

STRIKE IN THE  
COPPER MINING DISTRICT  
OF MICHIGAN

LETTER FROM  
THE SECRETARY OF LABOR

TRANSMITTING

IN RESPONSE TO A SENATE RESOLUTION OF  
JANUARY 29, 1914, A REPORT IN REGARD  
TO THE STRIKE OF MINE WORKERS IN THE  
MICHIGAN COPPER DISTRICT WHICH  
BEGAN ON JULY 23, 1913



JANUARY 30, 1914.—Referred to the Committee on Education and Labor  
and ordered to be printed

WASHINGTON  
1914

63D CONGRESS : : 2D SESSION

DECEMBER 1, 1913—OCTOBER 24, 1914

SENATE DOCUMENTS

VOL. 8

WASHINGTON : : GOVERNMENT PRINTING OFFICE : : 1914

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## LETTER OF TRANSMITTAL.

DEPARTMENT OF LABOR,  
OFFICE OF THE SECRETARY,  
*Washington, January 29, 1914.*

SIR: In compliance with the resolution of the Senate of January 29, 1914, I transmit herewith a report in regard to the strike of mine workers in the Michigan copper district which began on July 23, 1913. This report includes the results of an investigation made under the direction of the Commissioner of Labor Statistics, together with reports of the efforts made by Mr. John A. Moffitt and Mr. John B. Densmore, as mediators in behalf of the Department of Labor to secure an adjustment of the dispute either by mediation or arbitration.

Respectfully,

W. B. WILSON, *Secretary.*

Hon. THOMAS R. MARSHALL,  
*President of the Senate, Washington, D. C.*

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# REPORT OF THE COMMISSIONER OF LABOR STATISTICS IN REGARD TO STRIKE OF MINE WORKERS IN THE MICHIGAN COPPER DISTRICT.

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UNITED STATES DEPARTMENT OF LABOR,  
BUREAU OF LABOR STATISTICS,  
*Washington, November 24, 1913.*

SIR: I transmit herewith a report containing the results of an investigation into the strike of mine workers in the Michigan copper district, begun on July 23, 1913. The investigation has been carried on by Mr. Walter B. Palmer of this Bureau, and the text of the report has been prepared by him.

I am, very respectfully,

ROYAL MEEKER,  
*Commissioner of Labor Statistics.*

SECRETARY OF LABOR,  
*Washington, D. C.*

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## INTRODUCTION.

This report relates to a strike of mine workers which began on July 23, 1913, in the Michigan copper district. The principal cause of the strike was dissatisfaction with regard to wages, hours of labor, and the use of the one-man drill instead of the two-man drill. The strikers were members of the Western Federation of Miners, which was established in the district in 1909, and which in 1913 had five local unions in the district. In these local unions there was a referendum vote, during the first 12 days in July, on the question of asking for a conference with the mine managers and on the question of declaring a strike if the managers should refuse to grant a conference or make concessions. The officials of the Western Federation of Miners state that at that time it had nearly 9,000 members in the district, and that 98 per cent of the votes cast were in the affirmative on each of the two propositions.

On July 14 the president and secretary of the district union, composed of the five local unions, sent a communication to the mine managers which stated that they hoped "to sell their labor collectively," and that they desired to have a conference with the managers to discuss "the possibilities of shortening the working day, raising wages, and making some changes in the working conditions." The communication stated that, as ordered by a referendum vote, a strike would be called unless the managers should agree to a conference or make concessions, and replies were requested by July 21. None of

the managers replied to the communication, because they considered that by doing so they would recognize the Western Federation of Miners. At a meeting of the district union on July 22 a strike was called, to take effect immediately.

Every mine in the district was closed on July 23, except two of the very small mines. Including the strikers, about 14,500 mine workers were made idle by the strike. The mines being closed, work was necessarily stopped in the stamp mills and smelters, which had about 1,500 employees.

During the first two days of the strike there was much rioting, occasioned by members of the federation attempting to prevent nonunion men from going to work. Sixteen men employed by one of the companies were injured and taken to the company's hospital. The sheriff of Houghton County called on the governor of Michigan for troops to quell disorder. The governor ordered troops to the district and they began to arrive on July 25. Within two days the whole National Guard of the State, over 2,600 men, had arrived. They encamped in tents on the property of the various companies.

In addition to the militia, there were during the strike about 1,700 deputy sheriffs, about 450 of whom had been appointed before the strike began. Many of these deputies were employees of the companies. The sheriff of Houghton County engaged 52 men from the Waddell-Mahon Corporation of New York to train these deputies. From this corporation one of the mining companies engaged 32 men and another company 25 men. Another company secured about 120 men from the Ascher Detective Agency of New York. The bringing in of these outside guards incensed the strikers more than anything else that happened during the strike.

The strikers hired halls, held public and private meetings, and had daily parades at the various mine locations. They were addressed by officials of the Western Federation of Miners, the United Mine Workers of America, and the American Federation of Labor. These organizations raised relief funds for the benefit of the strikers, and payment of strike benefits began in September.

After the first two days of the strike there was little disorder until the middle of August, when work was resumed in some of the mines of one of the companies. Many strikers were arrested for interfering with men going to work. Some were arrested charged with more serious crimes, but of cases tried in the circuit court no defendant was convicted of a more serious offense than assault. A number of mines were opened in September and October, and some of the companies brought in men to work in the mines who were engaged through employment agencies in New York, Chicago, and other places. Some of these men did not go to work when they learned of the strike, and others quit after working a few days.

A striker was shot in both legs by a corporal because of neglect to obey an order to halt. A private was waylaid by unknown parties, and so badly beaten that he was unconscious for hours. In attempting to arrest a striker for having trespassed on company property, two deputies and four Waddell-Mahon men shot into a mine workers' boarding house and killed two and wounded two of the strikers. In a clash between deputy sheriffs and strikers shots were fired by the

former. One of these shots entered the brain of a girl, and her recovery was considered marvelous. In a fight between a deputy sheriff and a striker both were killed. A clerk of one of the companies, while passing a group of strikers, was shot at twice, one shot going through his body. These were the most serious cases of violence during the strike. No attempt was made by the strikers to damage property.

Some troops were stationed in Keweenaw County but none in Ontonagon County. In these counties there was little disorder, and practically none until October, when some of the mines were reopened.

Most of the parades of the strikers were timed to pass the mines and mine villages at the hour in the morning when men started to work. On application of the mining companies, the judge of the State circuit court issued an injunction, which restrained the strikers from interfering with men who wished to go to work, from picketing in or about the mines, and from parading on highways over which employees had to pass to reach their homes or the mines. This injunction was issued on September 20, but the same judge that had issued it dissolved it on September 29. On application of the companies, the State supreme court reinstated and continued the injunction, but modified it to the extent that peaceful meetings and parading were not prohibited. After this several hundred strikers and 50 or more women were arrested for violation of the injunction. Most of them were arrested while they were on early morning parades. Most of these arrests were made by the militia. Those arrested were held on their own recognizance.

The mine managers refused to confer with members of the Western Federation of Miners, and in reemploying men required them to promise to have no connection with that organization. Two attempts to bring about an arbitration of the questions involved in the strike were made by the governor and one by the United States Department of Labor. The companies refused all arbitration proposals, because of their determination not to recognize the Western Federation of Miners directly or indirectly. In October a committee, appointed by the Copper Country Commercial Club, made a report, which discussed the matters in controversy and announced that the mine managers had agreed that they would, by January 1, 1914, arrange that underground men should work only eight hours per shift. The report also stated that the mine managers had agreed to give opportunity for the presentation of all grievances, and to appoint a day or half a day each week for hearing and adjusting grievances.

#### CAUSES OF THE STRIKE.

Dissatisfaction regarding wages, hours of labor, and the use of the one-man drill was the principal cause of the strike of mine workers which began in the Michigan copper district on July 23, 1913. These and other grievances are discussed in subsequent sections of this report.

No definite demands were made by the mine workers before the strike began, except that the local officers of the Western Federation

of Miners sent a communication to the mine managers, informing them that their employees organized into local unions of the federation desired to hold a conference with them "for the purpose of discussing the possibilities of shortening the working day, raising wages, and making some changes in the working conditions." The managers considered that if they should grant such a conference, or even reply to this communication, it would be giving recognition to the federation.

The copper-mine workers in Michigan, comparing their earnings with those of the copper-mine workers in Montana, found that in Michigan the rate of pay was much less than miners earn in Montana, where the Western Federation of Miners was strongly organized. While the average earnings per shift of mine workers in Michigan are less than the average of such workers in Montana the shift hours are longer in Michigan. This is true especially of trammers, timber men, and track layers.

In the Michigan district all underground workers are under ground from 10 to 11 hours a day or night shift, this including 1 hour for luncheon. On Saturday in Michigan the miners on day shift work 5½ hours, but there is no night shift, while trammers work 8½ hours, both day and night shift, including 1 hour for luncheon. The time stated for all underground workers in Michigan includes the time required for going to the working places and returning to the surface.

In Montana the Western Federation of Miners has contracts with the mining companies which stipulate that the time of each shift shall be 8½ hours, including half an hour allowed for luncheon, and including the time required to go from the surface to the working places, but not the time required to return to the surface.

The contracts stipulate that the minimum wages or earnings of underground men, whether engaged in mining, tramping, timbering, tracklaying, or other work, shall be \$3.50 per day, on the basis of the price of copper being less than 15 cents a pound; and if copper is selling at 15 and under 17 cents, the minimum shall be \$3.75; and if it is selling at 17 cents or over, the minimum shall be \$4.

A copy of one of the Montana contracts appears in the appendix to this report. The sliding scale of minimum wages is based on the monthly average price of electrolytic copper, as published in the Mining and Engineering Journal of New York. According to this journal the average price was below 15 cents a pound in January, February, and March, 1912; over 15 and under 17 cents in May and June, 1912; over 17 cents from July to December, inclusive, 1912; over 15 and under 17 cents in January, 1913; under 15 cents in February and March, 1913; over 15 and under 17 cents in April and May, 1913; under 15 cents in June and July, 1913; over 15 and under 17 cents in August and September, 1913.

In the Michigan copper district the mine workers have never had any contracts with the mining companies other than such terms as were fixed by the companies, and the companies have never stipulated in regard to a minimum wage. In some mines in this district miners on day or night shifts are paid as low as \$2.35 per shift, while trammers are paid as low as \$2.

No investigation was made of the earnings of mine workers in Montana. The minimum wage there is considerably higher than the average earnings in the Michigan copper district, but the earnings in the two districts could not be well compared without taking into account the cost of living in each district, which was not ascertained in this investigation.

#### WAGES OF MINE WORKERS.

Each of the companies involved in the strike was requested to state what increases had been made in wages or in contract rates during recent years, back to 1900, if possible. One of the most definite statements was made by the Calumet & Hecla Mining Co., which reported that its wages and rates had been changed as follows: March, 1899, a raise of 10 per cent; January, 1901, a raise of 2½ per cent; May, 1907, a raise of 10 per cent; December, 1907, a cut of 10 per cent; May, 1912, a raise of 10 per cent. Some of these changes were made by other companies on or about the months mentioned. Practically all of the companies in the district increased wages and contract prices 10 per cent in May, 1912.

Some miners work "on company account" or monthly basis, but many work on a contract basis. Contracts were formerly let on the basis of a cubic fathom of rock mined, but now they are usually let on the basis of tons mined. In no mines is the rock actually weighed, but the pay of contract miners is figured on the number of tramcar loads of rock which they blast out and which the trammers push to the shaft. In each mine the dimensions of the tramcars are the same, but the load, of course, depends on how fully they are filled or how much they are heaped. The miners seem to have accepted without much complaint this method of estimating their production, though it is rather surprising that such a crude method has not caused dissatisfaction.

Most of the mine managers who prefer the contract system, or prefer it if practicable, state that they prefer it because it gives an efficient miner an opportunity to increase his earnings above the regular monthly rate. Many miners also prefer the contract system because they can earn more by that system than by the ordinary monthly rate. All pay rolls that were examined showed that the average earnings of the miners and trammers on contract were greater than the average earnings of those paid by the month. However, complaints are heard among certain contract miners because during some months their earnings would be unusually low on account of the poor rock mined, or some other run of bad luck. Contract rates are sometimes fixed by the mine captain (foreman), but more generally by him and the superintendent or general manager. Monthly wages are always determined by the management.

The only mine workers that work on contract are miners and trammers. The following table shows the number of miners and trammers working on contract and monthly bases in July, 1913, just

before the strike began, and shows which system the mine managers prefer, according to their own statements:

Mine.	Miners on—		Trammers on—		Contract basis or shift basis preferred by management.
	Contract basis.	Monthly basis.	Contract basis.	Monthly basis.	
Ahmeek.....	138		75	42	Contract.
Allouez.....	79	2	94	2	Do. <sup>1</sup>
Calumet & Hecla.....	652	60	( <sup>2</sup> )	( <sup>2</sup> )	Do.
Copper Range.....	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	Do. <sup>1</sup>
Centennial.....	26	2	17		Do. <sup>1</sup>
Franklin.....	11	43		42	Do.
Hancock.....		47		29	Shift.
Isle Royale.....	56	93		157	Contract. <sup>1</sup>
Lake.....	6	34		25	Do.
La Salle.....		6		( <sup>3</sup> )	Do.
Laurium.....	( <sup>4</sup> )			( <sup>3</sup> )	Do.
Mass.....		38		31	( <sup>5</sup> )
Mohawk.....	225	14		126	Contract
Oneco.....		9		3	Shift.
Osceola.....	56	2		296	Contract.
North Kearsarge.....	94	2			Do. <sup>1</sup>
South Kearsarge.....	34	42			Do. <sup>1</sup>
Quincy.....	140	500		200	Do. <sup>1</sup>
Superior.....	22	16	32		Do. <sup>1</sup>
Tamarack.....	73	38		77	Do.
Winona.....	64	18		( <sup>2</sup> )	Do. <sup>1</sup>
Houghton.....		( <sup>3</sup> )		( <sup>2</sup> )	Do. <sup>1</sup>
Wolverine.....	98			86	Do. <sup>1</sup>
Total.....	7 1,774	9 966	9 218	10 1,116	
Per cent of total.....	64.74	35.36	16.34	83.66	

<sup>1</sup> When practicable.

<sup>2</sup> Not reported.

<sup>3</sup> All on shift basis; number not reported.

<sup>4</sup> All on contract basis; number not reported.

<sup>5</sup> Would have to be determined by trial.

<sup>6</sup> North Kearsarge and South Kearsarge included.

<sup>7</sup> Not including Copper Range and Laurium.

<sup>8</sup> Not including Copper Range and Houghton.

<sup>9</sup> Not including Calumet & Hecla and Copper Range.

<sup>10</sup> Not including Calumet & Hecla, Copper Range, La Salle, Laurium, Winona, and Houghton.

Of the total number of miners, 2,740, reported on either contract or monthly basis, 1,774, or 64.74 per cent, were on contract basis, and 966, or 35.26 per cent, on monthly basis. Of the total number of trammers, 1,334, reported on either contract or monthly basis, 218, or 16.34 per cent, were on contract basis, and 1,116, or 83.66 per cent, on monthly basis. Until January 1, 1913, a curious custom prevailed in all of the mines in the Michigan copper range, and it prevails yet in all mines except those of the Calumet & Hecla and its subsidiary companies. Miners that work full five and one-half day shifts or full five-night shifts are paid on the basis of having worked six shifts. Paying miners on this basis is an old Cornish custom imported into Michigan years ago. On January 1, 1913, this custom was modified by the Calumet & Hecla and its subsidiary companies, and these companies have since paid miners on night shifts for only five shifts a week, though they continue to pay miners on day shifts on the basis of having worked six shifts a week. On the same date these companies increased the rate of pay of miners "on company account" 25 cents per shift. In analyzing the tables relating to wages that follow, it is necessary to bear the old Cornish custom in mind.

An examination of the pay rolls of the mining companies involved in the strike of 1913 (except of a few companies having very small mines) was made by agents of the Bureau of Labor Statistics, and, from the figures thus secured, the tables which follow were compiled. These tables relate to the earnings of miners and trammers who together compose about half of the mine workers and who comprised the greater number of mine workers that went out on strike. All earnings shown in these tables are what the employees received after deductions had been made for materials used in the mines, such as powder, caps, fuse, and carbide, but not including deductions for medical attention, aid fund, rent, fuel, etc.

The following table shows the average number and average earnings of miners employed by each company during the 12 months prior to July, 1913, in which month the strike began:

Average daily earnings of miners, year ending June 30, 1913.

Mining company.	Six months ending Dec. 31, 1912.		Six months ending June 30, 1913.		Total for year ending June 30, 1913.	
	Average number of men.	Average earnings per day or shift.	Average number of men.	Average earnings per day or shift.	Average number of men.	Average earnings per day or shift.
No. 1. Calumet & Hecla.....	908	\$3.22	754	\$3.60	831	\$3.39
No. 2. Osceola.....	83	2.90	81	3.44	82	3.21
No. 3. North Kearsarge.....	158	3.26	120	3.59	139	3.40
No. 4. South Kearsarge.....	99	2.77	85	3.03	92	2.89
No. 5. Isle Royale.....	256	2.79	212	3.13	234	2.94
No. 6. Ahmeek.....	178	3.01	137	3.56	158	3.25
No. 7. Tamarack.....	134	3.24	123	3.37	129	3.30
No. 8. Allouez.....	134	2.95	95	3.60	114	3.22
No. 9. Superior.....	51	3.58	47	3.55	49	3.57
No. 10. Centennial.....	40	2.75	34	3.49	37	3.09
No. 11. La Salle.....			1	3.98		
No. 12. Laurium.....	9	3.86	6	3.26	7	3.62
Total, Nos. 1 to 12.....	2,050	3.11	1,695	3.48	1,872	3.28
No. 13.....	320	2.69	281	2.70	301	2.69
No. 14.....	200	2.67	186	2.71	193	2.69
No. 15.....	365	2.67	369	2.68	367	2.68
No. 16.....	670	2.75	634	2.79	652	2.77
No. 17.....	308	2.84	253	2.81	281	2.83
No. 18.....	125	2.83	107	2.86	116	2.84
No. 19.....	112	2.71	114	2.57	113	2.64
No. 20.....	106	2.91	100	2.88	103	2.90
No. 21.....						
No. 22.....	58	2.49	55	2.48	57	2.48
No. 23.....	43	2.98	48	2.66	46	2.81
No. 24.....	13	2.61	10	2.61	12	2.61
No. 25.....	36	2.63	39	2.63	38	2.63
Total, Nos. 13 to 25.....	2,356	2.74	2,196	2.78	2,279	2.74
Total, all companies.....	4,406	2.91	3,891	3.08	4,151	2.98

<sup>1</sup> 5 months; mine idle in May, 1913.

<sup>2</sup> 11 months; mine idle in May, 1913.

The average number of miners was found for this table by dividing the total number of shifts worked, as shown on the pay rolls, by the number of shifts that the mine was operated during each six-month period. In each of the tables that follow a similar method was adopted to find the average number of miners and trammers.

The first company shown in the preceding table is the Calumet & Hecla Mining Co., and its subsidiary companies are numbered 2 to

12. Other companies reporting are numbered 13 to 25. The earnings of miners employed during the year by the Calumet & Hecla and subsidiary companies varied from \$2.89 to \$3.62 per shift and averaged \$3.28. The earnings of miners employed during the year by the other companies varied from \$2.48 to \$2.90 per shift and averaged \$2.74. The general average for all companies during the year was \$2.98.

Miners do not work Saturday afternoons, hence in a month of 30 days without holiday they work only 23 shifts. But under the old Cornish custom their shift rate is computed by dividing their monthly rate by 26, because under this custom miners that work 5½-day shifts a week or 5 night shifts a week are counted as having worked 6 shifts. In other words, the monthly rate of "company account" miners is divided by 26 to arrive at the shift rate, and if a miner is absent 1 day one twenty-sixth of his monthly rate is deducted from his pay; if he is absent 2 days, two twenty-sixths of his monthly rate is deducted. If he works an extra shift on overtime work or in a month of 31 days, he is paid one twenty-sixth more than his monthly rate.

The shift rate is thus computed from the monthly rate by all companies except the Calumet & Hecla and its subsidiary companies. Prior to January 1, 1913, the Calumet & Hecla and subsidiary companies followed the old Cornish custom, and divided the monthly rate by 26 to obtain the shift rate, but since then they have divided the monthly rate by 24 instead of 26. They did this because they stopped counting night-shift miners, who work 5 shifts a week, as having worked 6 shifts, though they continued to count day-shift miners who work 5½ shifts a week as working 6 shifts. This, in part, explains why the average shift rate of miners of the Calumet & Hecla and subsidiary companies was higher during the first 6 months of 1913 than it was during the last 6 months of 1912. Another reason given by the company for this increase is the increased amount of contract mining, and still another reason assigned is the increased use of the one-man drill.

It should be understood that there has been no change in the time that miners work. If they work full time they actually work 23 shifts (counting two half shifts on Saturday forenoons as one shift) in a month of 30 days without holidays.

In computing the rate per shift for contract miners, their earnings for the month are divided by the actual number of shifts that they worked, but with the Calumet & Hecla and subsidiary companies Saturday half shifts are counted as full shifts, and with the other companies Saturday half shifts are counted as full shifts, and an extra shift on Saturday night is counted.

The different methods of computing the shift rate should be considered in comparing the rates shown in the table that are paid by the Calumet & Hecla and subsidiary companies with the rates that are paid by the other companies. The rates for the first 6 months in 1913 can be put on an equal basis only by multiplying the shift rates of the Calumet & Hecla and subsidiary companies by 24 and dividing by 26, or by multiplying the shift rates of the other companies, as they appear in the table, by 26 and dividing them by 24.

If the average shown in the table for miners employed by the Calumet & Hecla and subsidiary companies during the first 6 months

in 1913, \$3.48 per shift, be multiplied by 24 and divided by 26, the result is \$3.21 per shift, as compared with \$2.78 per shift paid by other companies on the same basis.

If, however, the earnings per shift are calculated on the time actually worked—that is, on the basis of 23 shifts—the average shift rate is increased above that which is shown in the table. Taking the earnings of miners employed by the Calumet & Hecla and subsidiary companies during the first 6 months of 1913 and multiplying the average shift rate shown in the table by 24 and dividing by 23, the result is \$3.63 per shift instead of \$3.48. Taking the earnings of miners employed by the other companies during the same period and multiplying the average shift rate shown in the table by 26 and dividing by 23, the result is \$3.14 per shift instead of \$2.78.

The following table shows the average number and average earnings of trammers employed by each company during the 12 months prior to July, 1913, in which month the strike began.

Average daily earnings of trammers, year ending June 30, 1913.

Mining company.	Six months ending Dec. 31, 1912.		Six months ending June 30, 1913.		Total for year ending June 30, 1913.	
	Average number of men.	Average earnings per day or shift.	Average number of men.	Average earnings per day or shift.	Average number of men.	Average earnings per day or shift.
No. 1. Calumet & Hecla.....	600	\$2.84	539	\$2.99	570	\$2.91
No. 2. Osceola.....	62	2.54	71	2.54	67	2.54
No. 3. North Kearsarge.....	138	2.54	132	2.54	135	2.54
No. 4. South Kearsarge.....	95	2.54	87	2.54	91	2.54
No. 5. Isle Royale.....	138	2.55	131	2.57	135	2.55
No. 6. Ahmeek.....	132	2.73	115	2.85	124	2.78
No. 7. Tamarack.....	111	2.75	95	2.76	103	2.75
No. 8. Allouez.....	94	2.68	103	2.73	98	2.70
No. 9. Superior.....	48	2.62	30	3.14	39	2.82
No. 10. Centennial.....	26	2.61	29	2.70	28	2.66
No. 11. La Salle.....			2	2.46		
No. 12. Laurium.....	3	2.53	2	2.46	2	2.50
Total, Nos. 1 to 12.....	1,447	2.71	1,336	2.80	1,392	2.75
No. 13.....	169	2.31	135	2.31	152	2.31
No. 14.....	77	2.31	72	2.32	74	2.32
No. 15.....	175	2.31	143	2.31	160	2.31
No. 16.....	207	2.51	199	2.51	203	2.51
No. 17.....	189	2.53	161	2.55	175	2.54
No. 18.....	103	2.50	94	2.49	98	2.49
No. 19.....	68	2.20	64	2.40	66	2.30
No. 20.....	95	2.38	90	2.38	92	2.38
No. 21.....						
No. 22.....	55	2.31	50	2.30	53	2.30
No. 23.....	24	2.46	25	2.27	24	2.36
No. 24.....	4	2.56	3	2.54	3	2.43
No. 25.....	36	2.31	34	2.31	35	2.31
Total, Nos. 13 to 25.....	1,202	2.40	1,070	2.41	1,135	2.40
Total, all companies.....	2,649	2.57	2,406	2.63	2,527	2.59

<sup>1</sup> 5 months; not including June, 1913.

<sup>2</sup> 11 months; not including June, 1913.

<sup>3</sup> 5 months; mine idle in May, 1913.

<sup>4</sup> 11 months; mine idle in May, 1913.

<sup>5</sup> Including 2 companies reporting for 5 months.

<sup>6</sup> Including 2 companies reporting for 11 months.

As the Cornish custom has never been applied to trammers, a simpler explanation can be made of the table that relates to trammers than of the table that relates to miners. The rates per shift are figured on the same basis for all companies. The monthly earnings

of contract trammers are divided by the actual number of shifts that they worked, and the monthly wages of "company account" trammers are divided by 26 or 27, since they work, when working full time, 26 shifts in a 30-day month and 27 shifts in a 31-day month, the Saturday shifts, day or night shifts, being two hours shorter than the shifts on other days.

As shown by the table, the earnings of trammers employed during the year by the Calumet & Hecla and subsidiary companies varied from \$2.50 to \$2.91 per shift and averaged \$2.75; the earnings of trammers employed during the year by the other companies varied from \$2.30 to \$2.54, and averaged \$2.40; and the general average for all companies during the year was \$2.59.

From the pay rolls of the various companies agents of the Bureau of Labor Statistics obtained the monthly rates of all miners and trammers working on "company account" during May, 1913, and the earnings and number of shifts worked by each contract miner and trammer during that month. From the data thus secured, the rates per shift were computed, and these rates were classified by amounts, as appears in the following tables, the first of which relates to miners.

Average earnings per day or shift and average number and per cent of miners earning each classified amount per day or shift in May, 1913.

AVERAGE NUMBER.

Mining company.	Average number of miners.	Average earnings per day or shift.	Miners earning each classified amount per day or shift.						
			Under \$2.	\$2 and under \$2.50.	\$2.50 and under \$3.	\$3 and under \$3.50.	\$3.50 and under \$4.	\$4 and under \$4.50.	\$4.50 and over.
No. 1. Calumet & Hecla.....	719.3	\$3.54			46.5	384.7	193.6	72.2	22.3
No. 2. Osceola.....	65.9	3.45			4.1	46.6	5.6	3.7	5.9
No. 3. North Kearsarge.....	98.8	3.69				57.0	15.2	15.3	11.2
No. 4. South Kearsarge.....	79.4	3.06			52.2	19.3	3.9	3.9	
No. 5. Isle Royale.....	197.3	3.15	0.3	0.4	86.9	89.9	9.7	8.2	2.0
No. 6. Ahmeek.....	139.2	3.72			11.6	61.1	24.2	22.3	20.0
No. 7. Tamarack.....	108.8	3.39			16.0	63.8	13.5	4.0	11.4
No. 8. Allouez.....	91.0	3.57			.4	69.3	11.6		9.8
No. 9. Superior.....	46.6	3.68			.4	33.8	1.9	2.7	7.8
No. 10. Centennial.....	31.9	3.40				26.4	3.2	2.2	
No. 11. La Salle.....									
No. 12. Laurium.....									
Total, Nos. 1 to 12.....	1,578.2	3.48	.3	.4	218.1	851.9	282.4	134.5	90.4
No. 13.....	251.2	2.74			220.2	29.0	2.0		
No. 14.....	187.8	2.67			183.9	3.9			
No. 15.....	355.1	2.65	1.3	1.7	327.0	22.6	2.5		
No. 16.....	624.6	2.78			580.6	40.1	3.9		
No. 17.....	227.1	2.90		1.0	168.7	36.1	11.5	8.9	.9
No. 18.....	107.1	2.75			99.7	5.6	1.9		
No. 19.....	94.0	2.63		66.5	11.6	11.9	4.0		
No. 20.....	89.1	2.85			70.7	16.0	2.2	.1	
No. 21.....									
No. 22.....	52.3	2.45		12.9	39.4				
No. 23.....	46.3	2.61			46.3				
No. 24.....	8.1	2.59			8.1				
No. 25.....	40.3	2.50		15.7	22.6		2.0		
Total, Nos. 13 to 25.....	2,083.0	2.73	1.3	97.8	1,778.2	167.2	28.0	9.0	.9
Total, all companies.....	3,661.2	3.06	1.6	98.2	1,996.9	1,019.1	310.4	143.5	91.3

Average earnings per day or shift and average number and per cent of miners earning each classified amount per day or shift in May, 1913—Concluded.

PER CENT.

Mining company.	Average number of miners.	Average earnings per day or shift.	Miners earning each classified amount per day or shift.						
			Under \$2.	\$2 and under \$2.50.	\$2.50 and under \$3.	\$3 and under \$3.50.	\$3.50 and under \$4.	\$4 and under \$4.50.	\$4.50 and over.
No. 1. Calumet & Hecla.....	719.3	\$3.54			6.5	53.5	26.9	10.0	3.1
No. 2. Osceola.....	65.9	3.45			6.2	70.7	8.5	5.6	9.0
No. 3. North Kearsarge.....	98.8	3.69				57.7	15.4	15.5	11.3
No. 4. South Kearsarge.....	79.4	3.06			65.7	24.3	4.9	4.9	
No. 5. Isle Royale.....	197.3	3.15	0.2	0.2	44.0	45.6	4.9	4.2	1.0
No. 6. Ahmeek.....	139.2	3.72			8.3	43.9	17.4	16.0	14.4
No. 7. Tamarack.....	108.8	3.39			14.7	58.6	12.4	3.6	10.5
No. 8. Allouez.....	91.0	3.57			.4	76.2	12.7		10.8
No. 9. Superior.....	46.6	3.68			.9	72.5	4.1	5.8	16.7
No. 10. Centennial.....	31.9	3.40				82.8	10.0	6.9	
No. 11. La Salle.....									
No. 12. Laurium.....									
Total, Nos. 1 to 12.....	1,578.2	3.48	(1)	(1)	13.8	54.0	17.9	8.5	5.7
No. 13.....	251.2	2.74			87.7	11.5	.8		
No. 14.....	187.8	2.67			97.9	2.1			
No. 15.....	355.1	2.65	.4	.5	92.1	6.4	.7		
No. 16.....	624.6	2.78			93.0	6.4	.6		
No. 17.....	227.1	2.70		.4	74.3	15.9	5.1	3.9	.4
No. 18.....	107.1	2.75			93.1	5.2	1.8		
No. 19.....	94.0	2.63		70.7	12.3	12.7	4.3		
No. 20.....	89.1	2.85			79.3	18.0	2.5	.1	
No. 21.....									
No. 22.....	52.3	2.45		24.7	75.3				
No. 23.....	46.3	2.61			100.0				
No. 24.....	8.1	2.59			100.0				
No. 25.....	40.3	2.50		39.0	56.1	5.0			
Total, Nos. 13 to 25.....	2,083.0	2.73	.1	4.7	85.4	8.0	1.3	.4	(1)
Total, all companies.....	3,661.2	3.06	(1)	2.7	54.5	27.8	8.5	3.9	2.5

<sup>1</sup> Less than one-tenth of 1 per cent

As appears by the second part of the table, 54 per cent of the miners in the mines of the Calumet & Hecla and subsidiary companies earned from \$3 to \$3.50 per shift, and 85.4 per cent of the miners in the mines of the other companies earned from \$2.50 to \$3 per shift. The average rate per shift for miners was \$3.48 in the mines of the Calumet & Hecla and subsidiary companies and \$2.73 in the mines of the other companies. It should be understood, however, that the rate per shift was found by dividing the monthly rates or earnings by 25 in the case of the Calumet & Hecla and subsidiary companies and by 27 in the case of the other companies. As previously explained, the division is made by 25 for the former companies and by 27 for the latter companies because May was a month of 31 days. In a month of 30 days the division is made by 24 and 26, respectively.

To reduce the average shift rate of miners for the Calumet & Hecla and subsidiary companies to the same basis as the average rate for the other companies, the average rate of the former, \$3.48, must be multiplied by 25 and divided by 27. This results in \$3.22 as compared with the average shift rate of the other companies than the Calumet & Hecla and subsidiary companies, which is \$2.73, figured on the 27 shift a month basis.



Following is a table relating to trammers, similar in form to that relating to miners:

Average earnings per day or shift and average number and per cent of trammers earning each classified amount per day or shift in May, 1913.

AVERAGE NUMBER.

Mining company.	Average number of trammers.	Average earnings per day or shift.	Trammers earning each classified amount per day or shift.						
			Under \$2.	\$2 and under \$2.50.	\$2.50 and under \$3.	\$3 and under \$3.50.	\$3.50 and under \$4.	\$4 and under \$4.50.	\$4.50 and over.
No. 1. Calumet & Hecla.....	502.8	\$3.08	0.2	31.5	240.3	115.7	100.8	14.1	0.1
No. 2. Osceola.....	64.6	2.54			64.6				
No. 3. North Kearsarge.....	150.6	2.54			150.6				
No. 4. South Kearsarge.....	99.9	2.54			99.9				
No. 5. Isle Royale.....	127.8	2.55			127.8				
No. 6. Ahmeek.....	120.1	2.93		.3	75.1	24.7	15.4	1.1	3.6
No. 7. Tamarack.....	75.7	2.81			75.7				
No. 8. Allouez.....	104.7	2.68			89.7	15.0			
No. 9. Superior.....	29.6	3.17		.2	8.3	17.5	3.6		
No. 10. Centennial.....	23.9	2.76			17.2	6.1	.6		
No. 11. La Salle.....									
No. 12. Laurium.....									
Total, Nos. 1 to 12.....	1,299.7	2.83	.2	32.0	949.2	179.0	120.4	15.2	3.7
No. 13.....	134.0	2.31			134.0				
No. 14.....	68.6	2.33			68.6				
No. 15.....	140.0	2.31			140.0				
No. 16.....	174.0	2.53		5.2	168.8				
No. 17.....	133.9	2.53		2.7	131.2				
No. 18.....	80.3	2.48		5.0	75.3				
No. 19.....	59.0	2.38		55.7	3.3				
No. 20.....	72.7	2.38		72.7					
No. 21.....									
No. 22.....	51.9	2.30		51.9					
No. 23.....	23.6	2.23		23.6					
No. 24.....	2.2	2.62		2.2					
No. 25.....	72.7	2.29		72.4	.3				
Total, Nos. 13 to 25.....	1,012.9	2.40		631.8	381.1				
Total, all companies.....	2,312.6	2.64	.2	663.8	1,330.3	179.0	120.4	15.2	3.7

PER CENT.

Mining company.	Average number of trammers.	Average earnings per day or shift.	Under \$2.	\$2 and under \$2.50.	\$2.50 and under \$3.	\$3 and under \$3.50.	\$3.50 and under \$4.	\$4 and under \$4.50.	\$4.50 and over.
No. 1. Calumet & Hecla.....	502.8	\$3.08	(1)	6.3	47.8	23.0	20.0	2.8	(1)
No. 2. Osceola.....	64.6	2.54			100.0				
No. 3. North Kearsarge.....	150.6	2.54			100.0				
No. 4. South Kearsarge.....	99.9	2.54			100.0				
No. 5. Isle Royale.....	127.8	2.55			100.0				
No. 6. Ahmeek.....	120.1	2.93		.2	62.5	20.6	12.8	.9	3.0
No. 7. Tamarack.....	75.7	2.81			100.0				
No. 8. Allouez.....	104.7	2.68			85.7	14.3			
No. 9. Superior.....	29.6	3.17		.7	28.0	59.1	12.2		
No. 10. Centennial.....	23.9	2.76			72.0	25.5	2.5		
No. 11. La Salle.....									
No. 12. Laurium.....									
Total, Nos. 1 to 12.....	1,299.7	2.83	(1)	2.3	73.0	13.8	9.3	1.2	.3
No. 13.....	134.0	2.31			100.0				
No. 14.....	68.6	2.33			100.0				
No. 15.....	140.0	2.31			100.0				
No. 16.....	174.0	2.53		3.0	97.0				
No. 17.....	133.9	2.53		2.0	98.0				
No. 18.....	80.3	2.48		6.2	93.8				
No. 19.....	59.0	2.38		94.4	5.6				
No. 20.....	72.7	2.38		100.0					
No. 21.....									
No. 22.....	51.9	2.30		100.0					
No. 23.....	23.6	2.23		100.0					
No. 24.....	2.2	2.62		100.0					
No. 25.....	72.7	2.29		99.6	.4				
Total, Nos. 13 to 25.....	1,012.9	2.40		62.4	37.6				
Total, all companies.....	2,312.6	2.64	(1)	28.7	57.5	7.7	5.2	.7	.2

<sup>1</sup> Less than one-tenth of 1 per cent.

As appears by the second part of this table, 73 per cent of the trammers in the mines of the Calumet & Hecla and subsidiary companies earned from \$2.50 to \$3 per shift and 62.4 per cent of the trammers in the mines of the other companies earned from \$2 to \$2.50 per shift.

The average rate per shift of the trammers employed by the Calumet & Hecla and subsidiary companies appears as \$2.83, and the average of trammers employed by other companies appears as \$2.40, and both averages are figured on the same basis, that is, by dividing the monthly wages of "company account" trammers by 27 and dividing the earnings of contract trammers for the month by the number of shifts that they actually worked.

During the strike many mine workers brought to the headquarters of the Western Federation of Labor their "dockets" or pay tickets, which showed how much they had earned during certain months, how much were the deductions, and how much was the net pay they received. These tickets were exhibited to prove that the earnings of mine workers were very low, and many of them were published in the Miners' Bulletin, a triweekly paper issued by the federation. Each docket showed the name of the employee to whom it belonged, the company for which he worked, and the number of shifts for which he was paid, but did not show his occupation, and in some cases did not give details about the deductions. An agent of the Bureau of Labor Statistics requested Guy E. Miller, editor of the Miners' Bulletin, to lend him some of the tickets in order that he might compare them with the pay rolls. He requested Mr. Miller to pick out some of the lowest of the tickets, and those that the latter selected were compared with the pay rolls at the various mine offices. The facts shown by the tickets supplemented by the facts shown by the pay rolls are presented in the following table and explanatory footnotes:

Name.	Occupation.	Month.	Shifts worked.	Earnings.	Deductions.	Net amount received.
Calumet & Hecla mine:						
Paul Blomster.....	Section laborer, surface.	July, 1913	16	\$32.00	<sup>1</sup> \$4.00	\$28.00
Osceola mine:						
John James.....	Loose inspector.....	June, 1913	24	63.69	<sup>2</sup> .50	63.19
Matt Crovatic.....	Dryman.....	Jan., 1913	27	50.88	<sup>4</sup> 5.50	45.38
Dominic Bruno.....	Trammer.....	July, 1913	5	14.42	<sup>5</sup> 5.00	<sup>6</sup> 9.42
North Kearsarge mine:						
Frank Isaacson.....	Rollerman.....	Mar., 1913	23	56.62	<sup>7</sup> 1.10	55.52
John James.....	Timberman.....	July, 1912	14 <sup>1</sup>	32.35	<sup>8</sup> 1.00	69.35
Do.....	Tracklayer.....	do.....	16 <sup>3</sup>	38.00		
Michael Somers.....	Contract miner.....	Jan., 1912	21	35.64	<sup>9</sup> 6.50	<sup>10</sup> 29.14
Louis Yuhias.....	Trammer.....	July, 1913	18	46.80	<sup>11</sup> 6.00	40.80
John Rigo.....	Laborer, surface.....	June, 1913	24	45.69	<sup>2</sup> .50	45.19

<sup>1</sup> Physician and aid fund, \$1; pasture for 3 cows, \$3; one free, others \$1.50 per month.  
<sup>2</sup> Physician and aid fund, \$0.50.  
<sup>3</sup> A cripple and practically a pensioner.  
<sup>4</sup> Physician and aid fund, \$1; rent, \$4; water, \$0.50.  
<sup>5</sup> Physician and aid fund, \$1; rent and water, \$4.  
<sup>6</sup> Also drew \$14 from aid fund during month on account of sickness.  
<sup>7</sup> Physician and aid fund, \$1; supplies, \$0.10.  
<sup>8</sup> Physician and aid fund, \$1.  
<sup>9</sup> Physician and aid fund, \$1.50; land lease for one year, \$5.  
<sup>10</sup> On referring to pay roll it was found that these earnings were much smaller than during other months in 1912. During the whole year Somers worked 301 shifts and earned \$1,061.92, an average of \$3.53 per shift. The deductions that were made from his earnings during the year were: \$16 for physician and aid fund; \$26 for wife in hospital; \$0.80 for supplies; \$33.65 for coal; total \$54.45. Fractured leg in January, 1913, and drew maximum amount provided by the State compensation law.  
<sup>11</sup> Physician and aid fund, \$1; coal, \$5.

Name.	Occupation.	Month.	Shifts worked.	Earnings.	Deductions.	Net amount received.
South Kearsarge mine:						
Gus Warnanen	Janitor	June, 1913	24	\$45.13	\$20.50	\$44.63
Imri Kulik	Trammer	Feb., 1913	19 <sup>1</sup>	50.07	39.00	41.07
Do.	do.	Mar., 1913	4	60.71	39.00	51.71
Proska Sefetsen	do.	Aug. 1912	20	50.35	41.50	48.85
Do.	do.	Sept., 1912	25	63.45	6.65	62.80
Do.	do.	Oct., 1912	16	40.60		
Do.	Laborer	do.	5	10.55	6.65	50.50
Do.	do.	Nov., 1912	20	42.30	2.50	41.80
Do.	do.	Dec., 1912	11	23.70	2.50	23.20
Do.	do.	Jan., 1913	25	52.88	2.50	52.38
Do.	do.	Feb., 1913	9	19.05	2.50	18.55
Do.	do.	Apr., 1913	20	42.31	2.50	41.81
Dominic Bruno	Skip tender	Nov., 1912	26	59.00		
Do.	Timberman	do.	23	5.70	61.00	63.70
Anton Krulitz	Trammer	Feb., 1913	17	43.15		
Do.	Laborer	do.	23	5.29	2.50	47.94
Ahmeek mine:						
John Gregorich	Trammer	May, 1913	25	63.45	2.50	62.95
Mike Miter	do.	Nov., 1910	21	48.45	76.50	41.95
Allouez mine:						
Bozo Kasanovich	Trammer, contract	Nov., 1912	23	58.49	61.00	57.49
Do.	do.	Feb., 1912	17	39.25	61.00	38.25
Herman Lukkonen	Miners' helper, contract. <sup>10</sup>	Apr. 1912	25	47.87	61.00	46.87
Do.	do.	June, 1912	25	43.25	61.00	42.25
Do.	do.	July, 1912	25	43.25	61.00	44.65
Do.	Timberman	do.	1	2.40		
Mathew Aho	Miners' helper, contract.	Nov., 1912	25 <sup>1</sup>	46.55	13.65	42.90
Do.	do.	Feb., 1913	16	31.33	15.11	19.22
Do.	Miners' helper, company account.	Mar., 1913	20 <sup>2</sup>	46.95	61.00	45.95
Superior mine:						
Joseph Allen	Lander, Rockhouse	May, 1913	26	53.00	2.50	52.50
La Salle mine:						
Geo. Brozovich	Laborer, surface	July, 1913	22	44.00	161.50	42.50
Wolverine mine:						
Anselm Dimonen	Drill boy <sup>10</sup>	Mar., 1913	13	17.50	2.50	17.00
Uno Lehto	Mucker, underground.	May, 1913	14	26.90	2.50	26.40
Waino Lehto	Laborer, underground.	June, 1913	8	17.55	61.00	16.55
John Lukajawie	Miners' helper <sup>10</sup>	May, 1913	27	41.55	2.50	41.05
Henry Lukajawie	Mucker, underground.	do.	25	54.80	61.00	53.80
Dependent Mossa	Laborer, underground.	July, 1913	9	19.75		
Do.	Stemmer	do.	1	2.70	2.50	21.95
Paul Musso	Laborer, Rockhouse.	do.	17	38.60	1915.15	23.45
Israel Harris	Laborer, underground.	Mar., 1913	18	39.45		
Do.	Stemmer	do.	6	16.15	2055.60	

<sup>1</sup> A cripple and practically a pensioner.

<sup>2</sup> Physician and aid fund \$0.50.

<sup>3</sup> Physician and aid fund, \$1; rent for boarding house, \$8.

<sup>4</sup> Physician and aid fund, \$1; supplies, \$0.50.

<sup>5</sup> Physician and aid fund, \$0.50; supplies, \$0.15.

<sup>6</sup> Physician and aid fund \$1.

<sup>7</sup> Physician and aid fund, \$1.50; coal, \$5.

<sup>8</sup> The pay roll shows that this man worked 150 shifts as a contract miner from January to July, inclusive, 1913; earnings, \$488.50; average per shift, \$3.26; deductions, physician and aid fund, \$7; 3 tons of coal, \$15; lamp, \$0.50; total deductions, \$22.50.

<sup>9</sup> During the months of March, April, May, and June, 1913, this man worked 72 $\frac{1}{2}$  shifts as a contract trammer and earned \$150.24. As his earnings each month were less than those paid trammers on company account, he was paid at company account rate, a total of \$184.05, instead of his actual earnings.

<sup>10</sup> Boy.

<sup>11</sup> Paid company account rate; contract not finished.

<sup>12</sup> Paid company account rate; actually earned \$28.75 on contract.

<sup>13</sup> During the last 5 months of 1912 this employee worked 122 $\frac{1}{2}$  shifts as a miner's helper and earned \$290.43.

<sup>14</sup> Physician and aid fund, \$1; overpaid in October, \$2.65.

<sup>15</sup> Physician and aid fund, \$1; overpaid in January, \$14.11.

<sup>16</sup> Physician and aid fund, \$1.50.

<sup>17</sup> Also received \$17 sick benefits from aid fund during month.

<sup>18</sup> Also received \$7 sick benefits from aid fund during month.

<sup>19</sup> Physician and aid fund, \$1; supplies: Building material for home owned by employee, \$14.15.

<sup>20</sup> Physician and aid fund, \$1; ground rent for year, \$5; assigned to grocery store, \$49.60.

In each case the table shows the occupation of the employee, and the footnotes explain the deductions.

As there has been a shortage of labor in the Michigan copper district for several years, the mine workers have steady work the year round. In copper mining there is no season of shortened production, as during some months in coal mining. The only general holidays in the Michigan district are New Year, July 4, election day, and Christmas. Miners work only half a day on Saturday, but other mine workers work Saturday or Saturday nights, but two hours less than on other days. Counting Saturdays as workdays, the number of days the various mines were operated in 1912 was as follows: Tamarack, 311; Lake and Houghton, 310; Calumet & Hecla, Ahmeek, Allouez, Centennial, Superior, Osceola, North Kearsarge, South Kearsarge, Laurium, Oneco, Quincy, Hancock, and Winona, 309; Isle Royale, 308 $\frac{1}{2}$ ; Copper Range, 308; Mohawk and Wolverine, 307; Mass, 306; Franklin, 256 (idle in January and July).

The average number of days that copper mines in the United States were operated during 1911 was 308;<sup>1</sup> the average number of days that coal mines in the United States were operated during the same year was 220.<sup>2</sup>

#### HOURS OF LABOR.

In the Michigan copper range the nominal hours of labor for underground workers are 10, or from 7 o'clock in the morning until 5 o'clock in the afternoon, and for the night shift from 7 p. m. to 5 a. m., not including 1 hour allowed for luncheon. According to this nominal schedule, an underground man leaves the surface at 7 o'clock and returns to the surface at 5 o'clock; that is, he is underground 10 hours, including the luncheon hour and the time required to descend into the shaft and to ascend to the top. But the man cages in which men are conveyed have a very limited capacity. Only one man cage in the district has a capacity for 40 men, and the others have a capacity for only 30 or less. Hence, there is much delay in carrying men down and in bringing them up, and in most mines the men are usually underground 10 hours and 30 minutes, and the mine workers claim not infrequently 11 hours. According to a statement of the Calumet & Hecla Mining Co., its underground men are underground 10 hours and 30 minutes, and some other companies report 10 hours and 20 minutes. Each of the companies was requested to answer the following inquiries:

Number of hours in each shift?

Does this time include the time allowed for going from the surface to the working place and returning? How much time is required each way?

Does this include time allowed for eating luncheon? If so, how much time?

The replies of the companies follow:

#### CALUMET & HECLA MINING CO.

The hours per shift are 10 hours and 30 minutes, including one hour for luncheon, except Saturday, when the number of hours for miners is 5 hours and 45 minutes, and for trammers and tim-

<sup>1</sup> Metal-Mine Accidents in the United States during the Calendar Year 1911, by Albert H. Fay. Technical Paper 40, Department of the Interior, Bureau of Mines, p. 21.

<sup>2</sup> The Production of Coal in 1912, by Edward W. Parker. Bulletin, U. S. Geological Survey, p. 37.

bermen 8 hours and 15 minutes. This includes the time allowed for going from the surface to the working place and returning. In the case of the Conglomerate mine, where all of the blasting is of necessity done at one time, viz, at the end of the shift, and where the depths are so great that it takes considerable time to hoist a cage load of 30 men, the time required in going down to work, waiting for the cage, and returning to the surface is approximately 1 hour and 45 minutes.

## OSCEOLA CONSOLIDATED MINING CO.

The hours per shift are not over 10 hours and 30 minutes—generally 15 or 20 minutes less. This includes ordinarily one hour for luncheon. On Saturday the day-shift miners are in the mine until noon—just five hours; the night-shift miners do not work at all; trammers, timbermen, etc., are in the mine eight or eight and one-half hours on Saturday. This includes the time allowed for going from the surface to the working place and returning. From the surface to the working place consumes 15 to 30 minutes, depending on the depth of the shaft and the distance from the shaft to the working place. From the time the men quit working to the time they reach the surface at the end of the shift consumes from 25 to 60 minutes.

## ISLE ROYALE COPPER CO.

Miners average 9 hours and 48 minutes per shift; trammers, timbermen, and other underground labor, 9 hours and 55 minutes per shift. This includes 1 hour for luncheon and the time allowed for going from the surface to the working place and returning, which averages from 5 to 15 minutes, depending on the distance. Surface time averages 9 hours and 40 minutes per shift, not including 1 hour for luncheon, except on Saturday, when the working time is 8 hours.

## AHMEEK MINING CO.

All underground employees' weekday shifts, except on Saturday, are 10 hours and 15 minutes, including 1 hour for luncheon, and including the time required for going and returning from the place of work to the surface, about 8 minutes each way. The Saturday shift for miners is 5 hours; for trammers, 8 hours and 15 minutes.

## TAMARACK MINING CO.

The hours per shift are 10 hours and 15 minutes, out of which 1 hour is allowed for dinner. This covers the time from leaving the collar of the shaft to go down into the mine until the return to the collar at the end of the shift. About one-half hour is consumed in going from the collar of the shaft to the working place and the same in returning from work.

## ALLOUEZ MINING CO.

The hours per shift are 10 hours and 20 minutes, except on Saturday. This includes 1 hour allowed for dinner and the time allowed for going from the surface to the working place and returning, which varies considerably, depending upon the distance of the working place from the shaft, from 10 to 20 minutes each way. Men on first trip down take the first car up. On Saturday the first trip of the day shift goes down at 6.45 a. m., and the miners are up at 12.10 p. m., and the trammers, timbermen, etc., at 3.30 p. m. On Saturday night shift no miners work; trammers go down at 3.35 p. m. and are up at 11.15 p. m.

## SUPERIOR COPPER CO.

Men are underground about 10 hours and 20 minutes, 1 hour being allowed for dinner. This includes the time allowed for going from the surface to the working place and returning, about 10 minutes each way.

## CENTENNIAL COPPER MINING CO.

The hours per shift are 10 hours and 20 minutes, except on Saturday. This includes 1 hour allowed for dinner, and the time allowed for going from the surface to the working place and returning, which varies considerably, depending upon the distance of the working place from the shaft, from 10 to 20 minutes each way. Men on first trip down take the first car up. On Saturday the first trip of the day shift goes down at 6.30 to 6.45 a. m., and the miners are up at 12.10 p. m. and the trammers, timbermen, etc., at 3.30 p. m. On Saturday night shift no miners work; trammers go down at 3.35 p. m. and are up at 11.30 p. m.

## LA SALLE COPPER CO.

The hours per shift are 10, except on Saturday. This includes the time allowed for going from the surface to the working place and returning, about 10 minutes each way. This also includes one hour for luncheon. Men are brought to the surface for luncheon.

## LAURIUM MINING CO.

The hours per shift are 10, except on Saturday. This includes the time allowed for going from the surface to the working place and returning, about 10 minutes each way. This also includes one hour for luncheon. Men are brought to the surface for luncheon.

## WINONA COPPER CO.

The nominal underground shift is nine hours, not including one hour allowed for luncheon, but including most of the time required for going from the surface to the working place and returning. Only about 15 minutes is required to hoist and lower all employees each way.

## HOUGHTON COPPER CO.

The nominal underground shift is nine hours, not including one hour allowed for luncheon, but including most of the time required for going from the surface to the working place and returning. Only about 15 minutes is required to hoist and lower all employees each way.

## MASS CONSOLIDATED MINING CO.

The shifts are nine hours, excluding one hour for luncheon, but including time for going from the surface to the working place and returning, about 15 minutes each way.

## COPPER RANGE CONSOLIDATED CO.

For the first five days of the week all men start underground at 7 a. m. and start up at 4.45 p. m., having one hour at noon for luncheon. From 15 to 20 minutes are required to descend and ascend. Men sent down first are taken up first. On Saturdays miners start down at 7 a. m. and start up at 11.45 a. m. Other underground men start down at 7 a. m. and up at 3 p. m., at which time the night shift trammers and laborers start down, and they begin coming up at 10.45 p. m.

## QUINCY MINING CO.

Men are underground about nine hours. This includes one hour allowed for luncheon, and includes the time required for going from the surface to the working place and returning, about one-half hour each way.

## HANCOCK CONSOLIDATED MINING CO.

The shifts are nine hours. This includes one hour for luncheon and includes the time required for going from the surface to the working place and returning, about 10 minutes each way.

## ONECO COPPER MINING CO.

The shifts are nine hours. This includes one hour for luncheon and includes the time required for going from the surface to the working place and returning, about five minutes each way.

## LAKE COPPER CO.

Shifts are called 10 hours. This includes time allowed for luncheon, one hour for miners and half an hour for trammers, and includes the time required for going from the surface to the working place and returning. Any working place in the mine can be reached in 15 minutes from the time a man leaves the surface.

## MOHAWK MINING CO.

The hours per shift are 10, including one hour for luncheon and the time required for going from the surface to the working place and returning, from 15 to 30 minutes.

## WOLVERINE COPPER MINING CO.

The hours per shift are 10 hours and 30 minutes, including one hour for luncheon and the time required for going from the surface to the working place and returning, from 15 to 30 minutes.

## FRANKLIN MINING CO.

The hours per shift are nine for underground work. This is exclusive of time allowed for luncheon, but includes the time required for going from the surface to the working place and returning, from 15 to 30 minutes each way.

The contracts of the Western Federation of Miners with the mining companies in Montana prescribe that the working time shall be eight and one-half hours per shift, including the time necessary to go down into the shaft and half an hour for luncheon, but the men return to the surface on their own time. As the mines in Montana are not nearly so deep as the older mines in Michigan, less time is required for going down or coming up in the former than in the latter.

In a number of States there are laws which provide that the hours of labor of men working underground shall not exceed eight per day. The States that have enacted such laws, the years of enactment, and the general provisions of the statutes now in force are as follows: In Wyoming, 1890-91, 1909; Colorado, 1905, 1911; Utah, 1896; Montana, 1905, 1907, 1911; Nevada, 1903; Idaho, 1907, the period of employment in underground work shall not exceed eight hours.

*California, 1909.*—The period of employment in underground work shall not exceed eight hours exclusive of meal time.

*Washington, 1909.*—It is unlawful to cause any underground employee to remain at his place for more than 8 hours out of any 24, exclusive of half an hour for luncheon.

*Missouri, 1901.*—It is unlawful to work underground laborers more than 8 hours in 24.

*Oregon, 1907.*—No person shall permit or require any person to work in any underground metal mines more than 8 out of 24 hours.

*Arizona, 1903, 1912.*—The hours of labor of men employed in underground mines, workings, pit workings, and tunneling shall not exceed eight, including the time going to and returning from the place of work; that is, the time between leaving the surface and returning thereto shall not exceed 8 hours in any 24.

*Alaska, 1913.*—The hours of labor of men working underground in mines shall not exceed eight, exclusive of descending or ascending time, or other time going to or returning from work.

*Pennsylvania, 1911.*—No hoisting engineer in any anthracite mine shall be engaged longer than 8 out of 24 hours.

*Oklahoma, 1908.*—Eight hours shall constitute a day's labor in underground workings. The United States Supreme Court has decided that a Federal statute similar in language to the Oklahoma law did not prevent the making of agreements for working longer than eight hours.

## THE TRAMMING TROUBLE.

For two years or more before the strike of 1913 there was a serious shortage of labor in the Michigan copper district. During this time the number of additional men that were needed was estimated at from 1,500 to 2,000. There was a greater shortage of trammers than of any other class of mine workers, and this shortage of trammers is a chronic condition. Usually about 29 per cent of the mine workers are miners, 21 per cent trammers, 28 per cent other underground workers, and 22 per cent surface workers.

The unskilled work of trammers is much harder labor than the work of miners, and their pay is considerably lower, as will be seen by referring to the section of this report which relates to wages. In addition, trammers work longer hours per week than miners. For five days a week, Monday to Friday, on either day or night shift, the hours that miners and trammers are underground are nominally 10, including an hour allowed for luncheon, but this time is often stretched into 10½ or 11 hours. This lengthening of the time that men are underground is caused by inefficient means for lowering men into the mine and bringing them up. The man cages are too small. There is in all the mines only one cage that carries 40 men, and the others carry only 30 or less, usually less.

The longer hours that trammers work are on Saturday, when the miners do not work a night shift and the day shift is only from 5 to 5½ hours, but the trammers have both day and night shifts, each from 7 to 7½ hours.

Before the strike began there was more dissatisfaction among the trammers than among any other class of mine workers. It is generally admitted, even by the mine managers, that the trammers have much the hardest work to do that is done in the mines. Two trammers have to load and push cars which weigh 1,200 to 3,000 pounds and which are loaded with from one and a half to two and a half tons of rock. Two men, or for the heavier loads three, push this weight of from 4,800 to 8,000 pounds over rough tracks hundreds of feet, often from 1,000 to 1,500 feet and sometimes farther, and do this many times a day. This is exhausting, muscle-straining, back-breaking work, really work for beasts of burden or for mechanical motors. It is said that trammers break down physically in a few years, and there are no old men on this kind of work. Only the young and strong can stand it.

Tramming is done mostly by the Finns, Croatians, Hungarians, Italians, and Poles. The work is so hard that Cornish men and other old miners will not touch it. Trammers, dissatisfied with their long hours, hard work, and low pay, hold on to their jobs hoping to be given jobs as miners, but the supply of miners is greater than that of trammers, and many trammers, after waiting in vain to be put to work on drilling machines, get disgusted and leave the mines.

When work was resumed in some of the mines the chief difficulty was not in getting miners but in getting enough trammers, and in many cases miners that were loyal to the companies were required to do tramming in order that the mines could be operated at all.

In very few of the mines in the Michigan copper district is any tramming done except by hand. In a few mines mechanical motors are used on some levels and in only one are mules used, and even in most of these mines there is much hand tramming. Some of the Michigan mine managers who have used mechanical motors admit that thereby the costs of tramming have been greatly reduced. Why all of them do not introduce mechanical motors in all mines is hard to understand, especially as there has been a constant cry about the scarcity of trammers in the copper district, and this scarcity has been greater during the two years preceding the strike than ever before. The only explanation that has been given is that it is impracticable to use motors where mining is done at so many places in the same mine. But it seems practicable to concentrate the mining on a few levels at a time, instead of working on many levels simultaneously, as is done in many of the Michigan mines. In mines in this district, as well as mines in other parts of the world, mining is concentrated on a few levels until they are worked out, and motors are used to great advantage.

The following table, based on reports from the companies, shows in which mines motors are used, the number of trammers, the weight of the cars, and the weight of the load:

Mine.	Motors used.	Trammers.		Weight of tramcars empty.	Tonnage capacity of tramcars.	
		Number that load and push cars.	Number that load cars only.		Level full.	Heaped, if required.
Ahmeek:				<i>Pounds.</i>	<i>Tons.</i>	<i>Tons.</i>
Tram		112		1,575	1.75	2.3
Mule	(1)		8	2,027	2.5	3
Allouez	No.	105		2,575	2.25	
Baltic	(3)	(3)	(3)	2,600	2.7	3
Calumet & Hecla	Yes.	268	235	1,900	2.3	
Centennial	No.	24		1,575	2.1	2.25
Champion	(3)	(3)	(3)	2,600	2.7	3
Franklin	No.	32		2,000	2	
Hancock:						
Hand tramming	No.	17		1,890	1.5	2
Electric	Yes.		7	3,000	2.5	3
Houghton	No.	6		2,500	2.25	3
Isle Royale	No.	128		1,360	1.2	
Lake	No.	35		2,500-3,000		
La Salle	No.			1,700	2.25	2.5
Laurium	No.	2		1,700	2.25	2.5
Mass	No.	57		2,094	2	2.5
Mohawk	No.	184		1,317	1.75	
North Kearsarge	No.	151		1,840	2.15	2.7
Osceola	No.	2		1,890	1.5	2
Osceola	No.	65		1,840	2.15	2.7
Quincy	(3)	(3)	(3)	2,000-3,100	2.5	
South Kearsarge	No.	100		1,840	2.15	2.7
Superior	No.	30		1,900	2.25	
Tamarack	Yes.	35	41	2,200	2.5	2.65
Trimountain	(3)	(3)	(3)	2,600	2.7	3
Wimona	No.	76		2,500	2.25	3
Wolverine	No.	99		1,185	1.8	

<sup>1</sup> Mules used instead of motors.

<sup>2</sup> When fitted with door car weighs 1,665 pounds.

<sup>3</sup> Not reported, but motors are known to be used to some extent in some of these mines.

<sup>4</sup> Average, 1.9 to 2.2.

Most of the tramcars used in Michigan copper mines are thoroughly antiquated. Most of them are old loose-wheel cars, the axles of which can not properly be kept supplied with grease. These cars also have their forward wheels but little in front of the middle of the cars. This arrangement facilitates dumping, but throws the load unevenly on the four wheels. The two forward wheels carry the greater part of the weight, and this makes these wheels bind on the tracks, especially in going around sharp curves. The tracks in many Michigan mines, following the lode, have many sharp curves and should be straightened, even though no copper-bearing rock was dug in making the drifts straighter.

Cars in a few of the mines have tight wheels; that is, the wheels are fixed on the axles, and the ends of the axles turn in brass boxes in which waste can be packed and the oil retained longer. These wheels and axles are like those on the truck of a railroad car, and are a great improvement on the old type of loose-wheel car.

In one or two mines still better tramcar trucks are used. The axles of these cars are provided with roller bearings, which greatly diminish the labor of pushing them. The expense of equipping all mines with this type of car would not be great, as these trucks cost only \$24 each. Both types of improved cars last described have their loads evenly distributed on the four wheels, as each pair of wheels is the same distance from the end of the car. Both of these types of cars are dumped by mechanical tippers.

#### THE ONE-MAN DRILL.

One of the grievances of the miners was in regard to the introduction of the one-man drill. This machine, invented by a man named Leyner, and called the water Leyner drill, was introduced in the various mines during 1907 and succeeding years, mostly in 1911 and 1912. Before this machine was used, two men worked on each drill. Both men set up or took down the machine, one operated it, and the other, using a can, poured water in the hole as it was drilled. They alternated daily in this work, and their earnings were the same, either on a shift or on a contract basis. Compressed air piped from the surface furnished power for the machine.

The water Leyner is mechanically an improvement on the old machine, because a man is not required to pour water in the hole that is drilled. Water is piped from the surface or from tanks in the mine, and under pressure is forced through a hole lengthwise in the drill to the cutting bit. Compressed air piped from the surface furnishes the power. After the machine is set up one man can easily operate it.

Many of the miners object to the one-man drill because they consider the work of setting it up or taking it down too heavy for one man. The two-man drill weighs from 275 to 300 pounds and the one-man drill weighs from 135 to 150 pounds. The machines are supported by tubular iron posts which are  $3\frac{1}{2}$ , 4, or  $4\frac{1}{2}$  inches in diameter, 4 to 10 feet long, and weigh from 12 to 20 pounds per foot. At the bottom of the post is a jackscrew which weighs from 75 to 100 pounds, but which is usually detached when the position of the post is changed. The post and attachments for the one-man machine weigh practically the same as those for the two-man machine.

The drill is set up after every blast and taken down before every blast, which means that it is usually set up and taken down every day. The mining companies admit that setting up or taking down a one-man drill is heavy work for one man, but they insist that two men each working on one-man machines near each other can assist each other in this work. In many cases, however, men have not worked close enough together to assist each other.

One objection raised against the one-man drill is that where a man works by himself he may be injured by a falling rock or other accident, and perhaps rendered unconscious, so that he can not call for assistance, even if some other miner were near enough to hear his call. The mining companies claim that under the provisions of a new law men will hereafter work close enough together to render assistance to anyone that may be injured. This law, enacted by the Legislature of Michigan, and approved May 7, 1913, provides that no employee in the copper or iron mines in the State "shall be permitted or required to operate any power or machine drill at a distance of more than 150 feet in the same drift, stope, opening, or working from where another person or persons are regularly and continuously employed." Some of the miners, however, insist that there is danger of a man being so injured that he could not help himself and could not inform anyone of his injury, even one no farther than 150 feet away.

While many miners object to the change from the two-man drill to the one-man drill, others who have become accustomed to the one-man drill prefer it for the reason that at most mines they earn more with the latter. All of the mining companies insist that the one-man drill is an economic necessity. By using the one-man drill the output per miner is largely increased and the mining companies give the miner the benefit of a part of the saving. A table prepared by the Calumet & Hecla Mining Co. shows the number of tons of rock mined by miners employed by the company and its subsidiary companies using the one-man drill and the number of tons mined by such miners using the two-man drill during the calendar year 1912. According to this statement, the efficiency of miners was increased 33.90 per cent in stoping, 90.60 per cent in drift stoping, and 91.08 per cent in drifting; and the earnings of miners were increased 7.47 per cent in stoping, 21.31 per cent in drift stoping, and 19.93 per cent in drifting.<sup>1</sup>

<sup>1</sup> These terms are explained under a section of the report headed "Underground conditions," page 103.

The following table shows the average number of miners in May, 1913, that used each kind of drill, the monthly rates of miners "on company account" that used each kind of drill, and whether miners have the option of using either kind, the data in this table having been furnished by the companies:

Mine.	Year 1-man drills were introduced.	Number of miners using—		Monthly rate of miners—		Have miners option of using either 1-man or 2-man drill?
		1-man drill.	2-man drill.	On 1-man drill.	On 2-man drill.	
Ahmeek.....	1912	157		\$78.00	\$69.00	No. <sup>1</sup>
Allouez.....	1912	95		78.00	71.50	No. <sup>1</sup>
Baltic.....	1909, 1911	104	169	71.00-74.00	68.00	No.
Calumet & Hecla:						
Osceola lode.....	1908	2 125	2 694	78.00	69.00	No.
Conglomerate lode.....				96.00	84.00	No.
Centennial.....	1912	40		78.00	71.50	No. <sup>1</sup>
Champion.....	1909, 1911	108	382	71.00-74.00	68.00	No.
Franklin.....	1910	118	26	( <sup>2</sup> )	65.00	Yes.
Hancock.....	1913	14	43	68.00	68.00	Yes.
Houghton.....	1912	( <sup>3</sup> )		78.00		No. <sup>1</sup>
Isle Royale.....	1911	132	85	78.50	69.00	No.
Lake.....	1911	31	17	65.00	60.00	No.
La Salle.....	1913	( <sup>4</sup> )		78.00	( <sup>1</sup> )	No. <sup>1</sup>
Laurium.....	1912	( <sup>4</sup> )		78.00	( <sup>1</sup> )	No. <sup>1</sup>
Mass.....	1911	75	26	65.00	61.00	No.
Mohawk.....	1912	49	198	70.00	70.00	No. ( <sup>1</sup> )
North Kearsarge.....	1912	84	22	78.00	69.00	No.
Oneco.....	( <sup>6</sup> )		13		68.00	
Osceola.....	1912	69		78.00	69.00	No.
Quincy.....	1907	278	417	85.80	79.30	Yes
South Kearsarge.....	1912	32	54	78.00	69.00	Yes.
Superior.....	1910, 1911	63		78.50	( <sup>1</sup> )	No. <sup>1</sup>
Tamarack.....	1913	39	125	78.00	73.00	Yes.
Trimountain.....	1909, 1911	98	116	71.00-74.00	68.00	No.
Winona.....	1912	37	124	( <sup>3</sup> )	67.50	Yes.
Wolverine.....	1913	7	112	78.00	70.00	( <sup>4</sup> )
		1,755	2,623			

<sup>1</sup> 1-man drills used exclusively.  
<sup>2</sup> In 1 mine; 2 mines are equipped exclusively with 1-man drills.  
<sup>3</sup> No "company account" miners working 1-man drills.  
<sup>4</sup> Not reported.  
<sup>5</sup> Not including 14 boys who assisted 48 miners.  
<sup>6</sup> No 1-man drills used.

Miners on contract work as well as those on company account or shift basis usually earn more using the one-man drill than they do using the two-man drill, especially after they have gotten used to the machine.

Each company involved in the strike was requested to furnish statistics showing the earnings of miners (in each case the same individual) using the one-man drill and using the two-man drill, or comparative statistics showing the earnings of miners both before and after the one-man drill was introduced. In the following table the statements are summarized so as to show the average earnings per day of miners using one-man and two-man drills and per cent of increase in earnings resulting from the use of the one-man drill. Following the table the statements of the companies in regard to earnings with the one-man and two-man drills are reproduced in full.

Comparison of average earnings per day of miners using one-man and two-man drills.

Mining company.	Two-man drill.	One-man drill.	Per cent of increase with one-man drill.
No. 1:			
Calumet & Hecla Conglomerate.....	\$3.65	\$4.02	10.14
Calumet & Hecla Amygdaloid.....	3.08	3.47	12.66
No. 2. Osceola.....	3.00	3.58	19.33
No. 3. North Kearsarge.....	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
No. 4. South Kearsarge.....	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
No. 5. Isle Royale.....	2.69	3.34	24.16
No. 6. Ahmeek.....	2.98	3.61	21.14
No. 7. Tamarack.....	3.24	3.83	18.21
No. 8. Allouez.....	3.02	3.70	22.52
No. 9. Superior.....	( <sup>2</sup> )	3.55	
No. 10. Centennial.....	2.71	3.52	29.89
No. 11. La Salle.....	( <sup>2</sup> )	3.98	
No. 12. Laurium.....	3.01	3.26	8.31
No. 13. Baltic.....	2.71	3.23	19.19
No. 14. Trimountain.....	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
No. 15. Champion.....	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
No. 16. Quincy.....	3.04	3.78	24.34
		4.08	34.21
		3.38	11.18
No. 17. Mohawk.....	3.10	3.47	11.94
No. 18. Wolverine.....	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
No. 19. Franklin.....	2.80	2.89	3.21
No. 20. Winona.....	3.13	3.45	10.22
No. 21. Houghton.....	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
No. 22. Mass.....	2.35	2.50	6.38
No. 23. Hancock.....	2.61	2.61	
No. 24. Oneco.....	2.61	( <sup>4</sup> )	
No. 25. Lake.....	3.16	3.57	13.59

<sup>1</sup> Average for a period of 6 months.  
<sup>2</sup> No statistics available.

<sup>3</sup> Average for a period of 3 months.  
<sup>4</sup> No one-man drills used.

CALUMET & HECLA MINING CO.

In the Conglomerate mine the average earnings of miners on two-man drill were \$3.65; of miners on one-man drill, \$4.02. In the Amygdaloid mine the average earnings of miners on two-man drill were \$3.08; of miners on one-man drill, \$3.47.

OSCEOLA CONSOLIDATED MINING CO.

All miners using the two-man drill during the last half of 1912 earned \$147,231.80 for 49,038 days, or \$3.002 per day. All miners using the one-man drill during the first half of 1913 earned \$62,326.93 for 17,397 days, or \$3.582 per day. The increase is 19.33 per cent in favor of miners using the one-man drill.

ISLE ROYALE COPPER CO.

The earnings of miners on the two-man drill during the last six months of 1912—34,031 days—were \$91,693.43; average per day, \$2.69 for 26 days, \$2.92 for 24 days (time actually worked). The earnings of miners on the one-man drill during the first six months of 1913—11,259½ days—were \$37,598.75; average per day, \$3.34. Per cent increase, 14.4.