Daily Tonnage Output of the Pick Miner[1]

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A VERAGE production per man per day expressed in
tonnage of coal is too commonly presented in statistical
statements without any explanation of its meaning,
significance, or lack of significance. Prolific causes of the
general dissatisfaction of coal workers in England and the
United States are the persistent assertion that output per
man is decreasing in the mines, that coal miners are
progressively inefficient from year to year, and the persistent
presentation and use of figures to prove this assertion.
Alongside of the operator's pay-roll statement that miners
are earning enormous wages, the statisticians place the
constantly diminishing average output per man per day,
utterly ignoring the fact that the coal miner is a piece worker.
As a concrete example of what is meant, an operator showed
from his books that a certain number of pick miners in his
mine received $40 per week in a certain pay-roll period.
The pick-mine rate was 75 cents. To earn $40 a miner must
produce 53.3 tons in the 6 days, or practically 9 tons per day.
Beside this is placed the statement that the average production
per man per day had dropped from 3.7 tons to 3.2 tons.

The method of arriving at that average is to divide the
total production by the total number of employees, both
underground and aboveground, and this by the total days
in operation (tipple time), to get the daily average. To say
that the mines of Illinois, for example, averaged 228 days
work in that year does not mean that all of the mine
workers could have averaged 228 days work in that
year. The "days worked", as computed, represent the
maximum possibility for any part of the labour force,
and not the actual working time for any definite part
of the employees. The days in which there was any "tipple
time," or, in other words, any coal hoisted, are commonly
reported as full days ; it does not mean a full day's work
for all employees. For example, let us suppose a mine with
a rated capacity of ten cars per day. On Monday morning
there are seen to be five empty cars on the track; the mine
whistle blows and all employees report for work ; half of

the miners may go down and work all day or all may work half a day ; in any event there is but a half day's production, a half-day's earnings for all employees on a "full-time" basis. On Tuesday morning ten cars are on the siding; all employees put in a full day's work ; the cars are quickly filled, and the miners and loaders fill all or most of the "pit cars", leaving them for a starter in the morning. On Wednesday morning two cars are on the siding ; the mine superintendent decides that there is a sufficient quantity of mined coal in the "pit cars" to load these two cars, and that no miners need go down. The machinery of the mine starts, however, and such men go down as will enable the operator to raise the necessary coal. There is "tipple time" to the extent of loading two railroad cars, hence the mine is reported as "in operation". Here we have three days, upon each of which there was active "tipple time," hence a report of three days' operation. On one of the days, the miners did not work at all, on one other only half day, or half force all day ; in other words, three days are reported, with only one and one-half days' actual full-time employment or production.

This is neither an extreme nor an unusual case, and is cited to illustrate the essential fact that the statistics of time worked in coal mines show the greatest length of time any proportion of the mine workers could have worked ; they do not even indicate what proportion of the miners worked less than that time or any other definite time. The working time as reported in the statistics is based upon the machinery of the coal shaft, not upon the men. This is true of the coal production returns from all countries of the world. A considerable percentage of the actual miners are frequently employed driving entries and doing yardage and other work, that should be charged either to maintenance or new development.

No figures are available, which will show actual one-man days' work performed by bona-fide miners in the bona-fide shipping mines, hence actual average daily production per miner is unknown and unknowable in the present condition of record keeping. Output may be increasing or decreasing ; nobody knows. What is known is that the proportion of underground non-miners and aboveground men to actual miners is increasing, and the average output per employee is statistically decreased by increasing the number of non-miners. This is true of England as well as of the United States. In the coal mines of Silesia, again, the number of women working underground and pushing pit cars has increased some 300 per cent., and, as the tonnage is admittedly divided by the "population of the mine," there is a decrease in *per capita* output per day, regardless of the work of the actual miner. As to the increase in underground men, this may be necessary, owing to the receding of the

working face from the bottom of the shaft and the increased difficulty in getting the coal out after the actual miner has performed his work.   There are many mines in Indiana and Ohio worked back two and three miles from the bottom of the shaft.   This necessitates more track-laying, track-repairing, and doubtless much additional underground labour of other kinds.   As other labour is introduced, of course the average output per man per day is reduced without any relation whatever to the efficiency of the miner.   As the coal miner is a piece worker, each additional miner must mean more coal, for the miner must get out tonnage or he makes no money.   The more miners, therefore, the more coal ; but this is not true of the other labour in and around the mines.   This is all day labour, and the more there is of it, the more is added to cost of production and the more you decrease the average tonnage per day per employee under the present statistical methods.

FALLACY OF STATISTICAL METHODS EMPLOYED.

As a concrete example of the statistical methods referred to above, the *Illinois Coal Report* for 1918 is here cited. On the introductory page is this statement :

. The report shows an increased production of 10,995,942 tons over last year. * * * There was an increase of 10,479 employees.   Taking the shipping mines, which produce more than 98 per cent of the coal, as a basis, we find the number of mines was increased from 324 to 370, the working time increased 15 days, and the number of underground employees 7,389 more than last year.   These increases account wholly for the increased tonnage, as an analysis of the figures shows that the average output per man per day is less than it was last year.

A fairer " analysis of the figures ", however, reveals these facts. Taking the shipping mines for 1918 as compared with 1917, there were 88,017 employees in 1918 and 78,056 in 1917, an increase of 9,961.   Of this increase only 1,454 were actual coal miners.   In 1917 there were 28,486 machine miners, including 3,957 machine miners' helpers, and there were 24,951 pick miners, a total of 53,437 actual miners. The shipping mines operated an average of 215 days and produced 77,412,054 tons, or 1,449 tons per actual coal miner. This was 6.7 tons per miner per day.   In 1918 there were 23,894 machine miners, or 27,869 including 3,975 machine miners' helpers.   There were 27,025 pick miners, or a total of 54,894 actual miners, who contributed to the 88,036,228 tons of coal produced by the shipping mines in 230 days' operating time, i. e. " tipple time. "   This was 1,604 tons per actual miner per year, or 7 tons per miner per day.

What occurred in Illinois was typical of the whole of the bituminous field, as is shown by the real meaning of the following extract from *Coal in 1917* (p. 931) :—

The most striking feature presented by the statistics of labour for 1917 is the relatively large increase in the number of outside or surface employees in comparison with the underground labour in both bituminous and anthracite mining. In the bituminous mines the increase in the total men employed was 7.5 per cent.; the underground employees, representing 79 per cent. of the total in 1917, increased only 5 per cent., compared with 1916, whereas the surface labour increased 21 per cent.

The reason for this difference is found both in the circumstances surrounding the labour market and in the greatly increased demand for coal that prevailed in 1917. The demand for coal was so great, and the prevailing market price of coal so good, that operators exerted every effort to increase their capacity and output. The most certain way to increase capacity is to put on more men, and, as experienced inside men were more difficult to obtain than day labourers, the outside force was augmented more rapidly and out of proportion to the normal requirements. Under the pressure for increased output the operators, apparently without regard to its effect on costs, added labour of any description.

In the coal industry the productive labour is that done underground. Except for the very small percentage of the output obtained from steam-shovel pits, the coal is produced by the men inside. The average output per man per day (all labour considered), in 1917, was 3.77 tons of bituminous coal, a decrease of 3.3 per cent from 3.90 tons in 1916. If the largely increased number of total men in 1917 had worked no more days in 1917 than were worked in 1916, they would have produced, at the average daily rate per man, nearly 30,000,000 tons of bituminous coal less than they did. In other words, the decrease in the average effectiveness of bituminous mine labour in 1917 largely offset the increase in the supply of labour, and the large gain in output was the result of the greater number of days worked. Stated in another way, 7.5 per cent. more men, working 5.7 per cent. more days, produced in 1917 only 10 per cent. more coal, because they were only 97 per cent as effective as in 1916.

The reasoning in the second paragraph of the above quotation could hardly appeal to a practical manager or superintendent of a coal mine. Given the fact that " the demand for coal was so great and the prevailing market price of coal so good, that operators exerted every effort to increase their capacity and output ", the following statement, " the most certain way to increase capacity is to put on more men, and, as experienced inside men were more difficult to obtain than day labourers, the outside force was augmented more rapidly and out of proportion to the normal requirements", is one that could scarcely have emanated from a practical coal operator with the expectation that it would be believed by anyone in the industry. It would seem to be entirely possible in any year to " decrease the average effectiveness of mine labour " by increases of 21 per cent. in the number of above-ground labourers, and any efficiency or effort of actual miners could be " largely offset by increase in the supply of labour " of the non-productive sort.

There is a sense in which adding a large number of names to the pay-roll may add to the shipment of coal from the mine, and hence of course to the output, by giving the miners greater opportunity to work. This condition of things is purely artificial and the result of railway manipulation of car service. This is clearly stated in *Coal in 1918* (p. 714) : —

When the number of cars ordered by operators for loading coal equals or exceeds the number that from day to day the railroads can furnish, the

railroads pro-rate the available supply among the mines. The basis for this distribution is the relative capacity of the mines to produce and load coal, which is expressed in the " car ratings " established by the railroads.   Thus the supply of cars received at each mine at the time when the operator has the greatest desire for the cars depends upon the mine rating.

As just stated, the rating is determined by the capacity of the mine to produce and load coal. Anything an operator may do to increase this capacity will therefore increase his rating, and thereby insure him a larger share of the cars available on his railroad.   For example, if the combined ratings of mines on a railroad division are 100 cars per day, and the number of cars on that division available for placement at the mines for coal loading on a given day is 80, each mine is entitled to 80% of its rating in cars.   If there are 10 mines on this division, each rated at 10 cars per day, each mine is entitled to 8 cars from the total of 80. If one operator, by adding to his supply of labour, can increase the hourly rate of output by, say, 20 per cent., his rating will be increased to 12 cars per day and his share of the total cars available will thereafter be 20 per cent. greater than before. As it is generally true that the mines are developed beyond the present labour supply, the desire to obtain more men and increase output in times of car shortage is logical and warranted.   Individual operators can correctly say that they are short of labour.   The point that must be clearly understood is that increases in employees in one or many mines will not, at such times and under the conditions described, increase the total production of coal. In the assumed case just cited, no matter to what extent one or several of the operators might increase the capacity of their mines by adding to this number of men, there would be only 80 cars to be loaded by the mines on that particular railroad division....

The explanation of this proportionately greater increase in outside labour (offered to the writer by those familiar with conditions at the mines) is that the years 1917 and 1918 were both periods of successively greater demand; that operators, in their efforts to increase the number of men at their mines and thereby their capacity, car rating, and car supply, added to their forces any and all labour obtainable; and that a large proportion of the new men could not be used underground and were therefore put at work on the surface.

In other words, the increase of 21 per cent. in the number of men employed in the coal mines, as shown in the report for 1917, were needed to get cars, not to get coal.

DEVELOPMENT WORK CHARGED TO LABOUR COST.

There is another element which must not be forgotten in discussing the alleged decrease in efficiency of men, as shown by the method referred. to of producing output statistics. In many of our mines the past few years have enabled the operators to show large profits. The excess-profits tax does not appeal to the average business man.   Under our excess-profits tax laws he can employ labour for almost any purpose, and advantage was taken of this fact, in not a few instances, to do considerable upkeep work that had been neglected around the mines.   The labour employed in maintenance and repairs and for new buildings was far in excess of what the industry had known before.   Money was used to extend the entries and driveways into the coal seams far beyond the present necessities.   In other words, the development work, which in all fairness should be charged

to capital investment, or at any rate maintenance, was charged
to labour, and the men, who were simply getting out a little
coal incidental to the yardage work done in driving entries,
were charged in the current statistics to cost of production.
The following figures will give an idea as to the tendency
to increase employment of this character.

NUMBER OF TONS PRODUCED AND NUMBER OF EMPLOYEES IN THE BITUMINOUS.
COAL INDUSTRY IN THE UNITED STATES, 1916 TO 1918.

	Production (tons)	EMPLOYEES		
		Underground	Surface.	Total.
1916	502,519,682	474,244	86,858	561,102
1917	551,790,563	498,185	104,958	603,143
1918	579,385,820	496,252	119,053	615,305

It will be seen from these tables that on January 1, 1917,
taking the bituminous coal fields as a whole, the average
output per man per day was produced by 62.8 per cent. of
the total employees, instead of 82.6 per cent., as in the current
coal statistics for 1918 ; that on January 1, 1918, the output
was produced by 59.9 per cent of the men, instead of 80.7
per cent., as shown in *Coal in 1918*, and that on January
1, 1919, taking the country as a whole, the actual tonnage
was produced by 57.4 per cent. of the men charged to the
industry.

WAGES OF PICK MINERS.

In the early part of 1919 the Bureau of Labor Statistics,
in a survey of bituminous coal fields, secured the co-operation
of the operators and the men to the extent of having the actual
time in the mine recorded for one pay-roll period.   From
that material the Bureau has already published the actual
earnings of miners per hour of time spent in the mine.
Unfortunately, the number of days during which this time
was actually taken was not secured.   That is to say, a man
who worked 40 hours in a pay-roll period of two weeks received
a certain amount of money, but the Bureau's schedules do
not show upon how many different days the man entered the
mine in order to perform these 40 hours of labour.   The
schedules did not show either the pick mine tonnage rate
or the thickness of the seam in which the man worked.
Thickness of seam is largely a determining factor of output
of pick miners up to about a 4½-foot seam.   A vein of coal
over 6 feet is not much, if any, better than one 6 feet thick.
This information has been secured by correspondence with a

THICKNESS OF SEAM OF COAL, TONNAGE RATE OF BITUMINOUS PICK MINERS, AVERAGE NUMBER OF DAYS WORKED IN HALF MONTHS ON 8-HOUR DAY BASIS, AVERAGE NUMBER OF TONS OF COAL MINED PER DAY IN HALF MONTH ON 8-HOUR DAY BASIS, AND NUMBER OF PICK MINERS CLASSIFIED BY AVERAGE NUMBER OF DAYS WORKED IN HALF MONTH AND AVERAGE NUMBER OF TONS OF COAL MINED PER DAY IN HALF MONTH ON 8-HOUR DAY BASIS IN 1919, BY STATE AND MINE.

State and mine number.	Number of pick miners.	Thickness of seam of coal in inches.	Pick miners' tonnage rate.	Average No. of days worked in half month on 8-h. day basis.	Number of pick miners whose average days worked in half month on 8-hour day basis were—													Average No. of tons of coal mined per day on 8-h. day basis.	Number of pick miners whose average tons of coal mined per day in half month on 8-hour day basis were—											
					Under 2.	2 and under 3.	3 and under 4.	4 and under 5.	5 and under 6.	6 and under 7.	7 and under 8.	8 and under 9.	9 and under 10.	10 and under 11.	11 and under 12.	12 and under 13.	13 and over.		Under 3.	3 and under 4.	4 and under 5.	5 and under 6.	6 and under 7.	7 and under 8.	8 and under 9.	9 and under 10.	10 and under 11.	11 and under 12.	12 and under 13.	13 and over.
Alabama:																														
1	153	96	$0.73	6.8	10	4	10	14	15	19	19	21	24	14	3			7.4	3	14	14	14	26	24	17	16	6	5	6	8
2	93	42	.825	7.1	2	2		3	6	10	17	15	22	11	5			6.8	2	4	4	21	19	26	8	4	3			2
3	60	33 to 40	1.09	8				3	2	2	10	8	15	18				5.5	4	6	11	22	8	6	1					
Colorado:																														
1	7	57	1.13	9.2			1			1				3	1	1		5.6			1	3	3							
2	113	108 to 11	.75	5.4	12	1	1	13	29	45	10	2		1				9.8	4	3	1	8	8	9	23	15	16	12		12
3	31	68	.78	6.6	1	2		3	4	5	6	7	2	1				6.1	2	4	8	6	11	3	4		1			
4	48	32	1.18	8.5	2			5		6	2	5	13	8	7			5.2	2	9	13	9	11	1	2	1				
5	195	78	.78	6.4	9	8	5	10	27	33	38	62	1	2				9.1			1	7	24	28	34	26	38	21	4	12
6	31	102 to 106	.75	6.3	5		2	4	1		3	6	10					9.8	1			4	4	4	6	5	3	4		
7	186	120	.75	7.2	9	8	11	6	8	23	27	48	38	6	2			9.2	5	2	4	12	19	23	29	31	22	15	11	13
8	103	96 to 144	.76	5.8	4	5	4	7	11	28	44							7.4	3	9	13	11	17	20	5	11	1	4	1	8
9	62	60	.83	8.3	1	1		3	4	3	9	16	19	3		2		7.2	1	1	8	15	6	11	7	8	1	1	2	1
10	153	72	.78	9.3	1	1	3	4	3	6	11	21	31	41	31			7.5	3	11	18	8	32	33	18	13	7	5	6	4
11	148	54	1.04	10.6		1	3	2		3	7	10	17	15	38	37	12	5.0	3	17	52	52	18	3		1			
12	12	46	1.13	6.4	2		1	1			2							5.3		4	2	4	1		1				
13	10	36 to 60	.93	8.0			1		2		2		1	3	2		1	5.5	2	1	3	1	1			1	1		
Illinois:																														
1	201	42	1.13	5.5	10	5	12	19	44	108	1		1	1				4.0	19	43	48	55	21	12	1	2				
2	140	42	1.13	8.3		2	1	3	3	17	40	74						3.3	48	62	27	2	1							
3	195	50	.91	7.4	1	2	3	10	10	10	46	113						6.3	4	13	29	41	48	26	18	8	4			
4	91	69	.84	7.0	1	2	4	4	4	11	19	42						9.6	1	2	2	2	7	10	1	17	13	5	8	7
5	188	66	.84	9.1	2	1	1	2	5	10	15	28	52	60	12			7.9	3	2	6	13	36	41	45	20	9	4	1	8
6	298	72	.847	8.9	2	4	1	3	5	12	25	54	132	60				7.1	3	10	27	50	58	53	49	29	10	8		1
Indiana:																														
1	189	52	.840	5.7	2	10	10	21	48	97	1							5.4	3	30	63	61	12	4	3	6	4	5		1
2	141	55½	.840	8.8			1	1	4	5	20	24	36	50				6.6		4	14	31	37	30	15	7	3			
3	121	50	.840	7.8	1		2			1	11	27	79					5.9		6	19	51	27	7	4	5	2			
Iowa:																														
1	103	36 to 72	1.100	8.6	1		1	3	3	3	7	22	62	1				5.1	6	12	28	30	20	6	1					
2	91	48	1.485	8.9								63	28					2.8	53	27	8	1				1	1			
3	219	60	.970	7.6	4	3	6	9	13	14	51	107	12					6.5	3	9	20	53	54	36	27	8	5	2	1	
4	111	44 to 54	.970	6.6	4			1		60	46							5.0	11	24	27	20	13	5	6	4	1			
5	140	44	.995	7.4	4	2	5	6	7	14	20	72	10					6.4	6	11	11	31	31	29	12	4	2	2		1
6	91	44	.995	8.0			2	2	5	4	6	14	40	22				6.7	2	2	16	9	30	11	12	7		1	1	
Kansas:																														
1	97	36	1.25	7.1	2	3	1	3	6	13	32	37						4.5	14	23	31	22	6		1					
2	116	36	1.25	6.6	5	4	7	5	18	20	21	21	14	1				5.4	11	20	18	26	18	13	3	4	1		2	
3	140	32	1.01	6.4	4	3	3	8	12	47	63							4.9	15	31	32	33	10	10	5	3		1		
4	59	38	1.01	7.0	1	1	3	4	9	2	17	23						4.7	10	11	13	16	8		1					
5	133	40	1.01	8.3	1		6	4	10	2	10	12	18	20	35	13		6.8	5	6	14	21	25	29	15	6	5	3	1	3
6	127	34	1.01	5.2	4	3	12	25	50	33								6.8	9	9	16	20	17	18	7	12	10	5	2	2
7	246	37	1.01	6.1		7	12	28	49	80	70							7.9	3	7	9	27	35	58	44	27	12	13	4	7
8	35	34 to 38	1.01	10.6				2	1				6		7	11	8	6.8		3	5	4	10	8	5					
9	202	38	1.01	5.7	2	7	11	17	60	104	1							6.5	11	20	22	37	34	30	19	10	9	3	4	3
10	103	34 to 39	1.01	6.2	3	4	5	5	18	16	52							5.7	9	10	22	21	13	17	7	2	1		1	
11	79	32 to 46	1.01	8.1	3	1	3	2	2	4	10	17	23	14				7.5	3	2	8	11	11	15	14	7	1			
12	145	36	1.01	7.8			2	7	11	18	33	38	33	3				4.7	20	35	34	26	16	9	4		1			
Kentucky:																														
1	7	44	.67	8.6							1	4	2					9.4						1		1	4			1
2	10	92	.60	5.8	3			2		1	1		1	1	1			9.4						2	2	1	1	1		2
3	104	.60	9.5								1	1	1	2	1		12.0					1		1			1		2
4	84	1.06	1.06	5.9	1	8	4	2	8	16	42	3						4.3	20	24	21	7	7	3	1	1				
5	23	41	1.13	8.7			2	2		1	1	2	4	5	3	3	1	4.6	3	7	5	5	2			1	1			
6	5	82	.60	6.0	1			1		1	1							9.6				1				1	1	2		
Maryland:																														
1	96	66	.952	8.5		3	1	2	1	4	18	21	29	17				7.5			2	3	6	19	36	5	5	7	2	1
2	73	65	.952	6.1	1	1	6	7	16	16	19	7						9.0				2	7	7	20	15	16	5	1	
3	99	65	.952	6.2	2	6	4	12	13	20	22	18	2					9.3			5	10	22	18	12	8	5	7	12	
4	141	108	1.047	6.3	4	4	12	6	18	36	43	17	1					6.1		11	25	33	26	25	13	4	1		1	2
5	82	108	1.047	6.5	2	1	6	9	9	18	19	14	4					7.3	1		5	6	18	30	10	8	2	1		1
Missouri:																														
1	121	22	1.3667	5.8	7	4	2	10	23	51	24							2.9	68	38	11	2	1		1					
2	18	22	1.5267	11.3							1	1	3	2		10		2.6	12	5	1									
3	87	22	1.5267	6.3	3	3	1	12	15	37		2	8	5	1			3.4	26	41	17	3								
4	25	22	1.5267	6.6	3	4				5		3	7	7	4			4.3	6	11	3	2	2	1						
5	35	33	1.5617	9.0			1		2		3	3	4	6	12			3.1	17	12	3	1								
6	160	54	.9600	8.3	1	4	1	6	5	4	18	38	83					5.9	2	8	37	47	33	17	11	2	1	2		
7	164	41	1.2200	6.8	2	5	9	5	10	19	71	43						4.2	18	48	59	28	11							
New Mexico:																														
1	30	72 to 102	.78	8.6	1				1	4	1	19	4					8.6		1				5	5	7	4	7		1
2	48	54 to 66	.78	7.8	1			3	6	13	1	5	19	4				8.3	1		3	2	7	11	14	10	7	1	4	1
3	109	54	.86	8.1	2		1	4	9	6	22	32	20	5	7	1		5.9	6	15	17	22	13	14	10	7	1	4		
4	148	54	.86	7.6	9	3	5	8	5	12	21	43	16	12	10	2	2	6.6	18	22	15	20	24	9	10	5	1	6	9	2
5	36	60	.78	10.8		1	1				1	2	5	6	5	3	10	7.4			7	4	6	9	2	3	1	1	2	2
6	157	72	.78	0.9	4	3	2		1	5	6	6	15	14	30	36	35	7.7	3	6	11	20	21	23	31	19	11	6	1	5
Ohio:																														
1	2	60	.8764	11.0												2		8.3							1	1				
2	11	60	.8764	10.3							2			1	3	1	3	6.7		1			2	1	5		1			
Oklahoma:																														
1	26	36	1.065	10.0						1	4	4	1	7	4	4	1	6.6		3	5	4	4	2	4	2	2			
2	16	48	1.010	8.3		1	2			1	2	1	4	3	2			6.2		2	3	2	4	5	1		1			
3	19	52	1.010	7.1	2	2	1	2		1	1	2	3	5	1			7.5		2	1	3	3	1	3	1	2	2	1	
4	54	46 to 48	1.010	8.4			1		5	16	11	22						6.2	5	4	9	9	7	7	6	7	3	3		
5	153	47	1.010	8.5	6	4	5	8	10	9	16	11	20	20	23	25	10	6.1	13	24	35	20	16	15	10	6	6	1	2	3
6	25	50	1.010	7.1	1	1	2	1		3	4	7	4	2				7.0	1	3	3	3	1	4	3	2	3	1		1
Pennsylvania:																														
1	31	69	.8764	10.0					2	1		4	4	11	6	3		7.9				6	3	5	8	4	4	1		
2	78	88	.7911	8.9		2	6		6	14	27	19	6	8				9.1				5	8	8	16	14	8	7		
3	47	65	.8764	10.5			3		1	1	2	6	5	8	13	6		7.3	3		3	3	13	8	5	3	2	2		
4	53	65	.8764	11.2		1		1	1	1	2	1	5	13	11	12	7.4			5	9	7	10	11	6	2	2		
5	13	60	.8764	6.0		3	1	1	1	1	2	2						7.9			1	2	2	2	2	1	1		1	
6	62	64	.8764	6.8	1	3	3	4	10	5	14	16	4	2				9.3			6	4	11	6	12	11	4	5		
7	62	71	.7911	10.6	1	1	2	1	3			2	3	6	11	12	14	8.5			4	4	18	14	13	3	3		
8	89	63	.7911	6.7	6		4	6	8	10	18	24	4					9.4	4	1	2	3	5	6	14	11	18	7	4	5
9	48	60	.8764	6.7		3	3	4	6		6	9	15	2				8.6			3	5	11	9	5	7	8	1		3
10	43	60	.8764	7.5	1					1	6	8	21					7.7			2	7	7	4	10	7	3	2		
11	158	73	.7911	8.0	1	1	6	8	9	16	25	34	35	16	4	3		12.9			1	2	6	6	14	6	11	19	21	75
12	36	42	.9017	12.1						3		2	3	2	4	3	18	6.5	2	6	1	5	7	4	4	4		3		
13	26	42	.9017	12.9								2	3	2	1	3	14	7.5			3	1	5	3	7	4				
14	18	42	.9017	14.5									1	1	1	15	7.1		1	1	3	3	3	2				
15	17	32	1.0120	7.4					1			1	10	5				3.6	3	7	7									
16	37	54	1.0120	6.0			2	5	1	19	10							6.4	1	3	9	10	7	6	1					
17	49	48	1.0115	6.6	2	1	2	6	5	13	5	10	4	1				6.4		7	12	12	4	4	1	1				
18	32	48 to 72	.9031	7.7		4	1	2		1	5	4	7	8				6.2	2	2	11	5	2	4	2	1	1			
19	45	60	1.0115	6.8	2		1	1	2	9	30							6.2		1	4	8	15	5	4	3	1	2		
20	37	58	1.0115	9.5					1	3	1		1	9	14	8		6.2		1	5	4	14	8	2				1	
21	109	45	1.0115	7.9		3	3	11	10	15	16	26	17	3				7.3		4	21	14	22	8	7	8	1	2	1	11
22	33	52	1.0115	10.4								2	4	7	20			7.3			2	6	6	5	7	5				
23	33	54	1.0115	7.2	1	3		3		2		3	3	6	2			6.4	1	4	4	7	4	9		1				
24	15	59	.8764	10.3					1	3	2		1	3	3	2		5.0	4	4	4		2	1						
25	31	58	.8764	9.4	1		2		2	1		1	3	6	4	11		8.2		1	1	4	4	6	6		2			
26	110	72	1.2000	6.2	4	2	7	5	9	19	29	36	8					5.6	8	9	24	23	16	13	4	5	2	2		
27	160	41	1.0120	7.2	1	5	4	10	9	20	28	41	51					7.7	2	6	21	28	32	32	21	16	6	5		
28	387	43	1.0120	7.2	12	12	12	15	20	23	63	104	136					6.8	2	19	30	91	91	74	36	23	6	3	2	
Tennessee:																														
1	97	60	.56	6.2	4	6	3	9	13	20	30	12						11.9					1	1	5	12	19	11	14	34
2	18	34	.80	4.8	1			4	3	12			1					6.1							1	5			1	
3	29	60	.77	6.7	1	2	3	2	2	1	3	3	2	6	2		6.4	1	1	3	9	6	5	3	1				
4	21	36 to 40	.80	6.6			6	3	1	3	12	2						7.0		1	3	6	2	6	3					
5	138	27	.95	6.0	3	1		6	10	20	40	38	5					4.7	14	33	43	20	14	5	4	2	1			
6	9	22	1.07					3			5							5.8	1		3	1	2		1					
7	55	33	.92	6.6		1	1		5	15	33							6.7	2	4	8	15	13	6	4	1				
Utah:																														
1	55	72	.80	9.6	1	2	3	1	2	1	3	2	2	14	15	7	2	9.3	1		1	2	6	6	10	4	6	4	1	4
2	79	168	.75	7.5	1	9	4	3	5	6	4	6	9	8	14	2	1	9.4	1		3	4	7	10	11	6	11	10	2	10
3	11	72 to 96	.70	6.6	3		3	1				3	1	2		1		10.0						1	2		4		2	
West Virginia:																														
1	15	56	.705	6.2			1	2	1	1	10							7.8	1	1	2	1	3	5		1				1
2	21	60	.860	6.3			1	3	3	3	4	1	4					8.0	1	1		5	3	7	3	2				
Wyoming:																														
1	83	144	.72	6.1		1	2	9	22	21	18	6	2	1	1			12.5					1	2	9	10	15	13	33
2	30	57 to 72	.77	7.4		4	3	1	5	1		3	3	4	1	5		10.7						10	11	2	6	1		
3	21	72	.77	9.1						1		4	13		2	1		10.4				1		2	2	1	3			
All States-118	9,817				232	224	316	507	880	1,483	1,684	1,770	1.3	623	366	198	150	6.8	577	913	1,251	1,431	1,395	1,275	984	672	462	290	471	336

[1] The regular hours that mines are open for work are 8 per day or 48 per week for all except those numbered 12, 13, and 14 in Pennsylvania, for which the hours are 10 per day or 60 per week.

[2] Rate for pillars; all other is machine-mined.

[3] Gross tonnage rate.

[4] The regular hours for this mine are 10 per day or 60 per week.

large number of these mines and, having the earnings of the men and the number of hours actually worked, it has been possible to derive the number of tons of coal mined in a day, all time being reduced to an 8-hour day basis. Data are shown in the following table for 9,817 pick miners in 118 mines in the various coal-producing States of the Union, and it is the first, and, so far as I am aware, the only, attempt to ascertain the productiveness of hand labour in bituminous coal mines. It should be remembered that this does not include machine-mined coal. The first part of the table distributes the days worked in a two weeks' pay roll upon the full 8-hour-day basis. It will be noted that comparatively few men worked the possible 13 days, by far the greater number working between eight and nine days. It will also be noted that there were comparatively few men and comparatively few mines, where the average output per miner was as small as popularly reported. The average output per hand-pick miner in all the coal fields was 6.8 tons per day of 8 hours. In cases where the output is small in thick seams of coal, it is a fair presumption that considerable entry driving and yardage work was being done during the pay-roll period.

THE MEN WHO REALLY PRODUCE THE COAL.

It cannot be said too often that these statistics of production per man per day in the bituminous coal industry are ascertained by dividing the total tonnage by the total employees both under and above ground, and then dividing this quotient by the average number of days the mines run (tipple time). The miners produce the tonnage, but the manager regulates the number by which this is divided. The figure as to the tons produced per man per day is therefore merely a matter of statistical manipulation.

This movement, if conscious movement it is, or at least tendency, to decrease relatively the actual coal getters, is general. The United States Fuel Administration, in Part III of the reports of its Distribution Division, gives quite general statistics along this line. The data there compiled are here reproduced in detail from the States comprising the central competitive field, and for all mines covered by the report named.

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