carondelet, the Spanish Governor of the Province of Louisiana, for a grant or

[3] Charles R. Keyes's "Spanish Mines: An Episode in Primitive American Lead-Mining" in *The Annals of Iowa* (Third Series), Vol. X, pp. 540–542.

[4] Oliver P. Shiras's "The Mines of Spain" in *The Annals of Iowa* (Third Series), Vol. V, pp. 321–330.

concession, based on the agreement entered into with the Indians at Prairie du Chien. This concession was granted by the Spanish government and the mines operated by Julien Dubuque came to be called the "Mines of Spain". After the Province of Louisiana had passed to France and then to the United States by the Louisiana Purchase the name, the "Mines of Spain", fell into disuse. Subsequently the premises were often referred to as "The Claims of Monsieur Dubuque", or "Dubuque's Lead Mines". These mines Dubuque continued to operate until his death in the spring of 1810.[5]

The extent of Dubuque's mining operations may be indicated by the report that he had a lead furnace at the mouth of Catfish Creek and another at Eagle Point. When he was visited by Zebulon M. Pike in 1805 it was reported that he was mining from 20,000 to 40,000 pounds of lead annually.

After Dubuque's death the Indians burned his house and fences and destroyed all traces of his mining operations so far as possible "in order to keep out other white men." The Indians themselves, however, continued to work the mines intermittently and sold the ore to traders who had furnaces on an island in the river. The explorer, Henry R. Schoolcraft, wrote in 1820:

> The lead ore at these mines is now exclusively dug by the Fox Indians, and, as is usual among savage tribes, the chief labour devolves upon women. The old and superannuated men also partake in these labours . . . They employ the hoe, shovel, pick-axe, and crow-bar. . . . When a quantity of ore has been got out, it is carried in baskets, by the women, to the banks of the Mississippi, and there ferried over in canoes to the island, where it is purchased by the traders at the rate of two dollars for a hundred and twenty pounds, payable in goods at Indian prices. . . . The traders smelt the ore upon the island, in furnaces. . . . Formerly, the

[5] Oliver P. Shiras's "The Mines of Spain" in *The Annals of Iowa* (Third Series), Vol. V, pp. 321–334.

Indians were in the habit of smelting their ore themselves, upon log-heaps, by which a great portion was converted into what are called *lead-ashes,* and thus lost. Now, the traders induce them to search about the sites of those ancient fires, and carefully collect the lead ashes for which they receive a dollar per bushel, delivered at the island, payable in merchandize.[6]

Although the mines were at this time within the domain of the United States, the Indians held the right of occupancy, and the whites were forbidden to make settlements. In 1829, however, James L. Langworthy is reported to have crossed the Mississippi River and to have explored the region near the site of Dubuque and between the Maquoketa and Turkey rivers.

Early in the year 1830 James L. Langworthy and his brother, Lucius H. Langworthy, crossed the Mississippi and commenced mining upon the forbidden soil. Other miners followed the two Langworthy brothers, and soon there was a group of miners sufficiently large to feel the necessity of a code of rules to be observed in the new mining community. And so, on the 17th of June, 1830, they met beside a cottonwood log on the bank of the river and prepared the following rules which probably constituted the first set of laws drawn up by white men within the limits of what is now Iowa:

Dubuque Mines, June 17, 1830.

We, a committee, having been chosen to draft certain rules and regulations, by which we, as miners, will be governed; and, having duly considered the subject, do unanimously agree that we will be governed by the regulations on the east side of the Mississippi River, with the following exceptions, to wit:

ARTICLE I.— That each and every man shall hold two hundred yards square of ground by working said ground one day in six.

[6] Henry R. Schoolcraft's *Narrative Journal of Travels from Detroit Northwest through the Great Chain of American Lakes to the Sources of the Mississippi River,* pp. 345, 346; Franklin T. Oldt's *History of Dubuque County Iowa,* p. 19.

ART. II.— We further agree, that there shall be chosen by the majority of the miners present, a person who shall hold this article, and who shall grant letters of arbitration, on application being made, and that said letter [of] arbitration shall be obligatory on the parties concerned so applying.[7]

These miners, however, were soon driven out by troops sent from Fort Crawford at Prairie du Chien, but at the close of the Black Hawk War in 1832 provision was made that this area should be given up by the Indians in June, 1833. At that time the miners returned and thereafter continued their mining operations without hindrance from the law, although no civil government was in operation.

In November, 1836, five blast furnaces were reported in the neighborhood of Dubuque. One of these smelted 70,000 pounds of lead per week, another 60,000 pounds, and another large furnace, 70 by 33 feet in dimensions, smelted 100,000 pounds per week. The current price of lead at that time was $23 per thousand pounds.[8]

It was reported in the *Dubuque Visitor* that not less than six million pounds of lead were shipped from Dubuque in 1838. According to Lucius H. Langworthy, the amount of lead exported from the Dubuque mining district from 1833 to 1856 varied from 40,000,000 to 60,000,000 pounds annually. He said that this result was reached by "surface scratching" and "dry diggings" and that a greater profit would probably result from deep mining. If the average price of lead during this period was $20 per thousand pounds, which was considered as a fair estimate, the annual receipts from this source varied from $800,000 to $1,200,000. "In a large measure it was this mineral that enriched

[7] John Carl Parish's "The Langworthys of Early Dubuque and Their Contribution to Local History" in THE IOWA JOURNAL OF HISTORY AND POLITICS, Vol. VIII, p. 317.

[8] Franklin T. Oldt's *History of Dubuque County Iowa*, pp. 19–21.

many of the first capitalists and laid the foundation for the prosperity of Dubuque from 1833 to 1857 and enabled the city to recover itself'' during the Civil War and the years that immediately followed.[9]

Historically the lead mines of Dubuque have had a widespread interest. Concerning them Samuel Calvin wrote: ''They were the first of the upper Mississippi mines to be opened and among the first in America to be developed. In earlier years they were the most important source of lead in the world aside from the mines of northern England and of Spain. . . . As late as 1852 the Upper Valley mines produced 13,000 tons of lead; 10 per cent of the world's production of that year and 87 per cent of that of our own country.''[10] But with the discovery of the lead-silver mines of Idaho, Colorado, and Utah, lead mining in Iowa has been practically discontinued.

COAL MINING

The most extensive and most profitable mining interest in Iowa at present is coal mining. Coal is mined in more than twenty counties of Iowa, chiefly in the valley of the Des Moines River, extending from the mouth of that river northwestwardly to the vicinity of Fort Dodge in Webster County. Coal is also mined in southwestern Iowa in Page, Taylor, Montgomery, Adams, and Cass counties, and in eastern Iowa in Scott and Muscatine counties. Coal mining in Iowa once reached a peak of almost 9,000,000 tons per year, although in recent years the production has been much less than that.[11]

[9] Franklin T. Oldt's *History of Dubuque County Iowa*, pp. 22, 23.

[10] Samuel Calvin and H. F. Bain's ''Geology of Dubuque County'' in *Iowa Geological Survey*, Vol. X, pp. 480, 481. See also Vol. XXII, pp. 89–105.

[11] S. W. Beyer's ''Coal Statistics'' in *Iowa Geological Survey*, Vol. XIX, pp. 591–597. See also Vol. XXXVII, p. 382.

In 1894 the *Iowa Geological Survey* noted that the coal fields of the State embraced upwards of 20,000 square miles. Fully one-half of this area was considered as underlaid with workable coal seams, and it was estimated that "not less than 10,000 square miles, or nearly one-fifth of the entire areal mileage of the state" is underlaid with coal "in quantities of commercial importance." By way of emphasis this report said that there were within the coal mines of Iowa "latent resources and undeveloped possibilities, the extent of which has not been suspected heretofore by the majority of her citizens and the character of which has been entirely unknown to the people of other states."

Surveys of this type, however, in which coal is measured in terms of square miles may be very misleading. Perhaps a more accurate picture may be presented in terms of the number of tons produced annually, and the quality of coal obtained.

In the fifty years that have passed since this report was made there have been many variations in Iowa coal production. In 1917 the production reached almost 9,000,000 tons. In later years it has declined until in 1939 and again in 1940 the production was below the 1894 level of 3,900,000.[12]

The following table shows the production of coal from 1840 to 1915:[13]

Year	*Tonnage*	*Year*	*Tonnage*
1840	400	1846	6,500
1841	500	1847	8,000
1842	750	1848	10,000
1843	1,000	1849	12,500
1844	2,500	1850	15,000
1845	5,000	1851	18,000

[12] *Iowa Geological Survey,* Vol. II, pp. 33, 34, Vol. XXVIII, p. 14, Vol. XXXVIII, p. 434.

[13] James H. Lees's "Mineral Production in Iowa for 1917 and 1918" in *Iowa Geological Survey,* Vol. XXVIII, p. 14.

Year	*Tonnage*	*Year*	*Tonnage*
1852	20,000	1884	4,370,566
1853	23,000	1885	4,012,575
1854	25,000	1886	4,315,779
1855	28,000	1887	4,473,828
1856	30,000	1888	4,952,440
1857	33,000	1889	4,095,358
1858	37,500	1890	4,021,739
1859	42,000	1891	3,825,495
1860	41,920	1892	3,918,491
1861	50,000	1893	3,972,229
1862	53,000	1894	3,967,253
1863	57,000	1895	4,156,074
1864	63,000	1896	3,954,028
1865	69,574	1897	4,611,865
1866	99,320	1898	4,618,842
1867	150,000	1899	5,177,479
1868	241,453	1900	5,202,939
1869	294,105	1901	5,617,499
1870	263,487	1902	5,904,766
1871	300,000	1903	6,419,811
1872	336,000	1904	6,519,933
1873	392,000	1905	6,798,609
1874	799,936	1906	7,266,224
1875	1,231,547	1907	7,574,322
1876	1,250,000	1908	7,149,517
1877	1,300,000	1909	7,757,762
1878	1,350,000	1910	7,928,120
1879	1,400,000	1911	7,331,648
1880	1,461,116	1912	7,289,529
1881	1,960,000	1913	7,525,936
1882	3,920,000	1914	7,451,022
1883	4,457,540	1915	7,614,143

Since 1916 the value of the coal mined has also been recorded and beginning in 1928 the number of operators has also been given.[14]

[14] James H. Lees's "Mineral Production in Iowa" in *Iowa Geological Survey*, Vol. XXXII, p. 19, Vol. XXXIV, p. 452, Vol. XXXVI, pp. 424, 459; H.

Year	*Tonnage*	*Value*	*No. of Operators*
1916	7,260,800	$13,530,383	
1917	8,965,830	21,096,408	
1918	8,192,195	24,703,237	
1919	5,624,692	17,352,620	
1920	7,813,916	30,793,847	
1921	4,531,392	17,256,800	
1922	4,335,161	16,119,000	
1923	5,710,735	20,517,000	
1924	5,468,450	18,097,000	
1925	4,714,843	14,807,000	
1926	4,625,487	14,214,000	
1927	2,949,622	9,304,000	
1928	3,683,635	10,525,000	222
1929	4,241,069	11,948,000	201
1930	3,892,571	10,385,000	233
1931	3,388,355	8,575,000	231
1932	3,862,435	9,254,000	212
1933	3,194,983	7,217,000	242
1934	3,366,992	7,862,000	243
1935	3,650,163	9,002,000	263
1936	3,960,700	9,940,000	361
1937	3,637,054	9,529,000	340
1938	3,113,187	7,963,000	300
1939	2,947,557	7,189,245	
1940	3,231,177	8,060,587	
1941	2,939,000		
1942	2,990,000		

Summarizing conditions over a long period of years in the Iowa Geological Survey report in 1926, James H. Lees said: "The earliest recorded production of coal in Iowa was given in the U. S. Census for 1840 as 400 tons. In 1848 the production reached 10,000 tons; in 1867 it was 150,000 tons; in 1876 the output was 1,250,000, and by 1899 it had

Garland Hershey's "Mineral Production in Iowa" in *Iowa Geological Survey*, Vol. XXXVII, p. 382, Vol. XXXVIII, p. 428; *Statistical Abstract for the United States*, 1943, p. 748.

reached 5,000,000.'' The largest production was 8,965,000 tons in 1917 although the ''greatest spot value'' was reached in 1920, when the output was valued at $30,800,000. Since 1920 the production has been less than during most of the earlier years of the present century. According to Mr. Lees, ''This decline in production probably is to be assigned in part to adverse financial conditions in the state, in part, to increasing use of outside coals by Iowa people and in part to the mine labor situation. Approximately 15,000,000 tons of coal are used in Iowa every year, and of this amount nearly two-thirds is shipped in from other states.''[15]

Coal production by counties varied with the years. During the early period of production, Mahaska County led the counties of the State in coal output. In the decade of the eighties it was producing more than 900,000 tons annually. Other counties in order of production in 1885 were Polk, Boone, Lucas, and Keokuk. The reason assigned for Mahaska County's leadership was the fact that the railroads had given it ''a direct market north into a country entirely destitute of coal.'' There were thirty-nine mines operating in the county. Of this number, four mines at Muchakinock and three at Excelsior, the American Coal Company, the Standard Coal Company, the Acme Coal Company, and the Western Union Fuel Company shipped almost all of their products into the northern market.[16]

In 1890 an elaborate Coal Palace was erected at Ottumwa in Wapello County, in order to extol the values of Iowa coal. All of the counties in the coal-mining area of Iowa were invited to display their coal products at the palace, and many prominent men — including Governor

[15] James H. Lees's ''Iowa Coal Areas and Characteristics of Iowa Coal'' in *Iowa Geological Survey,* Vol. XXXII, pp. 75, 76.

[16] *Biennial Report of the State Mine Inspector,* 1883–1885, pp. 4, 38.

Horace Boies and President Benjamin Harrison — visited Ottumwa to see the palace and to participate in the festivities. Wapello County was at that time one of the six largest coal-producing counties of the State, with an output of about 300,000 tons annually. Mahaska, Polk, Keokuk, Lucas, and Monroe counties each produced more coal than Wapello, but Ottumwa and Wapello County led the parade in the matter of advertising their products.[17]

In their report for 1901 the State Mine Inspectors said:

> Mahaska county still maintains its position at the head of the list of the coal-producing counties of Iowa. For more than twenty-five years it has produced more coal each year than any other county in the state; but it begins to look as if its supremacy in this respect is about ended. The extraordinary development of mines in Monroe county in the last two years has far outranked development work in Mahaska county; and, unless something is done quickly to offset the advantage gained by its neighbor on the south, the indications are that Mahaska county will have to be satisfied with second place.[18]

By 1902 Monroe County had gained first place among the counties, with a production record of more than 1,000,000 tons. Polk County ranked second, producing more than 900,000 tons, while Mahaska and Appanoose counties followed in order with more than 700,000 tons each. By 1906 Monroe County was producing more than 2,000,000 tons annually and Polk County was producing more than 1,000,000 tons.[19]

The increased production in Monroe County was due in

[17] Carl B. Kreiner's "The Ottumwa Coal Palace" in *The Palimpsest,* Vol. III, pp. 336–344; *Biennial Report of the State Mine Inspectors,* 1889–1891, pp. 6, 64, 97.

[18] *Biennial Report of the State Mine Inspectors,* 1899–1901, p. 36.

[19] *Biennial Report of the State Mine Inspectors,* 1901–1903, pp. 17, 57, 79, 1905-1906, p. 6. The 1905-1906 report was for one year only, from July 1, 1905, to June 30, 1906.

part to the fact that many miners had moved from Muchakinock in Mahaska County to found a new mining town at Buxton in Monroe County, and the development of the Consolidation Coal Company at Buxton had reached high production by 1905. The biennial report of the State Mine Inspectors issued in 1910 noted that Buxton was "by far the largest mining town in the state." It possessed good homes, schools, churches, and a $20,000 Y. M. C. A. building. The miners were "taken to and from the mines in special trains". Buxton was at that time a town with a population of some 5000 persons, more than half of whom were negroes. It remained a thriving coal-mining town until after the first World War, but it was never incorporated.[20]

Muchakinock and Buxton were typical examples of mining towns that developed, flourished for a time, and then passed into history. Almost fifty mining camps in Iowa grew into mining towns that have now ceased to exist. Most of these fifty towns had post offices which have now been discontinued. Many of these towns developed to a considerable size and importance but they were seldom incorporated. Some of them flourished for several years; others had a briefer history. Each one had its part in the development of mining in Iowa.

Monroe County seems to rank first in the number of coal-mining towns that have almost or entirely vanished. There was Buxton, Cedar Mines, Chisholm, Fraker or Bluff Creek, Hilton, Haynes, Lahart, Miami, Selection, Ward, White, and Whiteburg. All of these except Lahart and Miami had post offices. All these post offices have been discontinued and all of the towns have virtually vanished.

Appanoose County had at least seven coal-mining towns

[20] *Biennial Report of the State Mine Inspectors,* 1908–1910, p. 46; J. A. Swisher's "The Rise and Fall of Buxton" in *The Palimpsest,* Vol. XXVI, pp. 179–192.

that are now listed as "abandoned". Keokuk and Mahaska counties have each had five such towns. Lucas County has had at least four. Boone, Marion, and Polk counties have each had three such towns. Jasper and Webster counties have each had two. Davis and Wayne have each had one. There may have been other coal-mining towns in Iowa that have been abandoned, but this will suffice to show that coal-mining towns are transitory — they tend to come and go.[21]

In 1917, a peak year in coal production, Iowa ranked tenth among the States of the Union in coal, being surpassed by Pennsylvania, West Virginia, Illinois, Ohio, Kentucky, Indiana, Alabama, Colorado, and Virginia. At that time Monroe County was producing more than 2,000,000 tons annually, while Appanoose and Polk counties were each producing more than 1,500,000 tons. In 1920 Monroe County still held the lead with two and a half million tons. But by 1925 there had been a marked decline in coal production in Iowa. Marion County then held first place with 947,949 tons, Monroe, Polk, and Appanoose counties followed in order.[22]

In 1931 Appanoose, Polk, Lucas, Marion, Dallas, and Boone were the leading coal-producing counties, but no county was producing more than 550,000 tons. The average price at the mine at that time was $2.53 per ton. In 1942 Marion, Appanoose, Mahaska, Dallas, and Polk were the leading coal-producing counties in Iowa. Production was still low as compared with earlier years.[23]

[21] David C. Mott's "Abandoned Towns, Villages and Post Offices of Iowa" in *The Annals of Iowa* (Third Series), Vol. XVII, pp. 435–465, 513–543, 578–599, Vol. XVIII, pp. 42–69, 117–148.

[22] James H. Lees's "Mineral Production in Iowa for 1917 and 1918" in *Iowa Geological Survey,* Vol. XXVIII, pp. 17, 22. See also Vol. XXIX, p. xxviii, Vol. XXXII, p. 21.

[23] James H. Lees's "Mineral Production in Iowa in 1930, 1931, and 1932" in *Iowa Geological Survey,* Vol. XXXVI, p. 445; *Biennial Report of the State Mine Inspectors,* 1942-1943, p. 13.

Sometimes attempts have been made to mine coal in Iowa at points where coal is not plentiful. The Plymouth County board of supervisors in 1873 offered a reward of $500 for the discovery of a paying mine in that county. The offer was later raised to $5000. While digging a well in 1880 Reynolds Moreton, a member of the British colony near Le Mars, thought that he had struck a five-foot vein of coal. Excitement ran high for a time. But, alas, coal in paying quantities was never found in that area.[24]

Statistics show that there has been a marked reduction in the production of coal in Iowa since 1917. This, however, is not peculiar to Iowa; it is true of coal throughout the United States. Production of coal in the United States in 1930 was at about the level of 1913 production, but in 1934 it had fallen to 70 per cent of that figure. The increased use of water power for generating electricity, the substitution of fuel oil and natural gas for coal, and the improved efficiency in coal-burning units account in a large measure for reduced demands for coal. One author states that the three factors most responsible for reduced consumption of bituminous coal are "(1) hydro-electric power generation, (2) petroleum and gas, (3) improved efficiency in combustion of coal and generation of steam." The improved efficiency of steam plants was regarded as "the greatest single factor in reducing coal consumption".[25]

The quality of Iowa coal is a matter which is not always clearly explained. Indeed, it is not always understood. Information from government sources is meager and the little that is obtainable is sometimes misleading. Technical Paper 269 of the Bureau of Mines, entitled *Analysis of Iowa Coals* (1921), contains the following statement:

[24] Jacob Van der Zee's *The British in Iowa*, pp. 174–186.

[25] H. L. Olin's *Iowa Coal Studies* (Technical Paper No. 3, issued by the Iowa Geological Survey), p. 5.

Iowa coal is low-grade and non-coking bituminous, carrying considerable sulfur in the form of pyrite and gypsum. The gypsum coats the vertical faces of the coal so that it looks somewhat as though daubed with whitewash. In many places the coal is "bony". . . . In general the coal is hard, slabby, or blocky, and makes a fair steam and domestic fuel, though sooty. In general Iowa coal weathers rapidly on exposure, hence it does not store well, and if much slack is present it soon takes fire spontaneously. . . . The most marked characteristic is the presence of small and large limestone bowlders or concretions called "niggerheads".

The report of the Bureau of Mines likewise indicated that although few fusibility tests had been made, it appeared from those recorded that Iowa coal has "a very low softening temperature, ranging from 1,850° to 2,100°."[26]

In his *Iowa Coal Studies* Dr. H. L. Olin, Professor of Chemistry at the State University of Iowa, referred to the above statements as a "sweeping and, in many respects, astounding indictment". From the vantage point of fifteen years study of Iowa coals he made a categorical denial of these charges and implications so far as they refer to Iowa coals as a class. Relative to the quality of coal found in Iowa, Professor Olin said: "Iowa coal is bituminous and is admittedly lower in rank than most of the coals of the Appalachian or Eastern Province where the processes of mountain making have greatly reduced inherent moisture and volatile matter, but it is higher in rank than the great deposits of lignite and sub-bituminous of Texas, Wyoming, North Dakota and other states of the plains region. Such a statement is manifestly unfair if it is made in derogation; in any case it is meaningless when made without qualifying explanation."

Relative to coking and the sulphur content of Iowa coal Professor Olin said: "We have proved that coals from all sections of the state produce firm, hard cokes when the

[26] H. L. Olin's *Iowa Coal Studies* (Technical Paper No. 3), pp. 8, 9, 11.

treatment adapted to their peculiar chemical composition is applied. . . . It is true of the coals in certain regions of the state that thin leaves of gypsum or calcium carbonate have formed in the vertical cleavage planes which might suggest 'plaster'. Such mineralization however, is not in general, excessive and while its occurrence raises the ash content slightly it could hardly be considered a fault to be advertised."

With regard to the "bony" and "sooty" properties of Iowa coal, Professor Olin said:

> Perhaps such deposits exist but in general the producing companies of today do not work them. . . . Smoke and soot producing tendency of greater or less degree is a property of all bituminous coals. Iowa coals form smoke and soot when improperly burned as do other coals of similar rank and other fuels like oil and natural gas. How much better or worse they are in this respect than any given group produced elsewhere has not been determined; certain types from the Appalachian field, however, are known from common experience to be no better.

With reference to storing Iowa coal, Professor Olin said: "Our own tests as well as those of certain large coal users of the state have proved that Iowa coal will keep indefinitely when properly graded and piled. Iowa slack coals mixed with fine dust and loosely packed, will not keep; neither will similar mixtures from Illinois, Indiana or Kentucky."

Are Iowa coal beds full of "niggerheads"? Professor Olin's answer is, "No, not in general. Concretions of various minerals are found in the coal measures of the whole Interior Province but they are not especially typical of the Iowa coal seams."

Finally, the ash fusion point of Iowa coal is relatively low, but not as low as some reports would indicate. The mean ash fusion point of samples selected from all coal-

producing counties in the State of Iowa by Professor Olin was 2187° F.

This analysis points out that the intrinsic value of Iowa coal is, in a large measure, determined by methods of mining and preparation, the grading, cleaning, and storing of coal, and the proper use of it in efficient coal-consuming units. Iowa coal can be good or bad depending upon its origin, its preparation, its preservation, and its use.

It is clear that Iowa coal has a commercial value. It may well be maintained that "the majority of Iowa consumers of domestic coal who seek primarily the greatest possible returns in heat value, can be most economically served by the prepared coals produced within the state." However, "those who demand the luxury service that only oil, gas, coke or certain hard clean-burning coals of the Appalachian fields can furnish are asking for more than mere thermal energy; they seek a convenience of firing and a cleanness of handling that none of the midwest coals can supply with the equipment in common use."[27]

In Iowa as in other mining areas, there have been three general methods of opening a mine, depending upon the depth and angle of inclination of the seam. Where the seam lies horizontal and outcrops in the hillside, it is usually opened by a tunnel driven in the coal. This is called a drift mine, and is the most economical method of development. When the seam outcrops on the surface, but is inclined at angles varying up to sixty degrees or more, it is opened by means of a tunnel following the coal down from the surface. This is known as a slope mine. Where the seam lies at considerable depth and there is no outcrop within the limits of the property which it is proposed to develop a shaft is sunk from which tunnels may be extended in various directions into the coal areas. This is known as a shaft mine. In

[27] H. L. Olin's *Iowa Coal Studies* (Technical Paper No. 3), pp. 7, 15, 17.

addition to these three methods of mining there is "slip" mining, in which the thin layer of soil is removed and coal is taken out much as stone is taken from a quarry.[28]

Perhaps the first mining in Iowa was in drift mines, where farmers removed from the banks of a stream such coal as they might need for their own use. At an early date, however, shaft mining became the most common method. By the time the first Mine Inspectors' reports were published, in the eighties, more than half the mines in Iowa were shaft mines. Drift mines ranked second in number, while there were comparatively few slope mines. In later years drift mines have become relatively unimportant, while shaft and slope mines have been about equal in number. In recent years, too, slip mines have increased in number. Indeed the increased development of slip mines in 1945 gave rise to the introduction of a bill in the Iowa General Assembly to further regulate and control this type of mining.[29]

There are two principal methods of mining coal — the "Longwall" method and the "Room and Pillar" method. Practically all other methods are but modifications of these two plans. By the term "Longwall" is meant "the method of taking out the whole of the coal, after getting a little distance from the shaft, without first driving narrow roads."

A pillar of coal, known as the "shaft pillar", is usually left on each side of the shaft as a support. Beyond these pillars "the workings are opened out in every direction necessary to get room for the required number of men to be working along lines or faces of coal in such positions as will yield the best coal at the cheapest rate."

[28] A. T. Shurick's *The Coal Industry*, p. 58.

[29] See the tabulated reports of the State Mine Inspectors for the various years. See also Senate File, No. 36, Fifty-first General Assembly, 1945.

From the foot of the shaft main roads must be maintained extending into the mine. These must be wide enough for small coal trucks to pass, and if animals are used for transportation, the roadways must be of sufficient depth to allow mules to pass through. From the main roads to the inner periphery of the mine smaller roads may be projected along which the miners may push the coal they mine in smaller coal trucks to a main road. Thence it is transported out of the mine in the regular course. As the mine is worked, the waste materials are thrown back to fill up the open spaces, the smaller roads are filled in, and new by-ways are opened.[30]

The other system of mining is known as the "Room and Pillar" method. This is a plan by which "the coal seam to be worked is divided or cut into a series of separate blocks, panels or pillars, as they are most frequently termed, by pairs of narrow tram roads."

"Starting from the winding shaft, one of these pairs will be driven along the line of level of the coal each way from the shaft, that is, assuming the dip of the seam to be from north to south, one of these pairs will be driven eastward and the other westward, and, as there must be a constant current of air going past the men, a connection is made at short distances between the two roads to form a short circuit. Until this connection has been made the air has to go along one side of the road and return along the other". The running of narrow parallel roads and the connecting of them at intervals forms rectangular stalls or rooms each of which may be worked separately by the inserting of pillars to support the roof as the work progresses — hence the name Room and Pillar method.[31]

Each of these methods has its advantages and disadvan-

[30] James Tonge's *The Principles and Practice of Coal Mining*, pp. 121, 122.

[31] James Tonge's *The Principles and Practice of Coal Mining*, pp. 119, 120.

tages and both methods have been extensively used in Iowa.

Mining is regarded by all as a hazardous occupation. Yet there is something fascinating about it, and those engaged in it seem to give little thought to the dangers which they constantly face. Indeed, it is said that many of the mine accidents, if not most of them, are due to the fact that the miner himself becomes careless in working in and about the mine. He does not take due precaution in firing his shots, or he enters a room without carefully inspecting the roof, or remains in a room knowing that the roof is in need of repair. Thus it appears that the more one is compelled to face dangers, the less he heeds them.[32]

One of the chief problems connected with the safety of mines is the problem of ventilation. Mine owners and operators cannot prevent the escape of noxious gases in the mines. But they can in a measure neutralize their deadly effects by meeting the demands for a larger supply of wholesome air. This can best be done through methods of artificial ventilation. There are two general methods in use, both of which have been extensively used in Iowa.

"The first method and the oldest is very simple. A large fire is maintained at the bottom of the air shaft, and the heated column of air being lighter produces the necessary ventilation through the various rooms of the mines," just as a room in a home may be ventilated by a fireplace. These fires are maintained in furnaces or grates.[33]

The second and more modern method of ventilation is by use of a large fan by which a current of fresh air is constantly being forced into the mine. In the first Iowa Mine Inspector's report, in 1882-1883, the opinion was expressed

[32] Some Mine Inspectors have estimated that as high as ninety per cent of the mine accidents are due to carelessness.— See *Biennial Report of the State Mine Inspectors*, 1881–1883, pp. 10, 11, 1893–1895, pp. 35, 42, 73, 74.

[33] William J. Nicolls's *The Story of American Coals*, p. 176.

that the fan system was superior to the furnace method. The cost of installation of the fan, it was said, was greater but the operating costs were less. Hence the Inspector expressed the view that "the fan is both cheaper and more effective than a furnace." While this opinion has been expressed many times, both furnaces and fans have been used extensively in Iowa mines. In recent years, however, the commonly accepted method is by the use of fans.[34]

A comparison of the data obtained from the reports of the Mine Inspectors over a period of years presents an interesting development of the mining industry. In 1885 mining activities were reported in twenty-six counties. Mahaska County was at that time the largest coal-producing county in the State, with an annual production of 762,000 tons. Polk, Boone, and Lucas counties were next in order with an annual production of about 450,000 tons each. There was a total production of 4,012,575 tons. There were 479 mines of which 273 were shaft, 140 drift, and 66 slope mines.[35]

In 1892 reports were obtained from twenty-three counties in which 298 mines were operating. The number of mines was less than seven years before and the annual coal production had decreased to 3,918,491 tons. Of this, Mahaska County produced 1,048,030 tons. Appanoose, Monroe and Polk counties were the next highest coal-producing counties.

Detailed reports were given for seven counties in the third district. Of the 107 mines operating in that area — Boone, Dallas, Greene, Guthrie, Marion, Polk, and Webster counties — 68 were shaft mines, 28 were slope mines, and

[34] *Biennial Report of the State Mine Inspectors,* 1881–1883, p. 49, 1885–1887, p. 165, 1889–1891, pp. 85–88, 1893–1895, p. 12, 1895–1897, pp. 5, 6.

[35] Data compiled from *Biennial Report of the State Mine Inspector,* 1883–1885, pp. 4, 50–62; *Iowa Geological Survey,* Vol. XXVIII, p. 14.

11 were drift mines. Steam power was used in 46 of them and horse power in 61. Moreover, 62 of the mines were shipping coal while 45 of them operated for local purposes only. Furnaces were used in 73 of these mines, fans were used in 33, and one was ventilated by natural forces. Of the 107 mines, 58 used the "room and pillar" plan of work while 49 used the "longwall" method.[36]

In 1905, 6,798,609 tons of coal were mined in twenty-three counties of Iowa. Monroe County mined more than one-third of the State's output and yielded twice as much coal as any other county in the State, with a production of 2,117,127 tons. Polk, Appanoose, and Mahaska counties followed in order. There were at that time 310 mines reporting in Iowa. A large majority — 250 — of them were shaft mines. Of the remaining number 46 were slope mines and 14 were drift mines.

Steam power was used to operate 164 of these mines. Horse power was used in 145 of them, and one was reported as using electric power. At least 91 of the mines shipped coal into other areas. Eighty of the mines reported only local operation, while others did not report upon this item. Of the 310 mines in Iowa at this time, 182 were using the "room and pillar" system, while 128 operated on the "longwall" method. Data relative to ventilating systems showed evidence of change at that time. In 146 mines fans were in operation. In 138 cases furnaces were used for ventilation. In 26 cases various other methods were used, including natural ventilation, steam jets, stoves, grates, and in one instance a pump exhaust.[37]

In 1917, the peak year for the production of coal in Iowa,

[36] *Biennial Report of the State Mine Inspectors,* 1891–1893, pp. 4, 40, 72; *Iowa Geological Survey,* Vol. XXVIII, p. 14.

[37] *Biennial Report of the State Mine Inspectors,* 1903–1905, pp. 6–96; *Iowa Geological Survey,* Vol. XXVIII, p. 14.

reports were received from 258 mines in 23 counties. These data show a tendency away from the drift mines and toward the development of shaft mines. Of the 258 mines reporting 201 were shaft mines and 57 were slope mines. There were no drift mines. Power used in operation was divided almost equally between the use of steam and horse power, with some tendencies toward the use of gasoline engines and electricity. One hundred and sixteen of the mines used steam, 113 horse power, 22 electricity, and 7 gasoline engines. More than half of the mines — 144 of them — operated locally, while 114 shipped coal to other areas. The "room and pillar" system was used in 163 mines, while the "longwall" method was employed in 95 of them. Ventilation was obtained chiefly by the use of fans. Fans were operating in 154 mines, furnaces in 68, and other methods, chiefly natural forces, were used in ventilating 30 of the mines.[38]

In 1933 reports were made by 497 mines in 27 counties of Iowa. Of the mines reporting, 238 were shaft mines, 203 slope mines, and 26 drift mines, while 30 were strip mines. Steam power in mines had been largely replaced. Steam was used in 47 mines, horse power in 161, gasoline engines in 164, and electricity in 59. Man power was used in 29 mines. The "room and pillar" method of mining continued to be used in 283 Iowa mines, while the "longwall" method was used in 177 mines. Ventilation was obtained by the use of fans or by natural forces. Furnaces for the purposes of ventilation had almost entirely disappeared from Iowa mines.[39]

Iowa mining statistics for a period of fifty years — from 1892 to 1941 inclusive — show an average annual production of a little more than 6,000,000 tons of coal. The hazards

[38] *Biennial Report of the State Mine Inspectors,* 1916-1917, pp. 14–66.

[39] *Biennial Report of the State Mine Inspectors,* 1932-1933, pp. 33–48.

of mining may also be shown statistically. During this period an average of twenty-seven miners lost their lives each year in mining Iowa coal. The greatest loss of life occurred in 1902 when there were fifty-five mine fatalities in a single year. More than twenty of these were due to a single disaster — the Lost Creek Mine disaster in Mahaska County. In 1932 nearly 3,500,000 tons of coal were mined in Iowa with only six fatalities. In 1937 and again in 1941 there were but nine fatalities in the coal mines of Iowa. The reduced number of fatalities in recent years, it is believed, is due in a large measure to a greater precaution on the part of the miners themselves.[40]

The Lost Creek Mine disaster was the result of faulty or careless firing of a shot, and resulted in an amendment to the Iowa law requiring the appointment of shot examiners in all mines where blasting is done — thus assuring a greater degree of care in this matter.[41]

Because a great deal of the coal is interlaid with impurities and because these impurities can, in a large measure, be removed by a washing process, the washing of coal has come to be a subject of interest, although it has not yet been extensively practiced in Iowa.

In all coal washing, water is the main material used in separating the impurities from the good coal. The chief impurities that can be removed are sulphur and ash, but even these cannot always be removed. To insure success the impurities must be present in the proper relation to the coal. "If the sulphur is present as organic sulphur or as finely disseminated pyrite in the coal, it cannot be successfully removed by washing. On the other hand, if the sulphur is

[40] *Biennial Report of the State Mine Inspectors,* 1940-1941, p. 10.

[41] *Biennial Report of the State Mine Inspectors,* 1901–1903, pp. 19–21; Phil Hoffmann's "The Lost Creek Disaster" in *The Palimpsest,* Vol. XXVI, pp. 21–27.

present in the coal chiefly as pyrite in flakes and lumps of appreciable size, it is possible by washing to separate a considerable part of the sulphur from the coal. The same statement may be made regarding the ash. If much of the ash is disseminated uniformly through the coal, washing will improve the coal but little. But if a considerable part of the ash is present as shale, slate, or bony coal the ash content can be decreased appreciably by washing.''[42]

The successful separation of impurities from coal depends upon the difference in specific gravity between the coal and the impurities. Anything that is heavier than coal and is detached from the coal may be removed. In some instances good coal may remain attached to the impurities in such quantities that the whole piece is considerably heavier than pure coal. In such cases the coal may be lost in the washing process. Accordingly, if mine-run coal is to be washed, it may be best to crush the coal or reduce the chunks to a uniform size to facilitate washing and reduce the ratio of coal that clings to the impurities. It frequently happens that only the fine coal removed by screening, and not the mine-run coal, is washed.

The washing of coal is a part of an economic process and producers of coal are reluctant to expend additional money and labor unless there is a demand and economic returns for it. The consumer, likewise, views the matter economically. Thus, the evolution of coal washing, in a large measure, depends upon the following economic principles:

> The preparation of coal shall, by the cleaning of the raw material and the production of suitable and well screened sizes, secure a maximum price per ton of output.
>
> To arrive at this result three points must be kept in view: (a) highest possible purity of coal; (b) smallest possible loss of coal; (c) low cost of production.

[42] George F. Kay's ''The First Coal-washing Plant in Iowa'' in *Proceedings of the Iowa Academy of Science*, Vol. XXII, pp. 225–228.

As the foregoing three demands are conflicting, it will be necessary for the proper and economical installation of a preparation plant to find in each case the best relation between the three factors.

From the consumer's standpoint the disadvantages of impurities in coal have been briefly catalogued by H. L. Olin: "(1) Incombustible matter reduces the gross heat value; (2) it increases the weight of material per unit of heat that must be handled and transported; (3) it interferes with the processes of combustion and renders less available the heat actually generated; and (4) it increases the grate losses through escape of unburned fuel substance." Pitted against these disadvantages is the advantage of purchasing coal at a cheaper rate. This is a distinct advantage to local consumers, but may be offset by increased freight charges if shipment is involved.[43]

The washing of coal has never been extensively developed in Iowa. The first coal-washing plant in Iowa was established at Lakonta in Mahaska County in 1912. This plant, for the most part, washed only screenings furnished chiefly by the Consolidation Coal Company at Buxton. In the process of washing the screenings were elevated and passed over inclined jigs with one-fourth inch and one-half inch perforations. Eight hundred gallons of water per minute were used in each of three jigs. The washed coal passed over the head of the jig, while the impurities, being heavier than the coal, dropped to the bottom of the jig and were removed through gates that opened readily. The washed coal was then passed over revolving screens to obtain uniformity of size. The Lakonta plant had a capacity of 1000 tons per day, and in 1914 it washed a total of 98,000 tons of coal. Because of the shortage of man power the Lakonta plant was closed during the first World War and was not reopened.

[43] H. L. Olin's *Iowa Coal Studies* (Technical Paper No. 3), pp. 20–25.

During the decade of the thirties extensive experiments were made in coal washing at the State University of Iowa. As a result of these experiments methods by which coal can be washed have been devised and tested, although the producer and consumer must still determine when such operation is economically advantageous. Mechanically, coal can be washed successfully. With the increasing desire for the use of a better grade of coal, it seems likely that the washing of Iowa coal may become more and more profitable.[44]

Legislation relative to coal mining in Iowa dates back to the period of the Civil War. In 1864 the Tenth General Assembly of Iowa passed a measure which provided that any person owning or possessing Iowa land which was underlaid with coal, if he were desirous of mining such coal and deemed it necessary to have a coal yard and wagon road upon land owned by another or if a drain through and under the surface of the land of another became necessary, might petition the court for such privileges. The petitioner, after the payment of damages to be assessed by a jury, might enter the land of another and proceed to lay out such yards and roads as were necessary. The law also stipulated that after the entry and drains were opened and the yard and roads were established, "it shall be lawful for the applicant to use them for his exclusive benefit, and any person obstructing or in any way injuring said entry and drain, wagon road or coal yard, shall be liable to treble damages in an action brought by the applicant." Two years later the Eleventh General Assembly amended this law to provide for the construction of railway tracks on property acquired under the provisions of this law.[45]

[44] George F. Kay's "The First Coal-washing Plant in Iowa" in *Proceedings of the Iowa Academy of Science,* Vol. XXII, pp. 225–228; H. L. Olin's *Iowa Coal Studies* (Technical Paper No. 3), pp. 20–25.

[45] *Laws of Iowa,* 1864, Ch. 91, 1866, Ch. 66.

In 1872 provisions were made for the inspection of coal mines in Iowa. Under the law as passed by the Fourteenth General Assembly in that year, it was the duty of the board of supervisors in each county in which coal or other minerals were being mined to appoint a mine inspector. It was the duty of this inspector, upon application by any owners, operators, or employees of a mine, "to examine and apply such scientific tests as may be necessary to ascertain the condition of the atmosphere in such mines, as affecting the life and health of employees and miners; and when he shall be satisfied of the prevalence of choke-damps (carbonic acid gas,) or fire damps, (light carbureted hydrogen gas,) in sufficient quantities to jeopardize the health or life of such employees or miners, he shall determine the number and capacity of additional entrances or shafts, or other means necessary for the proper ventilation of such mines, and to afford ingress and egress to such mines in case of explosions, or the falling-in of the entrance or shaft to such mines."[46]

As amended in 1874, the Iowa law provided that a mine inspector "must be practically acquainted with mining and competent to fulfill the duties of his office". Moreover, each inspector was required to inspect twice during each year, "all mines and collieries in his county, in which more than ten miners are employed, and apply scientific tests to ascertain the condition of the atmosphere in such mines". It was also the duty of the inspector to examine and test all machinery used in the mine, to ascertain if it were kept in good repair and if it were "sufficient to secure the safety" of those operating it. This law also provided that "no young person under ten years of age, or female of any age, shall be permitted to enter any mine to work therein".[47]

[46] *Laws of Iowa,* 1872, Ch. 44; *Code of 1873,* Secs. 1228–1235, 1567.

[47] *Laws of Iowa,* 1874, Ch. 31.

In 1880, the Iowa law provided that the Governor should appoint a State Mine Inspector who should hold office for two years. The law stipulated that this appointee should "have a theoretical and practical knowledge of the different systems of working and ventilating coal mines, and of the nature and properties of the noxious and poisonous gases of mines, and of mining engineering." This Inspector was to devote his entire time and attention to the duties of his office and was to receive therefor a salary of $1500 per year.

Provision was also made that a map or plan of each mine should be kept in the office of the Inspector. Moreover, the law provided that after six months from the passage of the act it should be unlawful to operate any shaft or slope mine in which more than fifteen persons were employed at any one time, unless there was to every seam of coal worked in the mine "two separate outlets, separated by natural strata of not less than fifty feet in breadth, by which shafts or outlets distinct means of egress must be always available to afford easy escape from such mine in case of explosion, cavings, or falling in of either shaft." The law also provided that the mines should be properly ventilated, and in shaft or slope mines in which the human voice could not be distinctly heard, the owner was required to provide and maintain "a metal tube" or other means for communication from the top to the bottom of the shaft or slope. The law also stipulated that no boy under the age of twelve years should be permitted to work in any mine.[48]

In 1884 a new law was passed under the general title, "Mines and Mining", but it was applicable chiefly to coal mines. This law placed renewed emphasis upon methods of ventilation and the use of safety appliances in mines. It provided that:

[48] *Laws of Iowa*, 1880, Ch. 202.

The owner or agent of every coal mine, whether it be operated by shaft, slope, or drift, shall provide and maintain for every such mine an amount of ventilation of not less than one hundred cubic feet of air per minute for each person employed in such mine, and not less than five hundred cubic feet of air per minute for each mule or horse employed in the same, which shall be distributed and circulated throughout the mine in such manner as to dilute, render harmless, and expel the poisonous and noxious gases from each and every working place in the mine. And all mines governed by the provisions of this act shall be provided with artificial means for producing ventilation, such as exhaust or forcing fans, furnaces, or exhaust steam, or other contrivances of such capacity and power as to produce and maintain an abundant supply of air for all the requirements of the persons employed in the mine.[49]

In 1886 provision was made for the appointment of three Mine Inspectors who were required to "have a theoretical and practical knowledge of the different systems of working and ventilating coal mines, and of the nature and properties of the noxious and poisonous gases of mines and of mining engineering".[50]

At the following session of the General Assembly, in 1888, the law was amended to provide that the Executive Council should appoint a Board of Mine Examiners. This board was required to give examinations to candidates for the office of Mine Inspector, and the Governor was to appoint Inspectors from persons who had successfully passed these examinations.[51]

Following the year 1888 only minor changes were made in the Iowa laws relative to mining prior to 1911. In that year the Thirty-fourth General Assembly repealed much of the former law and rewrote the laws relative to mines and mining.

[49] *Laws of Iowa*, 1884, Ch. 21; *Code of 1897*, Secs. 2478–2496.

[50] *Laws of Iowa*, 1886, Ch. 140.

[51] *Laws of Iowa*, 1888, Ch. 52.

The new law provided that the Governor should appoint three Mine Inspectors from the list of men who had received certificates of competency from the Board of Mine Examiners. The board of inspectors was authorized to prepare a standard form of reports. These should be uniform throughout the State for reports to the district mine inspectors or to the Board of Mine Inspectors.

Mine owners and operators were required to make detailed maps or plans of each mine, showing "all shafts, slopes, tunnels or other openings to the surface or to the workings of a contiguous mine; all excavations, entries, rooms and crosscuts; the location of the escape ways, and of the fan or furnace or other means of ventilation and the direction of air currents and the location of permanent pumps, hauling engines, engine planes, abandoned works, fire walls and standing water."

Provisions were made for two places of egress in each mine located at stipulated distances apart, and for escape shafts equipped with stairways or hoisting apparatus. Stipulations were made relative to boiler and engine rooms, and lights at the top and openings of the shaft. Detailed regulations were made relative to ventilation and the use of safety appliances. The latter included the installation and use of a telephone system in all mines in which the working parts extended more than 3000 feet from the foot of the slope or shaft or the mouth of the drift as the case might be. Provisions were made for annual reports including reports of mine accidents.

An interesting section of the law relative to sobriety stipulated that "No persons shall go into, at or around a mine or the buildings, tracks or machinery connected therewith while under the influence of intoxicants and no person shall use, carry or have in his possession, at in or around the mine or buildings, tracks or machinery connected there-

with, any intoxicants.'' Penalties for a violation of the law as provided in Section 2491 of the *Code of 1897* were made applicable to this law.[52]

The Iowa law relative to mining as enacted in 1911 remains the basic law of today. The laws were recodified in 1924 and the arrangement altered somewhat. There have been other minor changes from time to time, but no complete revision.[53]

The law as codified in 1924, and as carried forward in the *Code of 1939* consisted of one hundred and twelve sections covering every phase of coal mining.[54] It provided for the appointment of three Mine Inspectors, specified their duties, and stipulated that a summary of their reports, together with requests for changes or repairs, should be posted at some convenient and conspicuous place to which employees should have free access.

It set forth the duties of mine owners and operators, designated methods of opening, operating, and closing mines, prescribed rules for ventilation and for the installation and use of safety appliances, and for the issuance of maps, plans, surveys, and reports. The rights of employees and the rights of adjoining landowners were likewise set forth in the law.[55]

Labor problems have not often become critical in the coal mines of Iowa. Yet there have been labor problems even in this State, and labor leaders have emerged from Iowa mining areas. Indeed, John L. Lewis, President of the United Mine Workers of America, was born in Lucas, Iowa, and received his first inspiration as a labor leader in the

[52] *Laws of Iowa*, 1911, Ch. 106; *Supplement to the Code of Iowa*, 1913, Secs. 2478–2496-e.

[53] *Code of 1924*, Secs. 1226–1337.

[54] *Code of 1939*, Secs. 1226–1337.

[55] *Code of 1939*, Secs. 1232–1239.

coal-mining regions of Lucas County. He attended grade schools in Lucas, Colfax, and Des Moines. As a lad he worked in the coal mines, but was also interested in outside activities. After working hours he organized a debating society and managed a baseball team. In 1906 Lewis was a delegate from a Lucas County mine to the national convention of the United Mine Workers of America. From that time forth he was a leader among the mine workers wherever he was.[56]

In the early eighties the miners of the White Breast Coal Company in Lucas County went on a strike protesting the size of the screens, which were one and one-half inch mesh. The miners, who were not paid for the coal taken out by the screens, demanded that the screen be reduced to one inch mesh and the company refused the demand. The strike was broken by the hiring of colored men to take the place of the strikers. It was about this time that John L. Lewis's father left the Lucas County mines to work for a time at Colfax and then in Des Moines. The family later returned to Lucas County.[57]

In 1884 labor conditions became critical and a strike of widespread interest occurred. It broke out at What Cheer in Keokuk County and at Angus in Boone County. Although these two points are widely separated this was referred to as a single strike. The circumstances were as follows.

The miners at these two points made simultaneous demands for increase in wages. The operators at Angus told their miners to go back to work, promising that if the What Cheer operators paid the price demanded the miners at Angus would likewise receive the advance. The Angus

[56] *Current Biography,* 1942, p. 511.

[57] *Current Biography,* 1942, pp. 511–513; *Biennial Report of the State Mine Inspector,* 1881–1883, p. 77, 1883–1885, p. 70.

miners returned to work while the What Cheer miners attempted to enforce their claims.

The operators of the What Cheer mines had other mines in Illinois upon which they could draw for supplies of coal. What they lacked they purchased from the Angus mine. At one time they attempted to introduce colored miners, but this caused a general uprising. When a wagon loaded with household goods belonging to some of the colored miners was upset and thrown into the creek, the idea of introducing colored help was abandoned. At length, however, the What Cheer miners were forced to resume work at substantially the old rate of pay.

In the face of this ruling the Angus miners sought to enforce their demands by a strike. Whereupon the operators relied upon other mines and ignored conditions at Angus. Later, miners were imported from Minneapolis, Minnesota. This came near causing a riot, and State troops were called in to quiet the unrest. Public sentiment then turned in favor of the operators and the miners at length were forced to resume work, nothing having been gained.

In reporting this incident, in 1885, the Mine Inspector summarized the facts and gave the following advice relative to labor conditions:

> Workmen have a right, either individually or in mass, to demand an advance in wages and to refuse to work if the demand is not complied with; and they also have a right to refuse to accept a reduction in wages, and to call meetings and discuss questions affecting their interests, and to stop work if they think proper; but the operators also have rights. They have a right to discharge any man or company of men who do not suit them, and to employ men in their places, and when men are on a strike the operators have a right to employ new men if they can, on any conditions they choose, to take the place of workmen on strike, and the rights of one are as sacred as the other. But the system of strikes in settling disputes is all wrong. Not a year passes but we are compelled to witness

some conflict in which labor is arrayed against capital over the adjustment of wages, and it will continue to be so as long as the system of strikes prevails. Many a long strike, disastrous to both parties, could be avoided if men would acquaint themselves with all the circumstances and allow their better judgment to have control.[58]

This is the attitude that has usually been assumed by the State Mine Inspectors. Usually, too, it is the attitude that has prevailed among Iowa miners and mine operators. As a result labor conditions have not often become critical in the coal mines of Iowa.

In summarizing the Iowa coal situation let us recall that Iowa has produced a maximum of almost 9,000,000 tons of coal in a single year, and that its average annual production for a period of fifty years has exceeded 6,000,000 tons.

Iowa coal is admittedly not as high grade as that found in the Appalachian area, but if it is properly mined, properly treated, and burned in efficient heating units, it will supply abundant heat at a low cost. The best authorities in the field advocate "that Iowa coals should be more widely used, not on patriotic grounds but squarely on economic considerations."[59]

It is reported that Lincoln once said that he knew little about the tariff, but that he was sufficiently informed to know that if Americans buy foreign goods they get the goods, but lose the purchase price, whereas if they purchase homemade goods, they get the goods and keep the money. The use of Iowa coal presents a similar situation. If Iowans use Iowa coal they get an economic product, they aid the Iowa miners and mine operators, and they retain the purchase price within the borders of the Commonwealth of Iowa.[60]

[58] *Biennial Report of the State Mine Inspector*, 1883–1885, pp. 70–75.

[59] H. L. Olin's *Iowa Coal Studies* (Technical Paper No. 3), p. 8.

[60] "Iowa Coal" in *Iowa Factories*, Vol. I, February, 1912, p. 21.

CEMENT

Second in importance among the mineral products of Iowa viewed on a financial basis over a long period of years is cement. Of the total value of Iowa mineral products from 1895 to 1938, approximately 49 per cent came from coal, 18 per cent from cement, 17 per cent from clay products, 8 per cent from gypsum, 4 per cent from lime and stone, and 4 per cent from sand and gravel.[61]

Cement is a composite product, made chiefly of limestone and shale or clay. Portland cement, one of the most commonly used cement products, consists of lime, silica, alumina, and iron, mixed in the proper proportions and heated in properly constructed kilns to a temperature of about 3000 degrees Fahrenheit. The "clinkers" which are formed in the burning process are then ground into powdered cement for common use. Portland cement sets readily when mixed with water and has great strength. Combined with gravel or crushed rock it forms concrete which is used extensively for paving and building construction.[62]

Cement is not, however, a modern product, for it was used in ancient Rome. Julius Caesar led his armies over roads that were paved with blocks of stone set in cement or mortar not unlike modern concrete. This material was also used to some extent in the construction of houses, aqueducts, and other structures. Portland cement was patented in England in 1824. It was not used extensively in America, however, until 1870, and was first manufactured in Iowa about 1906. Materials for the manufacture of cement were, however, known in various parts of Iowa at a considerably

[61] H. Garland Hershey's "A Summary of Mineral Production in Iowa 1895–1938" in *Iowa Geological Survey,* Vol. XXXVII, pp. 456–458.

[62] S. W. Beyer and Ira A. Williams's "Materials and Manufacture of Portland Cement" in *Iowa Geological Survey,* Vol. XVII, pp. 33–85; John E. Briggs's *Iowa Old and New,* pp. 383–387.

earlier date. At Mason City the presence of cement materials was well known, as the name suggests. The rock along Lime Creek in Cerro Gordo County was of good quality and the clay in that region had long been used for brick and tile. The Northwestern States Portland Cement Company was organized and began to operate a mill at Mason City in 1908.[63]

Since the basic parts of cement are lime and clay, and since limestone and clay are found in many areas of Iowa, this industry tended to develop on a decentralized basis and large cement plants have developed in Cerro Gordo, Polk, Scott, and Jackson counties.[64]

Raw materials for the manufacturing of cement are obtained by three methods — quarrying, mining, and dredging. Quarrying — removal from quarries, cuts, or pits — is the most natural and the most common method of obtaining the raw materials. Mining is rarely employed in excavating materials of such wide distribution and of such low value per ton as the raw materials of cement. Occasionally, however, when a thin bed of limestone or shale is being worked, its dip will carry it under such a thickness of other strata as to make mining cheaper, for that particular case, than stripping and quarrying.

Mining is considerably more expensive work than quarrying, but there are some advantages in mining that serve to counterbalance the greater cost per ton of raw materials. A mine can be worked steadily and economically in all kinds of weather, while an open cut or quarry is commonly in a more or less unworkable condition during the winter

[63] John E. Briggs's *Iowa Old and New,* pp. 385–387; A. C. Davis's *Portland Cement,* pp. 1–30.

[64] H. Garland Hershey's "Mineral Production in Iowa for 1939 and 1940" in *Iowa Geological Survey,* Vol. XXXVIII, p. 428; F. A. Welch's "Cement and Gypsum Products of Iowa" in *Midland Schools,* Vol. XLIV, March, 1930, p. 245; *United States Census of Manufactures,* 1939.

months. Moreover, materials obtained by mining operations are usually dry and clean.

Dredging is resorted to only in the excavating of soft, wet raw materials. Occasionally when the deposits are in a basin or depression this method is used. Perhaps not more than ten per cent of the raw materials for cement in Iowa are obtained by mining and dredging combined.[65]

The manufacture of cement requires powerful machinery. First the limestone is dynamited in the quarry and loaded into dump cars by means of huge steam shovels. "From the cars it is dumped into a mighty crusher that munches pieces of rock weighing as much as seven tons like a giant crunching hard candy." Hammer and ball mills then pound the rock into pieces about the size of sand.

Meanwhile, clay has been dried and pulverized. Several tons of ground limestone and clay in the proper proportions are mixed and the material is then placed in kilns, which are equipped with enormous revolving cylinders. Chemists examine the product as it comes from the kilns, and add just the right amount of gypsum. Finally the clinker and gypsum are pulverized into a fine gray powder known as cement. Most of the finished product is placed in sacks or barrels for the market. Some of it "is spouted directly into box cars for shipment to big contractors."[66]

Since cement plays an important rôle in the construction of buildings and roads, its production and distribution may be taken as an index to the building program. In 1908 Iowa cement products were valued at $690,105. By 1910 production had reached $1,386,000. By 1914 it had reached $4,008,915, and by 1920, $8,742,854. In each of the years 1923, 1928, and 1930 production reached a point of more

[65] S. W. Beyer and Ira A. Williams's "Materials and Manufacture of Portland Cement" in *Iowa Geological Survey,* Vol. XVII, pp. 50–52.

[66] John E. Briggs's *Iowa Old and New,* pp. 385–387.

than ten million dollars annually. During the depression years it dropped, in 1932, to $3,907,427, which was about the level of the 1913 production. Following 1932 there was a gradual increase until in 1939 a new high point of $8,529,-107 was reached. With the outbreak of World War II there was a sharp decline in road building and in the use of cement for other purposes. It has been estimated, however, that in the ten-year period following the war, cement products may be double what they were in the ten-year period preceding the war.[67]

CLAY PRODUCTS

Clay products in Iowa, considered over a long period of years, have compared favorably in value with those of cement. Statistics show that in only two years between the years 1895 and 1938 were the clay products valued at less than a million dollars annually. Frequently it has ranged from five million to seven million, and in 1920 a high production of more than ten million dollars was reached.[68]

Clay suitable for the manufacture of clay products is widely distributed throughout Iowa, and plants manufacturing clay products have operated in almost every county of the State. In 1898 clay wares were made by 349 producers in 87 counties. In more recent years production has dwindled somewhat both in regard to volume and distribution. In 1929 there were only 53 plants operating in 31 counties. The valuation of the product had also declined in that year to $5,791,175. In the years that followed there was a further reduction until in 1932 the production was

[67] F. A. Welch's "Cement and Gypsum Products of Iowa" in *Midland Schools,* Vol. XLIV, p. 245; John E. Briggs's *Iowa Old and New,* p. 387; *United States Census of Manufactures,* 1919 to 1939; *Iowa Geological Survey,* Vol. XXXII, pp. 461, 462; *Minerals Yearbook,* 1943, pp. 1246, 1247.

[68] H. Garland Hershey's "A Summary of Mineral Production in Iowa 1895–1938" in *Iowa Geological Survey,* Vol. XXXVII, pp. 462–464.

reduced to $805,799. Although there has been a revival, there has not been a complete recovery to the level of 1920.[69]

The most common use of clay in manufacturing is the making of drain tile, common brick, vitrified brick, face brick, and in fire-proofing. During the early period of Iowa history Iowa lands were wet, and in many places crops could not be produced until the land was drained. Hence from the decade of the eighties until about 1920 many drain tile were used. In more recent years there has been less need of artificial drainage, and this demand for clay has declined.

During the years of the financial depression and also during the war years there has been a restricted building program, with a corresponding decline in the manufacture of brick. These two factors have materially reduced the output of clay products in Iowa. It should be noted, however, that with the return of normal conditions Iowa will be able to supply clay products, perhaps on a larger scale. During the past years the largest clay-producing areas in Iowa have been Cerro Gordo, Webster, and Polk counties. In 1916 — perhaps a typical year — Cerro Gordo County produced clay products valued at $1,943,530. Webster County ranked second with products valued at $1,332,411, and Polk County produced clay products valued at $971,-911.[70]

GYPSUM

Gypsum is a stone-like substance widely used as a build-

[69] James H. Lees's "Mineral Resources of Iowa" in *The Book of Iowa,* p. 149; George F. Kay's "Mineral Production in Iowa for 1916" in *Iowa Geological Survel,* Vol. XXVII, pp. 22–25; H. Garland Hershey's "A Summary of Mineral Production in Iowa 1895–1938" in *Iowa Geological Survey,* Vol. XXXVII, pp. 462–464.

[70] George F. Kay's "Mineral Production in Iowa for 1916" in *Iowa Geological Survey,* Vol. XXVII, pp. 22–25.

ing product. It is a "hydrated calcium sulphate", composed of lime, sulphuric acid, and water. It crystallizes in the monoclinic system, has a hardness of 1.5 to 2, and a specific gravity of 2.32. In its natural state it is not, therefore, excessively heavy, nor is it hard and durable. It may be easily scratched and weathers rapidly. The color of gypsum may be white, gray, or brown. A white, opaque variety of gypsum is known as alabaster. When pure gypsum is heated to a temperature of about 400 degrees Fahrenheit, it loses much of its water content, and from it is formed the plaster of Paris which, when mixed with water, becomes a very hard and durable substance.[71]

Gypsum has long been used as building material. It was known to the Egyptians at the time of the building of the Pyramids, and it was used extensively by the Greeks and the Romans in the development of their ancient architecture. Today it may be found in Asia, Africa, Australia, in central Europe, and in various States of the Union, extending from New York to California. The chief gypsum-producing States are New York, Iowa, Michigan, Ohio, California, and Texas. In the production of gypsum, Iowa has usually stood second in rank, being surpassed only by New York. In recent years, however, it has sometimes been surpassed by Michigan, Ohio, California, or Texas.[72]

The chief gypsum deposits in Iowa are inWebster County, and Fort Dodge has long been known as "the Gypsum City". Deposits are also found in Appanoose County, at Centerville. The presence of gypsum in the vicinity of Fort Dodge was dramatically advertised in 1869 by the notoriety of the "Cardiff Giant", which had been carved from a

[71] *The New International Encyclopaedia*, Vol. X, p. 528.

[72] Frank A. Wilder's "Gypsum: Its Occurrence, Origin, Technology and Uses" in *Iowa Geological Survey*, Vol. XXVIII, pp. 185, 186, 376–379; *United States Census of Manufactures*, 1927–1939.

block of gypsum quarried near that town, buried, and then resurrected.[73]

The first gypsum mill in Webster County was erected in 1872 at the head of Two Mile Creek, better known as Gypsum Hollow. The great thickness of the gypsum deposit in Webster County and its purity, together with its extent, make the supply practically inexhaustible. In 1900 it was estimated that the gypsum beds covered an area of fifty square miles and that not to exceed twenty-five acres of this deposit had been removed. The report added, "there remains twelve hundred and eighty times as much gypsum as has been removed since the beginning of the plaster industry". The average thickness of gypsum deposits suitable for use was ten feet and a single acre would produce 30,000 tons.[74]

Since these estimates were made, vast quantities of gypsum have been used, but an abundance still remains. Statistics show that in 1889, 21,789 tons were produced, valued at $55,250. In 1900, the 184,600 tons removed were valued at $561,588. By 1913 gypsum mining in Iowa had become a million-dollar industry. In 1919 it exceeded two million dollars, and in 1920 it exceeded four millions.[75]

The years of highest production were 1925, 1926, and 1927, when more than six million dollars worth of gypsum was produced annually. Due largely to the financial depression and a limited building program, the years 1928 to 1931 were disastrous for the gypsum industry in Iowa. The value of production dropped at the rate of more than a

[73] Ruth A. Gallaher's "The Cardiff Giant" in *The Palimpsest,* Vol. II, pp. 269–281.

[74] Frank A. Wilder's "Geology of Webster County" in *Iowa Geological Survey,* Vol. XII, p. 141; Frank A. Wilder's "Gypsum: Its Occurrence, Origin, Technology and Uses" in *Iowa Geological Survey,* Vol. XXVIII, p. 185.

[75] Frank A. Wilder's "Gypsum: Its Occurrence, Origin, Technology and Uses" in *Iowa Geological Survey,* Vol. XXVIII, pp. 380, 381.

million dollars a year for five successive years, and a new low point was reached in 1933 when the value was $1,357,-407. Recovery began in 1934. In more recent years production has remained low. It is believed, however, that after the war there will be a very great increase in the use of gypsum.[76]

In 1913 the general law of mines and mining in Iowa as passed in 1911 was made applicable to gypsum mines. Since that time inspections have been made at regular intervals in the interest of safety and sanitation in the mines.

Usually the gypsum mines in Webster County are from twenty to fifty feet below the surface of the ground and stripping and quarrying are frequently feasible. Where mining methods are found to be desirable, however, the gypsum has been found to be of sufficient strength to form a good roof, so mine accidents from the fall of roof materials are much less frequent than is the case in the mining of coal.[77]

In 1910 the Scandinavian Coal Company discovered gypsum near Centerville in Appanoose County. It lay at a depth of more than five hundred feet, however, and was not as thick or as extensive in area as the Fort Dodge gypsum, hence its output is much more limited than that of the Webster County mines.[78]

Gypsum is used chiefly in the manufacture of building products. It is to be noted, however, that it has long been used also as a fertilizer. "Land plaster", the name com-

[76] H. Garland Hershey's "A Summary of Mineral Production in Iowa 1895–1938" in *Iowa Geological Survey,* Vol. XXXVII, p. 467; *Minerals Yearbook,* 1943, p. 1345.

[77] *Biennial Report of the State Mine Inspectors,* 1942-1943, pp. 55, 56; *Laws of Iowa,* 1913, Ch. 198.

[78] Frank A. Wilder's "Gypsum: Its Occurrence, Origin, Technology and Uses" in *Iowa Geological Survey,* Vol. XXVIII, pp. 129, 199, 209, 216, 469; *The Book of Iowa,* pp. 151, 152.

monly applied to pulverized but uncalcined gypsum, is of special value in fertilizing fields on which clover is to be grown. There is a familiar story that Benjamin Franklin scattered land plaster in a clover field, so as to form the sentence, "This has been plastered with gypsum". The sentence, it was said, could be read from a distance because of the greater height and richer color of the clover. In Iowa in recent years, as well as in Pennsylvania in Franklin's day, gypsum has been extensively used as a fertilizer.[79]

LIME AND LIMESTONE

The production of lime and limestone in Iowa during a long period of years has followed a trend differing from that of other mineral products. From 1896 to 1926 there was little variation in the normal annual production. Seldom did it fall below a value of $500,000 annually and seldom did it reach beyond $900,000. From 1927 to 1938 there were periods of greater fluctuation and there was a much greater annual production. Only once, in 1933, did production values fall below a million dollars annually; it frequently approached two million. In three successive years it exceeded three million, and in 1937 it exceeded the four million dollar mark.[80]

SAND AND GRAVEL

The production of sand and gravel has increased gradually with the years, with only an occasional decline. From 1906 to 1912 products were valued at less than $500,000. From 1912 to 1917 production increased gradually until it

[79] Frank A. Wilder's "Geology of Webster County" in *Iowa Geological Survey,* Vol. XII, p. 150; Frank A. Wilder's "Gypsum: Its Occurrence, Origin, Technology and Uses" in *Iowa Geological Survey,* Vol. XXVIII, p. 187.

[80] H. Garland Hershey's "Mineral Production in Iowa for the Years 1933–1938" in *Iowa Geological Survey,* Vol. XXXVII, pp. 471, 472.

reached the million dollar mark. By 1920 it had reached almost two million dollars. During the next decade there were fluctuations, but by 1930 production had reached two and a half million dollars. There was a new low point in 1933, then a steady gain until 1938 when it again attained a height of $2,299,000. During the years of the war, production has been low. But it is believed that after the war production will reach a new all-time high point.[81]

SPECULATIVE ACTIVITIES

Now and again there have been periods in Iowa history when people have sought to obtain wealth through the mining of products which they believed would be found in Iowa soil, but which in reality have not been found in paying quantities. Attempts have been made to extract gold, silver, and oil and gas from Iowa soil. But because of their very limited quantities these have represented speculative rather than real values.

Residents of Iowa have seldom attempted to extract gold directly from Iowa soil, but even this speculative scheme has not been entirely neglected. In 1901 Samuel Calvin made it clear that there was little hope of finding gold in Iowa. Gold, he said, is found either "in veins in the crystalline rocks", or in mountainous areas, and it may be found in the sand and gravel of the streams. But conditions are not favorable for its discovery in Iowa. Occasionally, said Calvin, gold may be "washed out of the sand banks and river gravels within the limits of our state", but the "resident of Iowa who imagines he has discovered a gold mine on his home farm is certainly basing his judgment on deceptive appearances of some kind."[82]

[81] H. Garland Hershey's "Mineral Production in Iowa for the Years 1933–1938" in *Iowa Geological Survey,* Vol. XXXVII, pp. 472–474.

[82] Samuel Calvin's "Ninth Annual Report of the State Geologist" in *Iowa Geological Survey,* Vol. XI, pp. 18–20.

The discovery of small quantities of gold has, however, been reported in Des Moines, Lee, Fayette, Hardin, Winneshiek, and Palo Alto counties.[83] The *Des Moines Register* for October 8, 1922, printed a picture of what was reputed to be "The Only Gold Mine in Iowa". It represented four men operating an "amalgamator", seeking to find gold nuggets in the sand and gravel on the Bernard Smith farm near Graettinger in Palo Alto County, but the comment concerning the picture gave no information as to the amount of gold obtained.[84]

The previous year there had been great excitement over the "discovery" of gold in that area, and Graettinger had been acclaimed "The Gold Mine City of Iowa". The following comment from the local newspaper at that time tells something of the story:

> On May 20, 1921, the Thomas J. Dee Co. of Chicago, a reliable firm of smelters, refiners and assayers reported that the sample of sand from the Bernard Smith farm tested $26.92 per ton in gold and silver. This was the start of the gold fever. Samples have been sent to Prof. Kinney at Des Moines, to the state college at Ames, to the mints at Philadelphia and Denver. To date no returns have been received on these samples. Wednesday Rock Island officials in Chicago wired to Estherville to make an exhaustive examination of gold situation at Graettinger. Thursday a second telegram asked when samples would be mailed to Chicago office. Freight Agent Halleck of Estherville visited the local gold field Thursday and secured samples from the Smith farm and from the Rock Island pit. He also took a number of photographs at both places. Tuesday the Times received the following telegram from the Newspaper Enterprise Association of Chicago: "Please wire not more than one hundred fifty words whether reported gold rush your city is true; also first name Farmer Smith whose farm gold was struck. Send collect day press rate immediately. Must have before five Tuesday

[83] Charles Rollin Keyes's "Annotated Catalogue of Minerals" in *Iowa Geological Survey*, Vol. I, p. 185. See also *Iowa Geological Survey*, Vol. III, pp. 400, 485, Vol. XV, p. 545, Vol. XVI, pp. 140, 141, Vol. XXII, p. 449.

[84] *The Des Moines Register*, October 8, 1922.

night.— R. J. Gibbons, Newspaper Enterprise Assn., Chicago Evening Post Blg''.[85]

The gold rush was temporary, but it was revived from time to time. On April 24, 1924, the *Graettinger Times* said:

> Gold mining activities in this locality took on a new aspect last week when the long looked for "gold machine" arrived with its crew of workmen. Representatives of the Gold Bar Mining Company to whom Mr. Herke leased his gold bearing deposits last year are on the ground and are installing the equipment preparatory to the opening of the gold fields in this territory. Tents have been pitched along the grassy slope of the Jack Creek dry bed on the Herke farm about one mile south of the Smith fields and but a short distance east of the Fitzpatrick farm place. The first equipment to reach here was accompanied by O. F. Rose, foreman, and Denver Rose and Ed Meyer. Other parties arrived the first of the week. A Times reporter visited the gold field the last of the week and interviewed the gentlemen in charge. Mr. Meyer, who furnished us much of the information above, is a very pleasant gentleman to meet and is well posted in his line of business. He visited this locality last fall and secured a number of samples of gravel. These he had tested and the test varied from $17 to $29 per ton. He said that at $5 per ton the machine could be operated profitably. The samples taken last fall, however, were secured on the Smith farm. The officers of the company have not made any arrangements with Mr. Smith for operating on his place. They secured a lease from Mr. Herke and it is on his farm that the first actual mining operations in this locality will take place. Graettinger people are taking the gold mining activities rather quietly and as a matter of course. There is very little of the excitement that prevailed two years ago when gold was first discovered.[86]

There have been attempts also to find silver in paying quantities beneath the Iowa soil. In 1870 and 1871 excitement ran high in Cedar County because of the reported dis-

[85] Copied in a letter to the author, from K. M. Chase, Superintendent of Schools, Graettinger, Iowa, February 22, 1945.

[86] Copied in a letter to the author from K. M. Chase, Superintendent of Schools, Graettinger, Iowa, February 22, 1945.

covery of silver in Iowa Township near the town of Rochester. Experts examined the ore, assays were made, and silver was reported "in paying quantities". Prospectors roamed the hills and mines were opened in several places. In 1871 Rochester was known as "Silver City".

The Tipton Advertiser, March 16, 1871, said:

> A stock company has been formed with a view of operating the mines, and a large quantity of land leased. The quantity of ore seems almost unlimited, and, if it is as rich as reported, it certainly will pay to work it.
>
> The friends there are very much elated with the prospect. Time will determine whether it will pay or not. Should it prove a good thing, it will add a great deal to the wealth of our county.

But, alas, the find was not as rich as many had hoped that it might be, and comments relative to the project were frequently in the nature of jests. One newspaper reporter facetiously commented:

> In consequence of the great excitement in the city of Rochester on the silver question, property is said to have risen wonderfully in value, and even the Cedar River went up last week. In fact, so great is the upward tendency of everything down there that old inhabitants have the greatest difficulty in getting down their medicum of poor whiskey, the miners can hardly keep the bottom of their hole under their feet, and the soil would answer for yeast if it wasn't quite so sandy.[87]

Thus silver mining in Iowa in its day created considerable speculative interest, but it has never proved to be of economic importance. Indeed, silver is very rarely mentioned in volumes of the Iowa Geological Survey, and where it is mentioned it is made clear that it "has never assayed percentages high enough to pay for extracting."[88]

[87] *The Tipton Advertiser,* March 9, 16, 1871; *The Clinton Herald,* November 15, 1923.

[88] Charles Rollin Keyes's "Annotated Catalogue of Minerals" in *Iowa Geological Survey,* Vol. I, p. 186.

Prospecting for oil and natural gas has been more common in Iowa. Indeed, there have been many people who have believed or at least hoped that rich oil fields might be found beneath the Iowa soil. Samuel Calvin, however, made it clear in 1901 that the conditions for the production of oil and gas in large quantities did not exist in Iowa. Despite this fact there have been many attempts to obtain these products. There seems to have been a quite common belief that one could find oil almost anywhere in Iowa if only one would dig deep enough. Unfortunately this appears not to be true, although small quantities of gas have sometimes been found in digging wells. Reports of such findings have been made in Boone, Decatur, Emmet, Fremont, Guthrie, Hamilton, Harrison, Johnson, Louisa, Polk, Scott, and Taylor counties.[89]

Such findings have not paid dividends but they have served to stimulate new hopes, hopes albeit that are not well founded. The situation with regard to oil, which applies also to gas, was well stated by Melvin F. Arey in the *Iowa Geological Survey* in 1910, when he said: "Suffice it to say that there is only the remotest possibility of finding oil in paying quantities anywhere in Iowa, due to the lack of certain conditions universally required as essential to the storage of oil in the earth."[90]

Despite all the evidence to the contrary a new enthusiasm for finding oil in Iowa developed in the decade of the thirties. In 1938 thousands of acres of Iowa lands were leased for prospecting for oil and gas. The boom was started by a report by W. G. Osborn, which appeared in a gas and oil trade journal, extolling the possible values of a large area

[89] George F. Kay's "Twenty-fifth Annual Report of the State Geologist" in *Iowa Geological Survey,* Vol. XXVII, p. 8. See also pp. 61, 268, and index to Vols. XI, XXIII, and XXV.

[90] Melvin F. Arey's "Geology of Butler County" in *Iowa Geological Survey,* Vol. XX, p. 51.

of land in southeastern Iowa and adjoining States. There was in this entire area only one producing oil well, and it was in the State of Kansas, but the report of the possibilities of oil and gas gave rise to much excitement and much leasing of land. This outburst of interest revived memories of two oil wells — one 5000 feet deep at Clarinda and another 3000 feet deep — which had been dug in Taylor County several years before.[91]

The talk of prospecting for oil was of such interest that two bills were introduced in the General Assembly of Iowa, in 1939, which sought to reward prospectors. One of these measures would have appropriated $25,000 prize money to the person or persons who should dig the first oil-producing well — a well that would yield at least 100 barrels of commercial crude oil per day, for thirty consecutive days. The second measure would have authorized the use of $40,000 by the Retrenchment and Reform Committee and the Executive Council for the promotion of oil wells. Neither of these bills became a law.[92]

The Forty-eighth General Assembly, in 1939, did, however, pass one measure relative to oil and gas wells. This measure provided that protection should be given underground fresh water strata, while drilling for oil. It provided for "offset drilling", plugging dry and abandoned wells, liens for labor and materials, and reports to be filed with the State Geologist indicating the location of any new wells. It further authorized the State, or any municipality, to enter into a gas or oil lease upon such terms as might be agreed upon, subject to the approval of the district court of the county in which the land is located.[93] But despite

[91] *The Des Moines Register*, December 11, 1938.

[92] House File No. 433 and Senate File No. 363, Forty-eighth General Assembly.

[93] *Laws of Iowa*, 1939, Ch. 63.

extensive digging and legislative plans for further prospecting, Iowa has not yielded gas or oil in paying quantities.

Iowa leads the States of the Union in the production of corn. It has valuable and extensive mining interests, too, but gold and silver, oil and gas are not among its assets. Samuel Calvin expressed this view many years ago when he said: "Iowans will do well to remember that, even in a state as munificently endowed as theirs, there are some things and some favoring conditions which Nature has failed to provide, there are some drafts on Nature's apparently limitless bounty which just go unhonored, there are some enterprises looking to the development of natural resources which in the very condition and structure of things are absolutely hopeless. Let them rather reserve all of their capital and energies for the development of the splendid resources which do exist and not waste any in the useless search for geological products which all enlightened experience shows could not, by any known possibility, be developed in the state."[94]

Iowa is indeed an agricultural region. Its wealth, its leadership, its renown lie chiefly in this field. But its mineral products, too, have great values — values far in excess of those of which we are accustomed to think. In a typical year the value of mineral products mounts to some $35,000,000. In 1920 it reached the high point of more than $57,000,000. Thus we may well remember that Iowa has great mineral wealth.[95]

JACOB A. SWISHER

THE STATE HISTORICAL SOCIETY OF IOWA
IOWA CITY IOWA

[94] Samuel Calvin's "Ninth Annual Report of the State Geologist" in *Iowa Geological Survey*, Vol. XI, p. 27.

[95] H. Garland Hershey's "A Summary of Mineral Production in Iowa 1895–1938" in *Iowa Geological Survey*, Vol. XXXVII, p. 458.