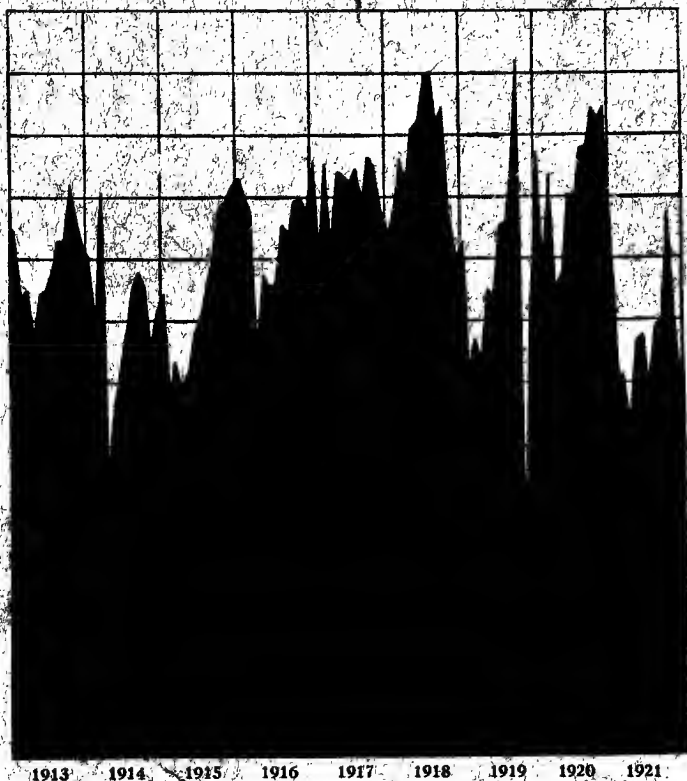


THE COAL MINERS' INSECURITY



THE IRREGULAR PRODUCTION OF SOFT
COAL IN THE LAST NINE YEARS

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THE COAL MINERS' INSECURITY

FACTS ABOUT IRREGULARITY
OF EMPLOYMENT IN THE
BITUMINOUS COAL INDUSTRY
IN THE UNITED STATES

By

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PREFACE

The purpose of this pamphlet¹ is to bring together, in small compass, dependable data drawn mainly from publications issued by state and federal bureaus, which show some of the economic facts behind the unrest of the miners in the bituminous or soft coal industry. No solution of the problem of human relations in this industry, nor any satisfactory wage adjustment, will be possible until industrial leadership has proved itself competent to give to the men employed a reasonably continuous opportunity to work while supplying coal to the country in the quantities required. This report does not undertake to suggest the methods by which efficiency and stability may be attained in bituminous mining, but merely to outline certain vital facts which affect the daily working life of the coal miner and explain his willingness to strike in defense of his wages. Only by understanding these facts can the public exert its influence toward more co-operative human relations in the industry.

For thirty-two years, from 1890 through 1921, the average number of days of operation of the bituminous mines of the country has been only 214 a year. The miners, of course, can neither work nor earn when the mine is not operating. Meanwhile the number of new bituminous mines has steadily increased. Instead of digging coal regularly throughout the year in those mines already in operation, many more have been opened than were required to supply the country's needs, with the result that mines and miners are idle for nearly a third of the working days of the year.

The miner has naturally sought rates of pay sufficiently high to enable him in his 214 working days to earn enough to maintain himself and his family throughout the year. The operator, seeking to keep down costs, compares these rates with the hourly

¹ The basis of this report is a manuscript which was prepared for the Russell Sage Foundation by Louis Bloch. Later the diagrams were constructed and some additional material supplied by members of the staff of the Foundation.

or daily earnings in other industries as evidence that the miner is over-paid, but he does not usually take into account the more regular employment in other occupations. The public, eager for lower prices for coal, is not in sympathy with any demand of labor which would seem to lead to higher prices. Thus the attention of all three groups is fixed upon the wage rate, over which a conflict of interests develops, while the irregular operation of the bituminous mines, which is the cause of the unfortunate combination of high rates and low earnings, receives no effective consideration.

Every two years a wage contract is negotiated in the mining industry between the United Mine Workers of America and the operators, and every two years the public faces the danger of a widespread strike if the representatives of miners and operators cannot reach an agreement satisfactory to both sides. Yet no basis for a permanently satisfactory contract between miners and operators in this branch of the coal industry can be attained through merely changing the wage rates, while employment continues to be intermittent and uncertain. If too many mines are in operation and too many miners are scantily employed in them, the condition is not one to be improved through periodic contests between the operators and the union over rates of wages per ton or per day. Over-development can be remedied only by a careful plan of regulation to limit the bituminous mines in operation to a number which could supply the country's need if reasonably full use were made of their capacity. In such a plan there would be no permanent conflict of interest, since the public, the operator, the investor, and the miner would all profit by a more efficient organization of the bituminous coal industry, which would make possible more regular employment for the miner, reasonable prices to the public, and wise conservation of the country's soft coal supply for the future.

The facts in this report relate solely to the mining of soft coal, not anthracite. Instability and irregular operation are much less characteristic of the anthracite industry. The natural supply of anthracite coal is limited, while bituminous coal deposits are abundant. In the anthracite fields, therefore, over-development does not exist as it does in the bituminous areas. Increase in the selling prices of soft coal results in the opening of more bituminous mines, and once open, deterioration of the

property and loss of capital can be prevented only by operation of the mine. The number of miners at work under the more favorable conditions of anthracite mining is very much less than the number in the disorganized industry of bituminous mining. The men in the bituminous coal mines number about 600,000, while only 150,000 are at work in the anthracite mines.

Not the wage rate only but the opportunity to earn wages regularly is vital to the miner. Not wage rates only but stability and efficiency of production affect the public interest. All industry pays tax for capitalizing and operating more bituminous mines than are required for the country's needs. The improvement of human relations in industry which the public conscience now demands can be attained in the bituminous mines only by such thoroughgoing reorganization of the entire industry as will stabilize production and make employment regular.

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April 15, 1922

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THE COAL MINERS' INSECURITY

"They have opened three mines where only two were needed; they have employed three men where only two were necessary. These mines and men can find productive work only during 175 instead of a possible 300 days in a year . . .

"This idle time of the miners is not confined to one season or period during which they can find employment elsewhere. To the contrary, the men are always subject to call, for which reason they urge a greater daily wage that their annual income may be sufficient for their needs."¹

This statement was made not by coal miners but by their employers, the coal operators of the bituminous coal fields. If it is accurate, it reveals a perplexing dilemma. A miner is paid for the number of tons he sends out of the mine. The men in a mine earn no wages on days when the mine is closed. Is it true that the miner is given opportunity to work less than three days out of five working days? Is this intermittency in work so uncertain that he never knows from week to week, or even from day to day, how often the whistle will blow to tell the men in the camp that the mine will be open for work? If the industry must keep too many men "subject to call," can the wage rates be made high enough to pay the cost of living for the miner and his family the year round? How great a tax does this intermittency of coal production levy upon the possible earnings of

¹ Illinois Coal Operators' Association and the Indiana Bituminous Coal Operators' Association. A Statement of Facts Concerning the Conditions in the Bituminous Coal Industry in the States of Illinois and Indiana. December, 1914, pp. 2, 6.—This statement was addressed to the President of the United States "for his consideration in connection with the appointment of the Federal Trades Commission." In it the operators besought relief from "the conflicting regulations of the states and the nation," which, they said, rendered them powerless to prevent waste in the industry. "Only the nation," they declared, "can reverse this tendency and provide against it."

the miner, upon the pockets of the buyer of coal, and upon the profits of investors in the industry?

To outline the pertinent facts as a basis for discussion is the purpose of this pamphlet. The statistics which are available in governmental publications show how much soft coal the country uses; how rapidly the number of mines in operation has been increasing; how many days in the year bituminous coal mines are operated; what causes are responsible for lack of opportunity to work; and how employment varies from season to season. Concerning the most important of all the facts about employment in the industry,—the miner's actual earnings in a year compared with what he is capable of earning if he had the opportunity to work regularly,—the information is unfortunately very meagre, but such statistics as are available will be set forth in later pages.

THE COUNTRY'S USE OF SOFT COAL

"At the present time America requires less than 500,000,000 tons of bituminous coal a year, while the capacity of the mines in operation is over 700,000,000 tons."¹ This comparison of needs and capacity for production was made in 1920 by the United States Bituminous Coal Commission appointed as the means of ending the miners' strike for higher wages which occurred in November, 1919. A decidedly larger estimate of excess in capacity has been made by F. G. Tryon of the United States Geological Survey, a thoroughly competent specialist on mining statistics. In December, 1920, in a speech before the American Economic Association, he said: "Since 1915, when the spot price began to rise sharply in response to the war-time demand, there has been an extraordinary increase in capacity. In 1915 the annual capacity of the soft coal mines was about 675,000,000 tons. Today it is certainly 800,000,000 tons, and there is evidence pointing to a figure of 900,000,000 tons. The increase in five years has therefore been between 125,000,000 and 225,000,000 tons, or between 19 and 33 per cent. . . . The bituminous industry was probably never more heavily overdeveloped than it is today."²

¹ United States Bituminous Coal Commission, Majority and Minority Reports to the President, 1920, p. 26.

² Tryon, F. G., The Irregular Operation of the Bituminous Coal Industry; in American Economic Review, Supplement to Vol. XI, No. 1, March, 1921, p. 62.

Unlike anthracite coal, which is largely used in households, bituminous coal is the fuel of transportation and industry. Diagram 1 shows how the country's output of bituminous coal is consumed. The facts are for the year 1915, which was fairly typical of other normal years in the proportionate demands of the several industries for soft coal, though the total consumption in that year was somewhat less than normal.

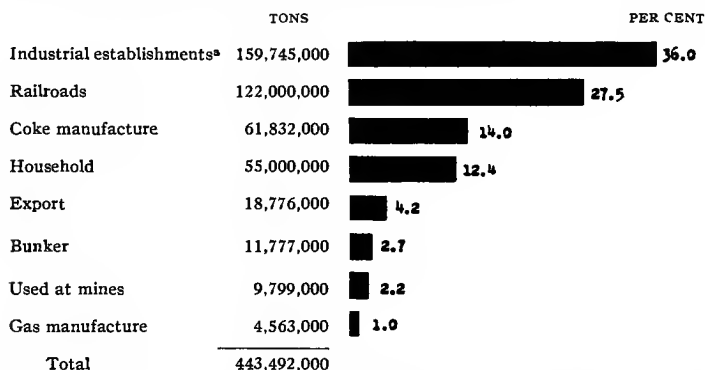


Diagram 1.—Bituminous coal consumed in the United States in 1915, by uses^b

^a Includes electric utilities.

^b Data from United States Fuel Administration, Report of the Distribution Division, 1918-1919, Part I, Distribution of Coal and Coke, p. 12.

The significance of the figures for our discussion is their evidence of the close connection between the soft coal mines and the other industries of the country. The regularity of demand for the goods and services of business in general largely determines the regularity of operation of the mines. General business depression speedily affects the employment of the miners. On the other hand, efficiency and economy of management of the bituminous mining industry directly influences primary costs in all other business. The fact, shown in Diagram 1, that over 77 per cent or more than three-fourths of the soft coal purchased in a typical year was used by industrial establishments, by railroads and in coke ovens, shows how dependent are the soft coal mines upon general business conditions. Only 12 per cent was used as household fuel and only 1 per cent for gas production.¹ While the

¹ Coal used for production of electricity is included in the diagram with that used by industrial establishments, because the principal use of electric power is for industrial purposes.

purchase of soft coal by householders in advance of need, instead of waiting until production is at its highest point, would help to make employment regular for the miners, it would nevertheless affect only 12 per cent of the total output. More important to the bituminous mining industry is regularity of purchase by manufacturers, railroad companies, and makers of steel.

THE CAPACITY OF THE BITUMINOUS MINES

The largest soft coal fields are found—in order of the amount of their production—in Pennsylvania, West Virginia, Illinois and Ohio, with smaller fields in Kentucky, Indiana, Alabama, Colorado and scattered areas in other states.¹

How far their combined capacity for production exceeds the needs both of industries and of households for coal has been pointed out in the statements, already quoted, of the United States Bituminous Coal Commission and of the statistician of the Geological Survey, that the bituminous mines actually in operation can produce 700,000,000 or more tons a year while the nation requires approximately 500,000,000. This over-development is reflected in the spreading of work over too many mines and among too many men.

The facts for Illinois, which is the third largest producing state, may be regarded as roughly representative of other large bituminous coal fields. The working time in Illinois has averaged less than in the Appalachian coal regions but the difference is merely one of degree. Table 1 shows the amount of coal produced, the number of men at work, and the days of employment in mines of various sizes in Illinois for the year ended June 30, 1919. The table includes data for shipping mines only. These are the mines which distribute coal outside the immediate locality. Of all the coal produced, a small part is used at the mine for steam and heat, a part is made into coke at some mines, and a small part is sold locally. The "local" mines produce an inconsiderable amount of the total tonnage.

Table 1 shows that the average number of days of operation of all the Illinois shipping mines was only 190 in the year which ended on June 30, 1919.² The small mines averaged fewer

¹ United States Geological Survey, Coal in 1918, Part A, Production, Insert.

² The period covered in this table is not the calendar year but the last half of 1918 and the first half of 1919. Comparison with the average days of opera-

TABLE 1.—MINES, TONNAGE, MEN EMPLOYED, AND AVERAGE DAYS OF MINE OPERATION, BY CLASSES OF MINES, ILLINOIS SHIPPING MINES, YEAR ENDED JUNE 30, 1919^a

Mines producing	Mines		Tons produced		Men employed		Average days operated
	Number	Per cent	Number	Per cent	Number	Per cent	
Less than 50,000 tons	91	24.4	2,400,238	3.3	4,836	5.5	169
50,000 and less than 100,000 tons	60	16.1	4,557,564	6.2	7,336	8.3	180
100,000 and less than 200,000 tons	93	24.9	13,723,060	18.6	19,881	22.6	195
200,000 and less than 400,000 tons	78	20.9	22,877,039	31.0	26,573	30.2	205
400,000 and less than 600,000 tons	33	8.9	15,936,120	21.6	16,744	19.1	201
600,000 tons and over	18	4.8	14,257,700	19.3	12,592	14.3	215
Total	373	100.0	73,751,721	100.0	87,962	100.0	190

^a Compiled from data for individual mines presented in the Annual Coal Report for 1919, State of Illinois, Department of Mines and Minerals, pp. 4-9.

days of operation than the larger ones, and for those producing less than 100,000 tons a year the combined contribution to production was 9.5 per cent of the total for the state, while the same small mines employed a slightly disproportionate number of men, 13.8 per cent of the total. The size of the mine is, however, not the controlling factor in production. The thickness of the seam of coal, the use of machinery, and other surrounding conditions are probably more important than the size of the mine, and these differences do not appear in the statistics quoted. The important point brought out in the table is the wide variation in the

tion for the country as a whole, which are given for the calendar year, is, therefore, impossible. The average days of operation of all bituminous mines in the country was 249 in 1918 and 195 in 1919. (See Diagram 4.) In the last half of 1918 and the first half of 1919, production of bituminous coal fell off greatly as compared with the other six months of each of these years. (Diagram 6.) Illinois' average of 190 days for the twelve months ending June 30, 1919, therefore, was probably not very different from that of the country as a whole.

average number of days of operation of the mines, from 169 to 215 in the same year for the different groups of mines.

Even in regularity of operation, however, the size of the mine is not the cause of differences. Some small mines work as regularly as some of the large producers, and some large mines are idle as many days in the year as their smaller competitors. This fact is brought out clearly in Diagram 2, which shows the days of operation for the same mines for which statistics are given in Table 1.

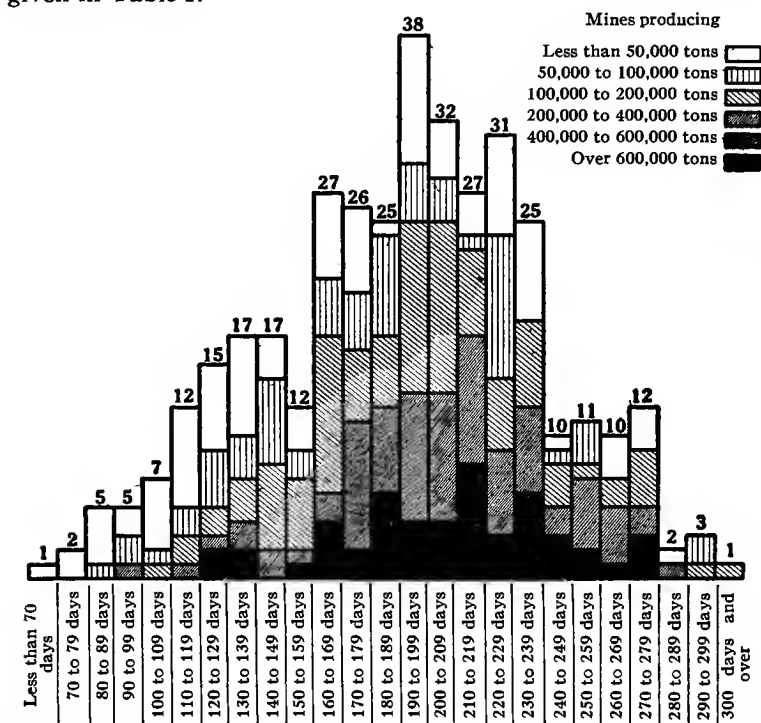


Diagram 2.—Number of shipping mines in Illinois operating specified number of days during the year ended June 30, 1919, by size of mines

In Diagram 2 the variation in the number of days of operation in a year is even more startling, since it is not obscured in averages. Some mines, both large and small, were open as few as 120 days in the year, while one was recorded as having "less than 70" days of operation. The largest group operated between 190 and 199 days. Only one mine worked as many as 300 days in the year,

Clearly the supply of coal was obtained from more mines than were necessary, operating, therefore, only part of the year. Other conditions being equal, fewer mines could have produced the 74,000,000 tons of coal in Illinois, had they been operated regularly throughout the year. To illustrate this possibility, it may be pointed out that the Illinois mines having an annual production of 200,000 tons or over in the year 1919, produced 53,000,000 tons in the twelve months considered in Table 1. These mines were operated, on an average, 205 days during that year. Had they been operated a full year of 304 days,¹ at the same rate of production, they could have turned out 79,000,000 tons of coal, or 5,000,000 tons more than the output of all the mines together. In other words, if the same rate of production had continued for 304 days, the state's output of coal in that year could have been secured from about 35 per cent of the mines with steady work for 64 per cent of the miners. Thus, the facts seem to show that insecurity of employment for the miner of bituminous coal results from the operation of more mines and the employment of more miners than the industry can reasonably support.

INCREASE IN MINES

That the bituminous coal industry has grown steadily during the three decades since 1890, and also that unemployment of the miners during a large part of the working year has been a constant feature of the industry, is shown in Table 2. Diagram 3 shows the increase in number of miners, as well as in the tonnage produced and the days of operation year by year since 1890.

Table 2 shows that the average annual output of coal during the five-year period ending with 1919 was in round numbers 507,000,000 tons. This output of coal was accomplished in an average of 224 working days. If a working year of 304 days had

¹ We shall assume that 304 working days is a fair standard of measurement of the maximum possible working year for the operation of a mine, allowing for 52 Sundays and 9 holidays out of the 365 days in the calendar year. The absenteeism of individual workmen, such as accidents or illness, would reduce further the reasonable expectation of days of employment for the miner. Moreover, conditions inevitably affecting an industry like bituminous coal would make it unreasonable to expect that this maximum number of days of operation would be an easily attainable standard. We are concerned here with the possible number of days of operation of the mines as a standard of measurement of regularity of operation of the industry rather than with the average days of employment which may reasonably be expected for the individual miner, or a reasonable expectation of practice for the mine.

TABLE 2.—AVERAGE ANNUAL PRODUCTION AND ESTIMATED FULL YEAR PRODUCTION OF BITUMINOUS COAL MINES IN THE UNITED STATES FROM 1890 TO 1919, BY FIVE-YEAR PERIODS^a

Period	Average tons produced per year	Average days operated per year	Average tons per day	Possible tonnage at same rate per full year of 304 working days	Excess of full year over average annual production	
					Tons	Per cent
1890-1894	120,653,153	211	571,816	173,832,064	53,178,911	44
1895-1899	156,058,560	205	761,261	231,423,344	75,364,784	48
1900-1904	251,954,028	223	1,129,839	343,471,056	91,517,028	36
1905-1909	353,002,993	213	1,657,291	503,816,464	150,813,471	43
1910-1914	434,852,490	216	2,013,206	612,014,624	177,162,134	41
1915-1919	506,876,698	224	2,262,842	687,903,968	181,027,270	36

^a Data for production and average days of operation for each year from United States Geological Survey, Coal in 1918, Part A, Production, pp. 711, 717; and subsequent publications of United States Geological Survey.

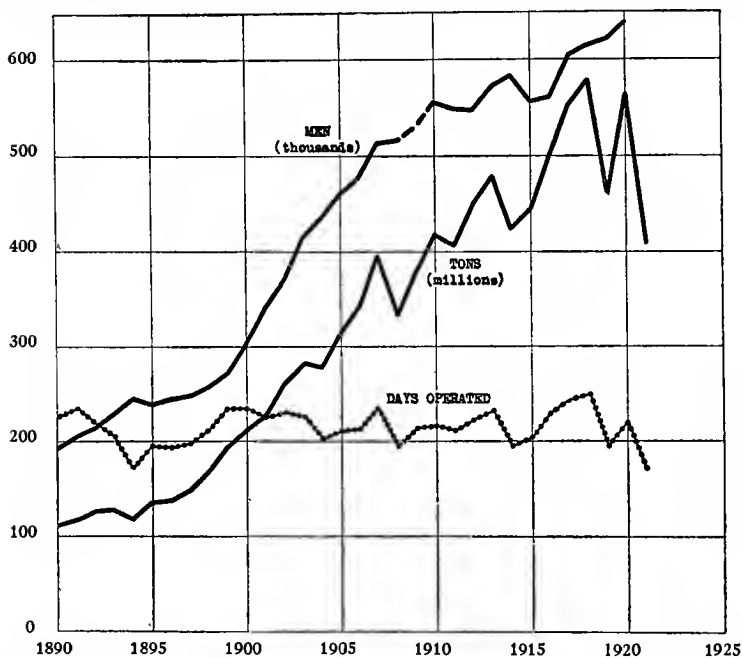


Diagram 3.—Miners employed, tonnage produced, and average number of days operated by the bituminous coal mines in the United States, 1890 to 1921, by years

been maintained the average annual production at the same daily rate would have been about 688,000,000 tons, an excess of 181,000,000 tons, or 36 per cent. This excess of capacity over production represents a surplus of many thousand men employed in the industry. For instance, in 1918, when the average output per miner was high, 942 tons was the average amount of coal produced per man,¹ and at that rate it would take about 192,000 mine workers to mine the 181,000,000 tons, which was the difference between actual and full-time production in 1919.

The increase in demand for coal has not resulted in the more regular operation of mines already open. New mines have been opened and more men employed, while the number of working

TABLE 3.—NUMBER OF BITUMINOUS COAL MINES AND TONNAGE PRODUCED IN THE UNITED STATES IN 1913 AND IN 1917, BY CLASSES OF MINES^a

Mines producing	Mines				Tons produced			
	1913		1917		1913		1917	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Less than 10,000 tons	1,728	29.9	2,193	31.7	6,280,271	1.3	8,824,023	1.6
10,000 and less than 50,000 tons	1,558	27.0	1,966	28.5	42,292,052	8.9	51,596,000	9.4
50,000 and less than 100,000 tons	959	16.6	1,044	15.1	69,018,483	14.4	74,894,269	13.6
100,000 and less than 200,000 tons	837	14.5	914	13.2	118,475,544	24.8	129,485,524	23.5
200,000 tons and over	694	12.0	792	11.5	241,463,241	50.6	285,365,741	51.9
Total	5,776	100.0	6,909	100.0	477,529,591	100.0	550,165,557	100.0

^a Data from United States Fuel Administration, Report of the Distribution Division, 1918-1919, Part I, Distribution of Coal and Coke, p. 19.

¹ United States Geological Survey, Coal in 1918, Part A, Production, p. 717.

days has shown no appreciable increase. Diagram 3 shows the dead level of days of operation while total tonnage and the number of miners have both grown steadily larger.

Moreover, as Table 3 shows, the small mines increased in numbers in the period between 1913 and 1917 more rapidly than the large ones,—a fact which makes more complicated the problem of stabilizing the industry, since regulation of small, scattered and unstable operations is difficult. Table 3 shows the changes between 1913 and 1917 in the number of mines and in the total production of coal in mines of different sizes. In these facts for the period through 1917, the full effect of our participation in the war was not yet evident.

Table 3 shows that in 1917 the mines in the United States numbered 6,909, which was an increase of 1,133 mines or 20 per cent over 1913. In 1917 the smaller mines were more numerous, in proportion to large ones, than in 1913, when the number producing on the average less than 50,000 tons annually was 3,286, or 57 per cent of all mines. By 1917 this number had increased to 4,159, or 60 per cent of the bituminous mines of the country, but these 60 per cent produced only 11 per cent of the total tonnage. In 1917 the mines with an output of 100,000 tons or more constituted 25 per cent of all the mines but produced 75 per cent of the total output of coal, while the other 75 per cent of the mines together produced only 25 per cent of the coal.

INCREASE IN MINERS

That the increase in mines has been accompanied by an increase in miners, rather than by more regular employment for those already in the industry, is clearly indicated again in the following table. Table 4 shows how the number of employes in the bituminous industry has increased and how the days of operation have varied since 1890. As in Table 2, the figures are given in five-year periods and the average number of days of mine operation is brought forward from that table.

The number of employes in the industry has increased since the five years ending with 1894 from 217,000 (in round numbers) to 592,000 or 173 per cent. All through those five-year periods from 1890 to 1919, the average number of days of mine operation, or, expressed in terms of the miners' interest, the opportunity for employment, has remained depressingly low, the averages for

TABLE 4.—AVERAGE AND RELATIVE NUMBER OF EMPLOYEES AND OF DAYS OF OPERATION FOR BITUMINOUS COAL MINES IN THE UNITED STATES FROM 1890 TO 1919, BY FIVE-YEAR PERIODS^a

Period	Employees		Days of operation	
	Average	Relative	Average	Relative
1890-1894	217,174	100	211	100
1895-1899	251,739	116	205	97
1900-1904	373,655	172	223	106
1905-1909	492,144 ^b	227	213	101
1910-1914	561,866	259	216	102
1915-1919	591,801	273	224	106

^a Data from United States Geological Survey, Coal in 1918, Part A, Production, p. 717, and subsequent publications.

^b Average for four years. Data for 1909 lacking.

the five-year periods varying from 205 to 224 days in the year. Again the facts show work spread thin over the year and covering not much more than two-thirds of it. Although a slight increase is shown in the number of days of operation during the period from 1915 to 1919 as compared with 1890 to 1894, the year 1921 has shown the greatest loss of working time of any year in the last three decades.

These figures are for the country as a whole. In Illinois, as Table 5 shows, the opportunity to work has actually decreased while the number of men employed has more than doubled.

TABLE 5.—AVERAGE AND RELATIVE NUMBER OF EMPLOYEES AND DAYS OF OPERATION FOR BITUMINOUS COAL MINES IN ILLINOIS FROM 1890 TO 1919, BY FIVE-YEAR PERIODS^a

Period	Employees		Days of operation	
	Average	Relative	Average	Relative
1890-1894	33,610	100	186	100
1895-1899	36,251	108	173	93
1900-1904	46,825	139	182	98
1905-1909	66,400	198	178	96
1910-1914	78,197	233	166	89
1915-1919	82,937	247	169	91

^a Data from State of Illinois, Department of Mines and Minerals, Annual Coal Report, 1919, p. 100.

From an average of 186 days of operation of the mines in the five years from 1890 through 1894, the opportunity to work and to earn fell in these mines to 169 in the five years from 1915 through 1919, while in that period the number of miners increased from 33,610 to 82,937. The increased demand for labor has not lengthened the excessively short working year.

INTERMITTENT EMPLOYMENT AND ITS CAUSES

The data given in several tables thus far in the discussion have covered long periods in order the better to show broad tendencies as measured in total capacity for production, numbers employed, and the regularity of operation of mines. These statistics have obscured the fluctuations within shorter periods which reveal the influence of general business depression, and of seasonal variation in demand.

Table 6 shows the number of days lost by the bituminous mining industry throughout the country each year since 1890, and Diagram 4 shows in graphic form the days of mine operation each year.¹

TABLE 6.—DAYS LOST BY THE BITUMINOUS COAL INDUSTRY EACH YEAR, 1890 TO 1921^a

Year	Days lost	Year	Days lost	Year	Days lost
1890	78	1901	79	1912	81
1891	71	1902	74	1913	72
1892	85	1903	79	1914	109
1893	100	1904	102	1915	101
1894	133	1905	93	1916	74
1895	110	1906	91	1917	61
1896	112	1907	70	1918	55
1897	108	1908	111	1919	109
1898	93	1909	89	1920	84 ^b
1899	70	1910	87	1921	134 ^b
1900	70	1911	93

^a Based on figures of the United States Geological Survey for average days of mine operation, assuming a full year of 304 days. The figures from which Table 6 has been derived are those for average days of mine operation, of which use has already been made in Tables 4 and 5 and in Diagram 3. The days lost were ascertained by subtracting the days of operation from the standard of a full operating year which we have adopted, that is, 304 days.

^b Based on preliminary figure for days operated.

¹ In Diagram 4 the average days of operation each year are illustrated by the upright columns, and the distance between the tops of these columns and the "full year" line at the top of the diagram represents the number of idle days. Both in the diagram and in Table 6 the recurring business depressions of the last three decades stand out conspicuously.

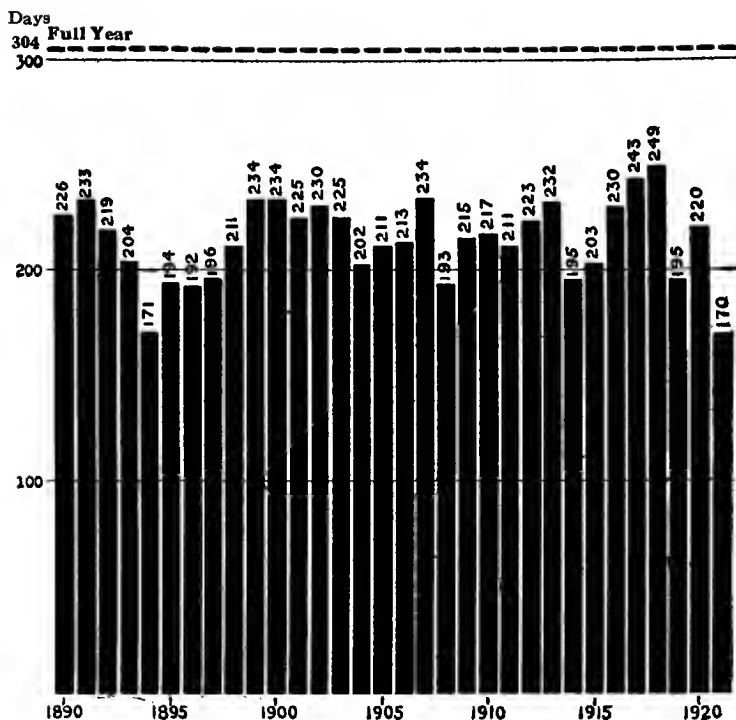


Diagram 4.—Days operated by bituminous coal mines in the United States each year from 1890 to 1921 compared with full working year

The statisticians of the Geological Survey have estimated the relative importance of the various causes of the loss of time in the decades from 1890 to 1919. They found three principal factors and measured their comparative influence as shown in graphic form in Diagram 5.

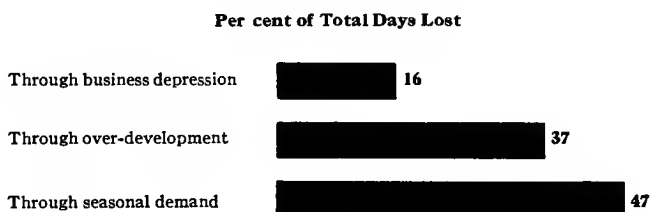


Diagram 5.—Relative importance of three primary causes of lost time as estimated by the United States Geological Survey

General business depression, as Diagram 5 shows, is estimated as accountable for 16 per cent of the loss of time in the operation of the mines. Over-development accounts for 37 per cent, and seasonal fluctuation for 47 per cent, of the lost days. The effects of general depression are evident in Table 6 in the large number of idle days in the years from 1893 to 1897, in 1904, 1908, 1914, 1915, 1919 and 1921. Obviously the remedies for this cause of idleness lie largely outside the coal industry.

"Only a sixth of the time lost in the past thirty years has been due to this cause, however," said Mr. Tryon of the Geological Survey, commenting upon these statistics. "If the maximum effect possible is allowed for these secular fluctuations there is still a residue of lost time—on the average 78 days¹ per year—which must be due to other factors."² This residue, as shown in Diagram 5, which is based on Mr. Tryon's estimate, he would attribute to over-development and seasonal variations. Over-development has been discussed in the preceding pages. Seasonal fluctuations, according to the Geological Survey, account for an even larger loss of time.

The reader may be surprised to find in this analysis no reference to "railroad car shortage," or to strikes as causes of idleness, since these are named frequently in the public press as the chief troubles of both operator and miner. In an article in the *Survey Graphic*,³ two members of the statistical staff of the Geological Survey, explain why they do not regard car shortage and strikes as primary causes of the miners' "broken year."

"Losses due to strikes," they say, "are spectacular when they occur, and in the last 20 years have mounted up to the enormous loss of 125,000,000 man-days.⁴ But the time lost on account of strikes is only 10 per cent of the total time lost, and it may be questioned whether much more coal would have been produced in the aggregate during that 20 year period if there had been no

¹ Mr. Tryon's standard of "a theoretical full year" is 308 days, and it is with this number in mind that he states the average annual loss of time as 93 days, of which 15 are the result of business depression.

² Tryon, F. G., *Irregular Operation of the Bituminous Coal Industry*; in the *American Economic Review*, Supplement to Vol. XI, No. 1, March, 1921, p. 58.

³ Tryon, F. G., and McKenny, W. F., *The Broken Year of the Bituminous Miner*, "published by permission of the director, United States Geological Survey," *Survey Graphic*, March 25, 1922, p. 1012.

⁴ "Includes strikes in the anthracite region which account for 33,000,000 man-days."

strikes. . . . More commonly strikes have been discounted in advance by accumulating large reserves of storage coal. . . . In terms of man-days lost because of strikes, the year 1910 was the record. Yet it also set a new record of production, and the average sales realization f. o. b. mine—the best index of prices, all things considered—did not differ greatly from that of the year before nor of the year immediately after. Strikes and labor disturbances, therefore, like car shortage, must be classed as secondary rather than primary causes of non-operation.”

Of car shortage they say: “No doubt we need more cars, but simply increasing transportation facilities will not mend the broken year of the coal miner. . . . More cars . . . will not sell more coal. They will merely affect the distribution of working time through the year, tending to increase it in the periods of peak demand, and to make it still less than now in periods of low demand. Car shortages have occurred not infrequently; but it is a curious fact that rarely have they curtailed the actual consumption of coal. For the most part their effect has been to limit the quantity of coal which could be produced in the fall and winter, thereby forcing some consumers to purchase earlier in the year.” Thus in the opinion of these experts car shortage is merely a secondary cause of lost time in the coal industry, and actually tends to limit extreme fluctuations in seasonal production.

SEASONAL VARIATIONS

We have noted that, in the estimates of the United States Geological Survey, the seasonal demand for coal is the cause of the largest proportion of loss in working time. Records of monthly output, which are available for the country as a whole from the year 1913, will serve to indicate the extent of the fluctuations month by month through the years. Diagram 6 pictures these variations in the period from 1913 through 1921.

Both seasonal and annual variations are shown in Diagram 6. In seven of the nine years included in the diagram the tendency of production to fall to relatively low levels in the spring and summer is clearly shown. It is to be recalled, however, that this is not an entirely normal period because it includes the war years. The war demand buoyed up production during the summers of 1917 and 1918, and the fluctuations in those years were much less

violent than in the so-called "normal years" before the war or in the period since the armistice. Table 7 shows the variations in production between the months of highest and lowest output during the same period which is included in Diagram 6.

Million
tons

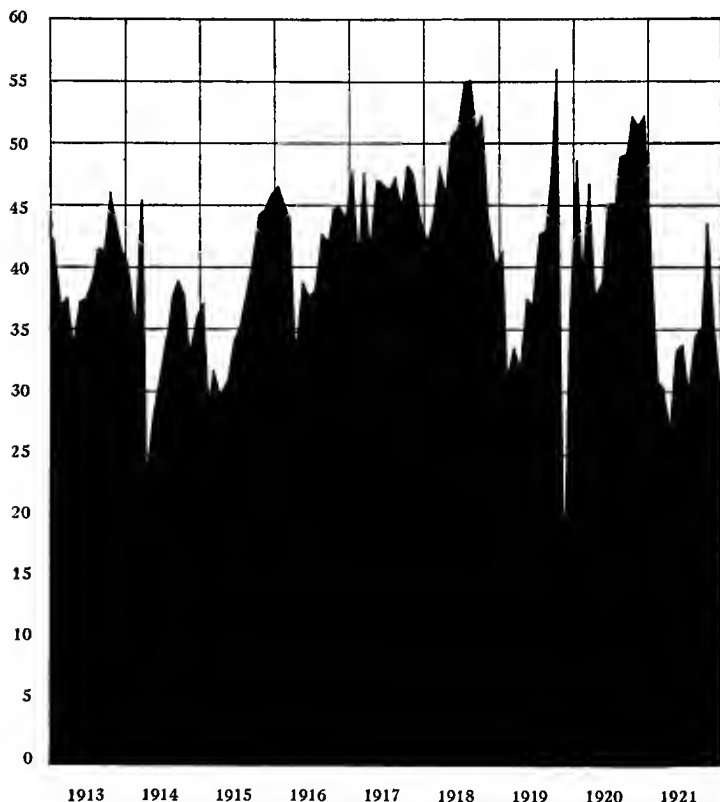


Diagram 6.—Monthly production of bituminous coal in the United States, 1913 to 1921

The month of October, it will be observed, appears five times in Table 7 as the highest production month, while the month of April appears five times as the month of lowest production during the nine years from 1913 to 1921. In 1917 and 1918 there was continuous demand for coal due to war production and the normal seasonal fluctuation was largely obscured. The relatively low output of coal in December, 1918, followed the signing

of the armistice in November and was also the effect of an influenza epidemic; while the extremely low production in November, 1919, was due to a wide-spread strike. With these exceptions, however, the figures presented in this table may be read as depicting a tendency to produce coal in largest quantities in the fall, while low production is characteristic of the spring. The fluctuations between the extremes in output in fall and spring are wide. For instance, in the year 1915, over 16,000,000 more tons were produced in December than in February, and in 1920 and 1921 the output in October was 37 per cent higher than in the preceding April. A wide variation like that between March and April, 1914, or between October and November, 1919, appears to be due to the stimulated demand for coal in anticipation of a strike in connection with the discussion of a new wage agreement in union mines. This cause of fluctuations will be discussed more fully later.

TABLE 7.—BITUMINOUS COAL PRODUCED IN THE UNITED STATES IN THE MONTHS OF HIGHEST AND LOWEST PRODUCTION EACH YEAR FROM 1913 TO 1921^a

Year	Highest month		Lowest month		Excess of highest over lowest	
	Month	Tons produced (in thousands)	Month	Tons produced (in thousands)	Tons (in thousands)	Per cent
1913	October	46,164	April	34,169	11,995	35
1914	March	45,455	April	23,609	21,846	93
1915	December	45,814	February	29,321	16,493	56
1916	January	46,593	April	33,628	12,965	39
1917	October	48,337	February	41,353	6,984	17
1918	August	55,114	December	40,184	14,930	37
1919	October	56,243	November	18,688 ^b	37,555	201
1920	October	52,144	April	37,939	14,205	37
1921	October	43,733	April	27,553	16,180	37

^a Data from the United States Geological Survey.

^b Low production in November, 1919, was due to the general strike in the bituminous industry in that month.

While monthly figures for the entire United States are available only since 1913, a longer record of monthly figures can be secured for Illinois mines. The data for the eight years from 1906 to 1913 inclusive are significant because all the abnormal condi-

tions of the period of the war and afterward are excluded. It is true that Illinois is an extreme illustration of seasonal variations in the bituminous fields. Most of the eastern districts show some seasonal rhythm but the range from high to low is less marked than in the Mississippi valley and the peak does not always come in the same month. Illinois is also affected, as are its neighboring states, by the fact already noted that the most violent extremes occur just before and after the dates of expiration of the biennial wage agreements, which normally occur on April 1st in the "even years." The sequence was interrupted during the war. Table 8 shows the comparative output in the mines of Illinois each month in each of the years from 1906 to 1913, when seasonal fluctuations were unaffected by war production.

TABLE 8.—MONTHLY PRODUCTION OF BITUMINOUS COAL BY SHIPPING MINES OF ILLINOIS FROM 1906 TO 1913^a

Month	1906	1907	1908	1909	1910	1911	1912	1913	Average
Amount in Thousands of Tons									
January	4,289	4,852	4,408	4,641	5,722	5,038	6,005	6,020	5,122
February	4,336	4,255	4,567	4,108	5,552	3,957	6,435	4,941	4,769
March	5,378	3,731	6,055	4,149	7,026	4,209	7,836	4,965	5,419
April	392	3,572	1,401	3,470	24	3,671	43	4,263	2,104
May	659	3,785	2,082	3,146	110	3,549	2,890	3,924	2,518
June	2,556	3,394	3,463	3,067	1,637	3,474	3,365	3,875	3,104
July	2,884	3,545	2,978	3,304	1,770	3,688	3,914	4,347	3,304
August	3,245	4,113	3,809	3,739	2,414	4,449	4,857	4,692	3,915
September	3,479	4,223	4,299	4,413	3,580	4,583	4,944	5,360	4,360
October	4,283	5,279	5,020	5,235	5,451	4,293	6,318	6,358	5,280
November	4,344	5,098	4,523	5,219	5,877	5,700	6,125	6,152	5,380
December	4,613	4,837	4,748	5,243	5,769	5,810	6,370	5,862	5,406
Total	40,458	50,684	47,353	49,734	44,932	52,421	59,102	60,759	50,681
Per cent of Annual Production									
January	10.6	9.6	9.3	9.3	12.7	9.6	10.1	9.9	10.1
February	10.7	8.4	9.6	8.3	12.4	7.6	10.9	8.1	9.4
March	13.3	7.4	12.8	8.3	15.6	8.0	13.2	8.2	10.7
April	1.0	7.0	3.0	7.0	.1	7.0	.1	7.0	4.2
May	1.6	7.5	4.4	6.3	.3	6.8	4.9	6.5	5.0
June	6.3	6.7	7.3	6.2	3.6	6.6	5.7	6.4	6.1
July	7.1	7.0	6.3	6.7	3.9	7.0	6.6	7.2	6.5
August	8.0	8.1	8.0	7.5	5.4	8.5	8.2	7.7	7.7
September	8.6	8.3	9.1	8.9	8.0	8.7	8.4	8.8	8.6
October	10.6	10.4	10.6	10.5	12.1	8.2	10.7	10.5	10.4
November	10.8	10.1	9.6	10.5	13.1	10.9	10.4	10.1	10.6
December	11.4	9.5	10.0	10.5	12.8	11.1	10.8	9.6	10.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

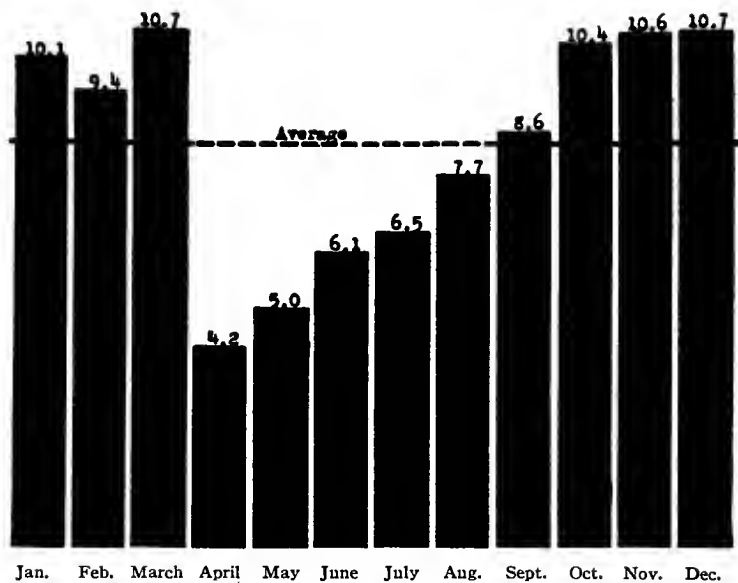
^a Data from State of Illinois, State Mining Board (now Department of Mines and Minerals), Annual Coal Reports, 1906 to 1914.

Table 8 shows that in Illinois production and employment are concentrated in the winter months. The average annual production of bituminous coal in Illinois in the eight years covered in Table 8 was, in round numbers, 50,681,000 net tons. Over three-fifths of this tonnage, namely, 62 per cent, was produced in the six months of January, February, March, October, November and December; while the remaining 38 per cent was taken out of the mines in the slackier months of April, May, June, July, August and September. Inevitably for the miner this means lost, or reduced, opportunities to earn during the year. The mines in Illinois were equipped with men and machinery for an average maximum production of nearly five and a half million tons in the busy fall and winter month, while their average monthly production was a little less than four and a quarter million, and the average in the month of least demand, April, was little more than two million.

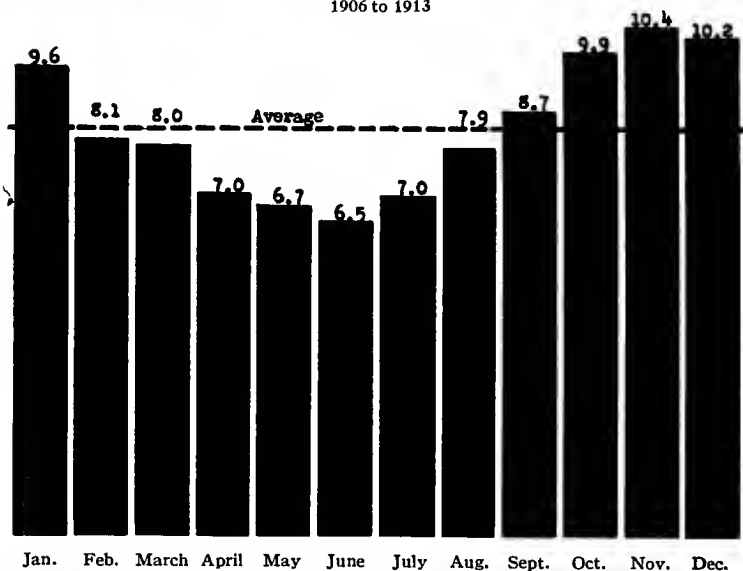
To attribute all of this difference between the extremes in March and April to seasonal variations in the demand for coal, however, would not be accurate. It ignores the effect of the biennial wage adjustment, to which reference has already been made. In Diagram 7 two sets of facts are shown for comparison: (1) the average monthly production in the entire period, as already given in Table 8; and (2) the average monthly production in the four alternating years when wage adjustments were not due.

Comparison of the averages in the odd and even years shows that in the "even" years of biennial negotiation the swing up or down from average production is much greater than in the "odd" years, when seasonal demand is not accentuated by forced buying in anticipation of a strike. With revision of wages expected on April first every other year, the abnormal buying of coal forces up production in March and earlier, while output is correspondingly decreased in April and May, even though no strike occurs.¹ The lower portion of the diagram which eliminates this disturbing factor may be said to picture accurately the seasonal variations.

¹ In a statement issued for the newspapers by the Bureau of the Census of the Federal Department of Commerce on March 23, 1922, appears this paragraph: "Coal production continued to increase during the second month of the year. Even with the smaller number of working days the output of bituminous coal was 3,000,000 tons greater than in January. This increase was in response to the demand for consumers' stocks in case of prolonged labor difficulties."



Average Monthly Production in Per Cent of Total Annual Production in Eight Years, 1906 to 1913



Average Monthly Production in Per Cent of Total Annual Production in Four "Odd" Years, 1907, 1909, 1911, and 1913, in which the Biennial Wage Adjustment did not Occur

Diagram 7.—Seasonal fluctuation in the production of bituminous coal in Illinois mines, 1906 to 1913

Seasonal variations in the coal industry and the remedies for them have been discussed frequently by engineers and official commissions. These comprise such measures as storage at the place of use to make purchases feasible in advance of need, and lower freight rates from the mines during months of least consumption in order to encourage buying. Seasonal variations constitute a major cause of irregular employment. The increased demand in winter tends to keep more men in the industry than would be needed if the work were more evenly distributed throughout the year. This excess in numbers of men employed tends in turn to make employment irregular and uncertain, regardless of variations in market demands. It is important to realize that increased storage facilities, reduced transportation rates during the slack months, and other means of eliminating seasonal fluctuations, desirable as these improvements are, would not wholly regularize the operation of the coal industry. From estimates of the Geological Survey already quoted it is shown that seasonal fluctuations are responsible for 47 in every 100 days of idleness in the mines during a year, but 37 in every 100 are lost through what the Geological Survey calls "sheer over-development." These estimates are more or less speculative, because the three big problems of seasonal demand, over-development, and recurrent business depressions are so related to one another that the effect of each on the industry cannot be accurately determined. It is safe to conclude, however, that the soft coal industry is functioning irregularly, and that its instability causes unemployment and uncertainty for the men who earn their living in digging coal.

Instability affects also the efficiency of the coal business and tends to raise the price of coal and hence the cost of all articles dependent upon coal for manufacture or transportation. So little information is available, however, on the various factors entering into the price of coal that it is possible only to suggest, but not to demonstrate the effect of instability in bituminous coal mining upon business in general. That the coal miner and his wife and children are the first to feel the effects of this irregular functioning of the industry needs no elaborate proof, despite the fact that data on earnings are as meagre as are many other relevant facts about the coal industry.

EARNINGS OF BITUMINOUS MINERS

Facts about miners' earnings, and the suffering which unemployment causes, can be understood only if conditions of life in a mining camp are known. In many mining communities the mine is the only place of employment. To find another job in dull periods means moving to another town. Moreover, a miner's family lacks the economic safeguards of life in a community with several varied industries, in which other members of the family, including wife and daughters, find work to help to secure the necessary income. However desirable, or undesirable, the employment of women and young girls outside the home may seem to the public, it is still the means of maintaining the households of many wage-earners, when dependence upon the insecure employment of one bread-winner in a seasonal industry becomes too hazardous. For many coal miners, this resource is lacking. The industry necessarily becomes responsible for insuring sufficient income to the men in the mines to maintain their families throughout the year. This fact must never be forgotten when comparisons are made between the rates paid in mining and those in other industries.

What, then, are the earnings of miners in the bituminous coal industry, and what effect has the irregular operation of the industry upon the miner's annual income?

Available facts concerning actual earnings are incomplete. The Geological Survey collects data on production, but does not include wage statistics in its reports. Special inquiries into wages have been made from time to time by the Bureau of Labor Statistics, but these have been limited to comparatively few mines and have not covered a period as long as a year.

MINERS' STATISTICS OF EARNINGS

Information concerning annual earnings was presented to the President's Bituminous Coal Commission in 1920 by the organization of the miners, the United Mine Workers of America. These facts related to the union scale of wages as agreed upon in contracts between the United Mine Workers and the operators' associations in the unionized central competitive field, which includes the states of Illinois, Indiana, Ohio and the western part of Pennsylvania. Non-union mines were not included. As the material was compiled before the increase in wages which fol-

lowed the award of the Bituminous Coal Commission, it does not show the earnings under the wage scale in effect from 1920 to 1922 and similar data are not available for this period.¹ The main point in which we are interested, however, is the effect of instability and irregularity of employment upon the miners' earnings, and for light on this point a comparison of actual and possible earnings in the years from 1913 to 1918 is as useful as if it covered the most recent period.

The wage data presented to the Bituminous Coal Commission by the United Mine Workers of America² were based on the amounts paid as dues to the organization by its members in the bituminous mines. Through the offices of the coal companies by the so-called "check-off" system, the local unions of the miners in the various districts collect from their members a percentage of their gross earnings for the support of the national organization. This assessment affords a basis for calculating the annual average gross earnings of the miners. Out of his gross earnings the miner must pay for powder, and for certain other expenses in connection with his work. The actual contents of his pay envelope are, therefore, less than the gross earnings upon which the union dues are calculated.

Table 9 shows annual earnings as computed by the United Mine Workers from assessments and size of membership in each of the four districts constituting the central competitive field, and also the average number of days of mine operation in these districts as given by the Geological Survey for the six years from 1913 through 1918.

The average annual earnings for the period of six years in Western Pennsylvania, where they were highest, were only \$988. In the war year of 1918, when the days of operation were at a maximum of 260,³ the average earnings in that district were

¹ In a forthcoming report of the United States Bureau of Labor Statistics, data on earnings in this period will appear, but they are not available as this manuscript goes to press.

² The same data were presented to the Senate Committee on Manufactures in the hearings on the Calder coal regulation bill, in testimony by William Green, Secretary-Treasurer of the United Mine Workers of America. His testimony has been published by the union in a pamphlet,—Statement of William Green, International Secretary-Treasurer, United Mine Workers of America, to the Senate Committee on Manufactures, January 24, 1921.

³ The reason for the larger number of days of operation in Western Pennsylvania, not only in the war period but in every year considered in Table 9, in com-

\$1,583. Indiana miners came next in that year with an average of \$1,516, while in Illinois the men averaged \$1,390 and in Ohio \$1,364.

TABLE 9.—AVERAGE ANNUAL EARNINGS OF MINERS AND AVERAGE DAYS OF MINE OPERATION IN THE FOUR DISTRICTS OF THE CENTRAL COMPETITIVE FIELD, 1913 TO 1918

Year	Western Pennsylvania		Illinois		Indiana		Ohio	
	Average annual earnings	Average days operated	Average annual earnings	Average days operated	Average annual earnings	Average days operated	Average annual earnings	Average days operated
1913	\$867	237	\$705	189	\$708	190	\$766	206
1914	776	207	650	173	630	168	405	108 ^a
1915	781	210	672	179	672	179	528	142
1916	895	229	775	198	732	187	771	197
1917	1,027	251	995	243	904	221	859	210
1918	1,583	260	1,390	228	1,516	249	1,364	224
Average	\$988	232	\$865	201	\$860	199	\$782	181

^a Low number of days operated in Ohio in 1914 is partly explained by the strike in Ohio mines in that year.

The average annual earnings varied from state to state with differences in the number of days of mine operation. The simple average for the six years was lowest in Ohio, \$782 with 181 days of operation, as compared with Indiana's \$860 and 199 days, Illinois' \$865 and 201 days, and the maximum of \$988 and 232 days in Western Pennsylvania.

Differences from year to year in days of operation are also reflected directly in differences in earnings. In the period covered in Table 9, the miners of the central competitive field received increases in their rates of pay in 1914, 1916, and twice in 1917. In spite of the increase in rates in 1914, the average wages were lower in 1914 and in 1915 than they had been in 1913. This was evidently because the days of mine operation decreased in 1914 and 1915 owing to the business depression in those years. The

parison with other states, is probably the wider market for coal of this district, which includes Canada, New England, and the entire Atlantic seaboard, as well as the iron, steel and other industries of Pennsylvania.

significant point is that the average annual income of miners, like that of wage-earners in other irregular industries, is reduced by lack of opportunity for employment, and irregularity of work may more than nullify increases in rates of pay. This should not be understood to mean that increases in rates of pay are unimportant to the miner, or that he can be indifferent to decreases. Quite the contrary is true. The fact that he works so much less than full time is his justification for seeking higher rates.

Aside from the effect of irregular employment upon earnings, which Table 9 has been used to indicate, the facts are important as showing actual annual income. To be sure they are averages, and they are compiled by one side in the wage controversy, the miners. How closely they correspond to the operators' figures will be shown later. Meanwhile it is interesting to compare them with data for 1919 derived from the United States Census. These are for the same states, except that the census figures are for the whole of Pennsylvania and not merely the western district. In 1919, according to these calculations, the average earnings of the miners in Pennsylvania was \$1,318 and the days of operation 218; in Illinois \$1,110 in 160 days; in Indiana \$1,062 in 148 days; and in Ohio \$1,102 in 164 days.¹

These earnings are distinctly lower for each state than those given by the union for 1918. The year 1918 was more prosperous for the miner than 1919, because he had more days of work and this would account mainly for the differences. Certainly it does not appear that the union understated the miners' earnings in order to make a case for an increase. The data both from the union and from the United States Census give no evidence of high annual earnings, even in Western Pennsylvania, where the earnings were highest.²

In order to picture the effect upon income of the loss of so many working days, which characterizes the industry, the facts about

¹ Fourteenth Census of the United States, Mines and Quarries, 1919, Bulletins for Pennsylvania, pp. 16 and 17; Ohio, pp. 6 and 7; Indiana, pp. 10 and 11; Illinois, pp. 14 and 15. The average earnings were ascertained by dividing the total wages paid in the year by the average number of wage-earners in 10 months, January to October, 1919. This avoided the months affected by the strike, November and December, 1919, when the number employed was not normal. The data on days of operation were supplied by the Geological Survey.

² Earnings are affected by conditions in the mines, such as thickness of the seam of coal, efficiency of machinery, availability of mine cars, etc. To some degree conditions are equalized by the differentials in rates which are agreed upon in applying the general wage scale to a particular district.

average annual earnings in Table 9 are used as the basis for estimating the difference between the income which the miners actually earned and that which they would have received had they worked 304 days, losing no time because of the failure of the mine to operate. It should be pointed out that since Table 9 shows the average earnings, which were actually received by the miners, allowance is already made in those averages for all causes of lost working time, whether due to the idleness of the mine or to the absence of the miner from work for illness or other personal reasons. These averages include the earnings of men who were not employed regularly every day when the mine was in operation. In every wage-earning group days are lost through sickness, through change of job from one place of employment to another, or through other personal causes. The days of employment shown in Table 9 were not days worked by the men but days when the mines were open for work. How many days of work these miners in the central competitive field actually put in, we do not know, but the amount which the men individually failed to earn through not working every day when coal was coming over the tippie is already discounted in the averages of actual earnings. If then, from these statistics of the wages actually received by the men in the specified days of mine operation, the possible earnings be estimated for a full-time working year of 304 days, the difference between actual and possible earnings represents fairly though roughly the tax upon the miners' income made solely by the idleness of the mine.

The result of this estimate of possible full-time earnings as shown in Table 10 should be regarded merely as a vivid picture of what irregular employment means in reduced earnings. It has all the weakness of trying to prophesy what might happen if conditions of employment were radically different. Actually, greater stability might produce even more startling possibilities in increased output for the miner, or wage rates might be decreased without any disadvantage to the miner provided his opportunity for employment were substantially increased and made more certain. Thus Table 10 becomes a measure of present waste rather than a prophecy of a future possibility.

According to Table 10, the miners in Illinois earned in the year 1913 only 62 per cent of the amount which would have been possible had they dug as much coal per day in 304 days as they dug in

the 189 days when the mines were open. They actually averaged about \$705 in annual earnings. At the same rates of pay and with the same regularity on their part, with full-time operation of the mines, they might have averaged \$1,134. The difference was \$429 in the year. In Western Pennsylvania, where the mines were open for work the largest number of days in the year, 237 in 1913, the estimated difference for each man was \$246. In 1918, which was the year of maximum production during the war, the days of mine operation were decidedly higher than in 1913.

TABLE 10.—ACTUAL EARNINGS AND ESTIMATED FULL YEAR EARNINGS OF MINERS IN THE FOUR DISTRICTS OF THE CENTRAL COMPETITIVE FIELD IN 1913 AND IN 1918

District	Average annual earnings	Days of mine operation	Average earnings per day of mine operation	Possible earnings at this rate in 304 days	Difference between actual and full year earnings	Per cent actual earnings are of full year earnings
1913						
Illinois	\$705	189	\$3.73	\$1,134	\$429	62
Indiana	708	190	3.73	1,134	426	62
Ohio	766	206	3.72	1,131	365	68
Western Pa.	867	237	3.66	1,113	246	78
1918						
Illinois	\$1,390	228	\$6.10	\$1,854	\$464	75
Indiana	1,516	249	6.09	1,851	335	82
Ohio	1,364	224	6.09	1,851	487	74
Western Pa.	1,583	260	6.09	1,851	268	86

Nevertheless, though higher basic rates and more regular work resulted in higher average earnings in 1918 than in 1913, the days of operation were still considerably less than a full working year, and the actual earnings were less than the estimated possible earnings for 304 days by \$268 per miner in Western Pennsylvania, \$335 in Indiana, \$464 in Illinois, and \$487 in Ohio. The estimated possible annual earnings in 1918 were \$1,854 in Illinois and \$1,851 in each of the other districts.

OPERATORS' STATISTICS OF EARNINGS

The National Coal Association, on behalf of the operators, submitted to the President's Bituminous Coal Commission data

regarding the earnings of miners in certain selected mines in the ten months from January to October, 1919. These mines were located in the same districts, the central competitive field, for which the statistics of the union were given though they were not for the same year. The operators stated that many of the men did not take full advantage of the opportunity to work while the mines were open and that this voluntary idleness accounted for low earnings. In their statistical tables they classified the earnings separately for several groups, according to the regularity of their attendance at work on days when the mines were operating. The number of calendar days each mine loaded coal was taken as "100 per cent opportunity for labor to work." A certain proportion of the men in each occupation were recorded as "working more days than the mine loaded coal," which means that these men worked in the mine every day of mine operation and also on days when coal was not being hauled out.

The operators' figures were for daily and monthly earnings, classified to show the "percentage of full opportunity" which each group worked. We have compiled from the tables, which the operators submitted, figures showing the earnings of those men only who worked "more days than the mine loaded coal." The average daily earnings of this group were closely similar to those of the group "working from 75 to 100 per cent of full opportunity," but they were distinctly higher than the daily earnings of the men who worked less regularly during the time that the mines were operating. We have used in Table 11 the average earnings of the group working at least all the days the mines were open, because their wages presumably show the maximum opportunity for earnings offered to the men by these mines in 1919.

According to the table, the machine miners, who are relatively few in number, had the highest earnings and they averaged daily \$7.07 in these fields. The hand miners averaged \$6.34 daily, the loaders \$5.99 and the day laborers inside the mine \$5.13. The highest average in any field included in the table for machine miners working "full opportunity" was \$8.72 a day and the lowest, \$5.32. Hand miners averaged \$7.28 daily in the best field, and \$4.90 in the field of lowest average earnings.

The union's figures showed a daily average for all occupations in 1918 of \$6.09 in three states and \$6.10 in the fourth. The operators did not give a general average for all occupations but

the range of their averages for the four groups of "inside" mine employes in 11 sub-divisions of the central competitive field was from \$4.86 to \$8.72 for those groups only who worked the full time that the mines were open. The resemblance between the operators' figures and the daily averages obtained in Table 10 from the union data is sufficiently close to indicate that the union did not underestimate the annual earnings. In making this comparison of daily earnings in 1918 and 1919 it should be recalled that the wage rates remained the same during those two years:

TABLE 11.—AVERAGE DAILY EARNINGS OF MINERS WORKING FULL OPPORTUNITY DURING THE TEN MONTHS, JANUARY TO OCTOBER, 1919, IN SELECTED MINES IN THE FIELDS COMPRISING THE CENTRAL COMPETITIVE FIELD, BY FIELDS ^a

Field	Number of mines	Hand miners	Loaders	Machine miners	Inside day labor
Pittsburgh Thick Vein	7	\$7.15	\$5.77	\$8.04	\$5.21
Pittsburgh Thin Vein	14	6.02	5.90	6.80	5.23
Eastern Ohio	18	6.06	5.55	6.15	5.22
Southern Ohio	32	7.28	5.95	7.04	5.04
Indiana	23	7.20	6.93	7.47	5.21
Southern Illinois	15	..	7.14	7.88	5.37
Southern Springfield	9	6.53	6.62	7.60	5.04
Northern Springfield	9	5.54	5.56	5.32	5.05
Fulton-Peoria	6	6.23	5.41	8.72	5.01
Northern Illinois	4	4.90	4.86	6.40	4.89
Fifth and Ninth Districts, Ill.	13	6.46	6.22	6.36	5.18
Average 11 fields	..	\$6.34	\$5.99	\$7.07	\$5.13
Highest field	..	7.28	7.14	8.72	5.37
Lowest field	..	4.90	4.86	5.32	4.89

Annual earnings at these rates in 249 days, the average number of days bituminous mines in the United States operated in 1918

Average 11 fields	..	\$1579	\$1492	\$1760	\$1277
Highest field	..	1813	1778	2171	1337
Lowest field	..	1220	1210	1325	1218

^a Compiled from tables furnished by the Bureau of Coal Economics, National Coal Association, showing average daily earnings as reported by the operators of selected mines in each field, by occupations, and by percentage of full opportunity worked. The number of days each mine operated is counted as full opportunity.

The operators made no statement of annual earnings. If their daily averages be multiplied by the average days of mine opera-

tion in 1918,¹ as is done at the bottom of Table 11, the resulting range of average annual earnings is from a maximum of \$2,171 for the most regularly employed of the machine miners in the field of highest earnings to \$1,210 for the loaders in the field of lowest earnings; while the average in all fields is \$1,579 for hand miners and \$1,492 for loaders.

ABSENTEEISM

The chief difference in the testimony regarding earnings offered by operators and union officials to the President's Bituminous Coal Commission was that the operators stressed the effect of voluntary idleness of the miner, which they contended was the chief reason for low earnings. We have already noted that in their statistics of earnings the operators classified the daily wages according to the time which the miners worked in proportion to the days the mines were open. Table 12 shows the

TABLE 12.—ADVANTAGE TAKEN OF FULL OPPORTUNITY TO WORK BY EMPLOYEES IN SELECTED BITUMINOUS COAL MINES IN THE CENTRAL COMPETITIVE FIELD IN THE TEN MONTHS, JANUARY TO OCTOBER, 1919

	Average number of men working specified portion of days the mines loaded coal each month					
	Less than 25 per cent	25 to 49 per cent	50 to 74 per cent	75 to 100 per cent	More than 100 per cent	Total
Miners	1,650	2,989	3,457	16,808	1,677	26,581
Company men	1,158	1,126	1,005	4,329	7,030	14,648
Per cent						
Miners	6.2	11.3	13.0	63.2	6.3	100.0
Company men	7.9	7.7	6.9	29.5	48.0	100.0

proportion of miners and of "company men" who worked the various percentages of "full opportunity," according to the operators' reports. Miners here include only the men who dig coal,—the hand and machine miners and the loaders. "Company men" are the other groups of mine employees who are paid at daily or monthly rates.

¹ The year 1918 is used in order to make possible comparison with the figures given by the union for that year.

Thus, the group who worked more days than the mines loaded coal, and for whom the statistics of earnings have already been given, constituted 6.3 per cent of the miners, but nearly half of the company men. The largest group of miners worked 75 to 100 per cent of the days that the mines were open.

A special inquiry would be necessary to analyze the causes of absenteeism. The Bituminous Coal Commission in its final report to the President pointed out a weakness in these figures of the operators, and made the following comment upon them:

"The contention of the operators has been that the miners do not make full use of the opportunities for labor afforded them and that those of the miners who work at least three-fourths of the available time earn sufficient wages. In support of this contention the operators submitted figures collected from a representative number of mines showing the number of men working each specified number of days, with their daily and monthly wages.

"We realize that a certain proportion of time is lost by the miners voluntarily. At the same time, we find that the figures submitted by the operators do not afford a measure of the amount of time so lost by the miners, for the reason that these figures make no allowance for the turnover. In these tabulations every man who worked at a mine at any time during the month is counted on the same basis as one who was on the roll every day the mine was in operation, regardless of the fact that many miners may have obtained employment on the last day of the month or been discharged at the end of the first day or moved to another mine in the middle of the month or died some time during the period.

"A man who worked 13 days out of a possible 26 at one mine and 13 at another would be counted in these figures as two men with an aggregate voluntary absenteeism of 26 days or 50 per cent of the 52 working-days for the two mines."¹

The report then goes on to discuss the psychological causes of absenteeism:

"But even after allowance has been made for all the factors

¹ United States Bituminous Coal Commission, Majority and Minority Reports to the President, 1920, p. 44.

entering into the problem a margin remains between the number of days that the miners actually work and the number when they have an opportunity to work. A fair interpretation of this margin is that an irregular industry breeds irregular habits among the workers. When the men are not accustomed to going to work regularly every morning the incentive for regularity becomes less potent and a certain amount of absenteeism inevitably results. This is the psychological factor of irregularity, and it may be expected that it will disappear in large measure as the industry becomes more stable."¹

These statements of the Commission can be supplemented by the results of a special investigation made in 1919 by the U. S. Bureau of Labor Statistics. Careful records were kept of the actual hours of labor of the men in the mines investigated. The proportions of full time worked by the mines and by the men are shown in Table 13 and pictured in Diagram 8.

TABLE 13.—AVERAGE FULL-TIME HOURS, HOURS OF MINE OPERATION, AND HOURS WORKED BY MINERS IN SELECTED BITUMINOUS MINES, IN ONE HALF-MONTH PAY-ROLL PERIOD, IN 1919 ^a

Occupation	Average full-time hours	Average hours of mine operation	Average hours miners worked	Hours lost by miners out of	
				Full time	Actual time mines operated
Hand miners	102.5	71.1	60.0	42.5	11.1
Machine miners	104.3	77.9	73.2	31.1	4.7
Loaders	104.7	81.2	65.3	39.4	15.9

^a Data from Wages and Hours of Labor in the Coal Mining Industry in 1919, United States Bureau of Labor Statistics, Monthly Labor Review, December, 1919, p. 223.

In making the inquiry the Bureau of Labor Statistics defined "full time" as "the number of hours which are regarded by employer and employe as constituting a day's work." This was multiplied by the number of days constituting the full half-

¹ United States Bituminous Coal Commission, Majority and Minority Reports to the President, 1920, p. 45.

month pay-roll period, and the result constituted "full-time hours" in the period considered.¹

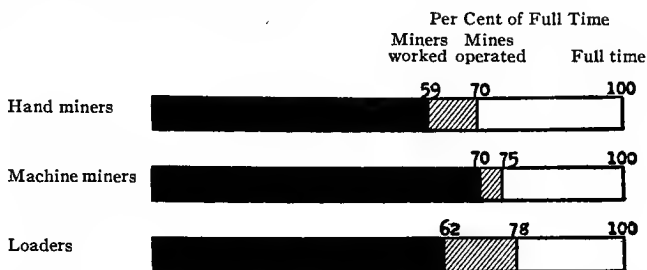


Diagram 8.—Time worked by miners and time the mines operated compared with full time

The significant facts of the table are summed up as follows in the report of the Bureau of Labor Statistics²:

"From the figures given . . . the immediate responsibility for idle time may be roughly apportioned between the management and the employees. Thus, the average full-time hours of all mines in which hand miners were found were 102.5 for the half month. Hand miners actually worked an average of 60 hours. The difference, 42.5 hours, was the amount of lost time on the part of the hand miners. But of these 42.5 idle hours there were on the average 31.4 hours during which the mines were not in operation. For that amount of idleness, therefore, the operators were immediately responsible.³ The remaining 11.1 hours of idleness represent the time during which the mines were in operation and opportunity for work was given of which the employees failed to take advantage. For that much idleness, therefore, the miners were immediately responsible.

¹ United States Bureau of Labor Statistics. Monthly Labor Review, December, 1919, p. 210.

² Ibid., p. 224.

³ Presumably this statement is a broad and general one, merely indicating that the individual miner could not be charged with voluntary idleness when the mine was shut down. Of course, there are reasons for the failure to operate a mine,—shortage of railroad transportation, or "no market," or physical conditions in the mine (fire or flood, for instance), or sometimes a strike,—for which it is not fair to hold the operator "immediately responsible." But in relation to the point at issue, namely, voluntary absenteeism of miners, the distinction is clear between operators' responsibility and miners' responsibility for time lost.

"For all machine miners combined the figures show average hours of idleness 31.1, of which the operators were responsible for 26.4 hours and the miners for 4.7 hours. The corresponding figures for loaders are 39.4, 23.5, and 15.9, respectively."

EARNINGS IN 1921

The award of the President's Bituminous Coal Commission resulted in increases of 27 per cent, on a general average, in tonnage rates, and a dollar a day for day workers or so-called "company men." In August, 1920, the operators granted an additional \$1.50 a day to company men, making the standard rate for them \$7.50. These increases in rates would have increased the annual earnings of miners had employment continued to be no more irregular than in the past. No thoroughgoing inquiry into earnings in bituminous mines has been made since these increases took effect,¹ and we can estimate only very generally how the miner has fared.

As has been shown in Diagram 4, the year 1920 was better than 1919, with 220 days of employment as compared with 195 in 1919. This greater regularity with higher rates of pay doubtless brought the miner a higher income in 1920 than in 1918 or 1919. The year 1921, however, was the worst in 30 years, with only 170 days of employment (if the preliminary estimate of the Geological Survey remains unchanged). Thus the average days of mine operation decreased about 23 per cent in 1921 as compared with 1920, and 32 per cent as compared with 1918 with its 249 days of operation, so that the earnings in 1921 could hardly have averaged as high as in 1918, even with the higher rates in 1921.

Further light on irregular operation in 1921 and early in 1922 is given by an analysis of the working time in bituminous mines made by the United States Bureau of Labor Statistics from

¹ See footnote, p. 33, for reference to an investigation by the U. S. Bureau of Labor Statistics which is not yet published. In reply to our request for recent data the National Coal Association wrote that "the National Coal Association has not collected any wage statistics of bituminous coal mine workers since the award of the Bituminous Coal Commission in 1919." In some states estimates have been made by officials of state bureaus but these are not satisfactory because they represent no analysis of pay-rolls. The Illinois Coal Operators' Association has recently begun the periodical collection of data on employment from its members and reference will be made to these in the text. We have been unable to discover any information concerning earnings in non-union districts.

data furnished by the Geological Survey for each week from October, 1921, to February, 1922.¹ In no week of that period did more than 10.7 per cent of the mines give employment for 48 hours or more. The number of mines reporting ranged from 2,086 to 2,584. In only two weeks in that period did more than 20 per cent of the mines work more than 40 hours a week and the maximum group working more than 40 hours in any week was only 25.1 per cent of the whole number. The Bureau says of these figures: "The number of mines reporting varied each week, and the figures are not given as being a complete representation of all mines, but are believed to fairly represent the conditions as to irregularity of work in the bituminous mines of the country."

The Illinois Coal Operators' Association has been issuing statistical tables for bi-weekly periods since the autumn of 1921. Of those which its secretary furnished us, from October 16, 1921, through January 15, 1922 (with one missing for the two weeks ending November 30), none covered more than 29 per cent of the mines of Illinois. Full data for wages are not presented; all miners earning less than \$50 in the two weeks' period are omitted from consideration and the tables give the average earnings only of those earning \$50 or more in two weeks, together with the percentage which they constitute of the whole force. The average earnings in two weeks of these employees are reported as \$92.76 for the two weeks ending October 31, 1921; \$86.85 for November 15; \$82.46 for December 15; \$80.81 for December 31; and \$79.36 for January 15, 1922. These appear to be gross earnings, from which must be deducted the amounts payable for powder, small tools, and other "occupational charges." These average charges are stated. This higher paid group is recorded as constituting a varying percentage of the total employees, from 91.3 per cent on October 31, 1921, to 59.5 per cent on December 15. The Association intends to publish fuller details, but in their present form the data do not include in the picture the group with lower earnings which in one of the two-week periods included 40 out of each 100 miners. Their earnings would depress the average. Moreover, the data do not yet cover a period long enough to show the effects of irregular employment in a year. The Association in its publications is emphasizing "the excess number of men

¹ Data of U. S. Bureau of Labor Statistics to be published in the Monthly Labor Review for April, 1922.

detained in the industry," and the fact that this results in lower average earnings than if the number were less.¹

The United Mine Workers have no comprehensive figures on earnings since 1918, but data have been given by W. Jett Lauck, from information supplied by the United Mine Workers for the men actually employed in a few districts. According to these figures, the average earnings during the year 1921 were only \$763 in the Pittsburgh district; \$550 in the Ohio district; \$500 in West Virginia (New River); and \$420 in Tennessee.²

THE MINERS' ESTIMATES OF COST OF LIVING

These facts about annual earnings are significant only if they are measured in terms of the cost of living. In the hearings before the Bituminous Coal Commission the miners' representatives gave two estimates of the cost of living, one for a so-called "minimum of subsistence," and the other for a "minimum of comfort." For the minimum of subsistence an annual income of \$1,603 was estimated as necessary, in January, 1920. This was to cover barest living necessities for a family of five. The detailed items of this budget were not published, but the total estimate was based on a number of earlier investigations in industrial centers revised to cover subsequent changes in retail prices. The "minimum of comfort" budget, which was estimated with a view to the needs of families living in mining communities, called for an annual income of \$2,244. This latter estimate was prepared by Professor W. F. Ogburn of Columbia University, at the request of the United Mine Workers. Table 14 shows the principal items of this budget.

This budget is simply an estimate. Moreover, it was prepared at a time of higher prices than the present. The cost of living in mining communities is one of the many important subjects connected with human relations in this industry about which exact facts are not available. The estimate made by Professor Ogburn serves, however, to illuminate the effects of irregular operation of the mines upon the lives of the miners. The miners might earn a reasonably comfortable living if they could work the

¹See, for instance, the pamphlet, "Coal, a Few Things the Public Wants to Know," issued by the Illinois Coal Operators' Association. (Undated.)

²Signed article, by W. Jett Lauck, with head-line, "Says Miners Wish More Work, Not Less and Must Get It," in Baltimore Sun, March 23, 1922.

year round. The lack of opportunity to work so many days in a year reduces their income to what the miners contend is often not even a bare subsistence.

TABLE 14.—COST OF A HEALTH AND COMFORT BUDGET FOR ONE YEAR FOR A FAMILY OF FIVE IN MINING COMMUNITIES AT PRICE LEVELS OF JANUARY, 1920^a

Food.....		\$801.38
Clothing		
Husband.....	\$146.81	
Wife.....	130.92	
Boy (11 yrs.).....	77.40	
Girl (5 yrs.).....	66.13	
Boy (2 yrs.).....	34.00	455.26
Housing, fuel, and light.....		286.00
Miscellaneous.....		576.30
Total.....		\$2,118.94
Average saving on garden and chickens.....		15.00
		\$2,103.94
Explosives, smithing, etc.....		140.00
Total.....		\$2,243.94

^a Prepared by W. F. Ogburn and presented by the United Mine Workers of America in their report, *The Case of the Bituminous Coal Mine Workers*, to the Bituminous Coal Commission in 1920.

In brief, the alternative to raising rates of pay is to increase the regularity of the opportunity for work at the present rates. The miner might well ask for a guaranteed minimum of employment as more important than higher rates of pay. The necessity for regarding a minimum of employment as a fixed charge upon the industry would probably make operators more reluctant to open new mines or unduly to enlarge those already open. To make employment regular is important not only for the miner, but for the economical conduct of the industry. Capital, as well as men, is wastefully used when money and energy are invested on a scale which could produce much more coal than can be sold.

SUMMARY

1. The capacity of the bituminous mines to produce coal has been conservatively estimated as 700,000,000 or 800,000,000 tons a year compared with actual requirements of about 500,000,000 tons.

2. The bituminous coal mines have operated on an average of only 214 days a year in the 32 years from 1890 through 1921. If

we accept 304 days as a full working year, the lost days of employment in bituminous mines have averaged 90 in a year.

3. Of these lost days 37 per cent, according to the estimates of the United States Geological Survey, have been due to the overdevelopment of the industry. The short working year has continued through times of prosperity. The excess of capacity over production in the bituminous coal mines makes employment intermittent for miners even when business in general is most prosperous.

4. The production of coal has increased from 120,600,000 tons per year in the five-year period from 1890 through 1894 to nearly 507,000,000 tons a year from 1915 through 1919. The number of employes has increased from an average of less than 200,000 in 1890 to about 600,000 in 1921. The days of employment in a year have shown no appreciable increase except temporarily during the period of the war. The increased demand for coal has resulted in opening new mines and employing more miners rather than in giving more regular employment in the mines already operating.

5. Seasonal variations, according to the United States Geological Survey, account for 47 per cent of the lost days in bituminous coal mining. In the period from 1913 through 1921 the excess of production of coal in the month of greatest output over that of the month of least output in each year varied usually from 11,000,000 to 16,000,000 tons or more and was never less than 6,900,000 tons. These seasonal variations result in keeping more men in the industry than would be needed if work were more evenly distributed throughout the year. This excess in numbers of men employed in the industry tends in turn to make employment more irregular and uncertain.

6. With employment intermittent and uncertain, the bituminous miners are forced to seek higher rates of wages to offset the periods of idleness and lack of earnings. The mine workers reported to the Bituminous Coal Commission that in 1918, which was a year of unusual regularity of employment owing to the war demands, the average annual earnings of their members in the central competitive field varied from \$1,364 in Ohio to a maximum of \$1,583 in Western Pennsylvania. Data derived from the United States Census indicate that in 1919 the average annual earnings of the miners in the same area varied from \$1,062 in

Indiana to a maximum of \$1,318 in Pennsylvania. Estimates of annual earnings derived from average daily earnings reported by the National Coal Association to the President's Bituminous Coal Commission indicate that the average annual earnings in the central competitive field for men working the full time of mine operation were about \$1,277 for inside day labor, \$1,492 for loaders, \$1,579 for hand miners and \$1,760 for machine miners. The general average increase of 27 per cent granted by the Bituminous Coal Commission would have increased these earnings had employment continued to be no more irregular than in the past. Even in the comparatively prosperous year of 1920, however, employment was 12 per cent less than in 1918, while in 1921 employment decreased 23 per cent as compared with 1920, and 32 per cent as compared with 1918. This shows that opportunity for employment as measured by the number of days the mines are operated is of primary importance to the miner, since irregular employment nullifies the advantage of increased rates of pay.

7. Estimates of the cost of living, prepared for the United Mine Workers, and presented by them to the Bituminous Coal Commission, showed that in January, 1920, \$1,603 was required for a budget to provide a "minimum of subsistence" for a family of five. The cost of providing a "minimum of health and comfort" for families living in mining communities was estimated as requiring an annual income of \$2,244. Even in the prosperous year of 1918 the miners' average annual earnings were not equal to the "minimum of subsistence," except for the annual income of a comparatively small group of machine miners employed "full opportunity," as estimated from the operators' figures, and their earnings were nearly \$500 less in a year than the miners' "minimum of comfort" budget. An allowance for a decrease in the cost of living and an increase in the miners' rates of pay probably would not cover the difference between a reasonable budget and the annual income of the miner in his short working year.

8. Present conditions in the bituminous coal industry render precarious and difficult the lives of more than half a million miners and their wives and children. The adjustment of wage rates is sure to produce conflict and bitterness until the equally important questions of stability for the industry and security of employment for the miner receive effective attention from operators and

public. Greater security in employment must be made the foundation of better human relations in this industry.

Wasteful over-development is a problem of organization of the industry as a whole in which either the operators or the public must take the initiative. The cost of living of everybody is increased by disorganization in the basic industry of coal. The public, the operator and the investor, and the coal miner have a common interest in making bituminous mining efficient and economical.

