

DEPARTMENT OF COMMERCE
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FOURTEENTH CENSUS OF THE UNITED STATES
MINES AND QUARRIES: 1919

MICHIGAN, WISCONSIN
MINNESOTA

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EXPLANATION OF TERMS.

Scope of census.—Census statistics of mines and quarries, and petroleum and natural-gas wells are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered and their growth or decline. Incidentally, the effort is made to present data throwing light upon character of ownership, size of enterprises, and similar subjects. When use is made of the statistics for these purposes it is imperative that due attention be given to their limitations, particularly in connection with any attempt to derive from them figures purporting to show average wages, cost of production, or profits.

The census does not cover enterprises which were idle, that is, in which neither productive work nor development work was done during the entire year; or the products of which were valued at less than \$500; or in the case of the bituminous coal mining industry, producing less than 1,000 tons; or, if not productive, in which development work amounting to less than \$5,000 was done.

Period covered.—The returns relate to the calendar year 1919, or the business year which corresponded most nearly to that calendar year, and cover a year's operations, except for enterprises which began or discontinued business during the year.

The enterprise.—As used in the text and tables the term enterprise represents one or more mines and quarries, wells or groups of wells, or natural-gas gasoline plants all within the same State operated under a common ownership or unified control, or for which only one set of books of account was kept, and for which a single report was secured. It may cover plants at several localities within the same State. If plants under unified control were not all located within the same State, separate reports were secured in order that statistics for the several enterprises thus defined might be included in statistics for the States in which they were located. The enterprise is further defined as being limited to a single industry. Separate reports were secured with very few exceptions for each industry conducted by an operator, and only where combined reports on two or more industries could not be separated does a single enterprise cover more than one industry. (See "Classification of industries.") The number of enterprises shown in the tables is equivalent to the number of individual reports tabulated.

Number of mines, quarries, wells, and plants.—Under these designations is given the count of the number of mines, quarries, wells, and gasoline plants shown by the returns received. The unit of enumeration for mines and quarries was difficult to define. As a rule each group of workings at a given locality in which operations were conducted as a unit or were unified by common management or joint handling of some part of the mining process, has been considered as a single mine or quarry. Many individual openings, therefore, are not counted as individual mines. The total number reported comprises those in operation or in the course of development during the year 1919. For petroleum and natural-gas wells the individual wells were counted and the total number productive December 31, 1919, is reported. The number of natural-gas gasoline plants is the total number reported in operation during the year.

Classification by industries.—The enterprises reported have been grouped by industries according to the kind of products. Only a few enterprises made consolidated reports covering more than one kind of product. In such cases classification was determined by the product of chief value.

Selected industries.—The general tables at the end of this bulletin give the principal facts separately for the industries of the State. A selection has been made of the leading industries of the State for more detailed consideration. Industries of greater importance than some of those selected are omitted when they comprise so few enterprises that detailed presentation would reveal the operations of individual concerns.

Influence of increased prices.—In comparing figures for cost of supplies and materials, and value of products, with the corresponding figures for earlier censuses, account should be taken of the general increase in the prices of commodities during recent years. To the extent to which this factor has been influential the figures fail to afford an exact measure of the increase in the volume of business.

Persons engaged in the industry.—The following general classes of persons engaged in the mines and quarries and petroleum and natural-gas industries were distinguished: (1) Proprietors and firm members, (2) salaried officers of corporations, (3) superintendents and managers, (4) technical employees, (5) clerks (including other subordinate salaried employees), and (6) wage earners. In the reports for the census of 1909 the fourth class, technical employees, was not distinguished and was probably included with other salaried employees.

The number of persons engaged in each industry, segregated by occupation, sex, and, in the case of wage earners, also by age (whether under 16 or 16 and over), was reported for a single representative day. The 15th of December was selected as representing for most industries normal conditions of employment, but where this date was not a representative day report for another date was requested.

The number of employees other than wage earners thus reported for the representative date has been treated as equivalent to the average for the year, since the number of employees of this class does not ordinarily vary much from month to month. The average of wage earners has been obtained in the manner explained in the next paragraph.

In addition to the more detailed report by occupation, sex, and age of the number of wage earners on the representative date, a report was obtained of the number employed on the 15th of each month, without distinction of sex or age. From these figures the average number of wage earners for the year has been calculated by dividing the sum of the numbers reported for the several months by 12. The importance of the industry as an employer of labor is believed to be more accurately measured by this average than by the number employed at any one time or on a given day.

The number of wage earners reported for the representative day is given in the table of detailed statistics for the industries, in connection with the classification of wage earners by occupation which was made for the representative day. This number is not used in any other way because, in view of the unavoidable variations of date, such a total is believed to be less significant than the average number. It would involve more or less duplication of persons working in different industries at different times, would not represent the total number employed in all industries at any one time, and would give undue weight to seasonal industries as compared with industries in continuous operation.

Salaries and wages.—Under these heads are given the total payments during the year for salaries and wages, respectively. The Census Bureau has not undertaken to calculate the average annual earnings of either salaried employees or wage earners. Such averages would possess little real value, because they would be based on the earnings of employees of both sexes, of all ages, in different occupations, and of widely varying degrees of skill. Furthermore, so far as wage earners

are concerned, it would be impossible to calculate accurately even so simple an average as this, since the number of wage earners fluctuates rapidly and irregularly in every industry, and in some to a very great extent from day to day. The Census Bureau's figures for wage earners, as already explained, are averages based on the number employed on the 15th of each month and while representing the number according to the pay rolls to whom wages were paid on that date, no doubt represent a larger number than would be required to perform the work in any industry if all were continuously employed during the year.

Prevailing hours of labor.—No attempt was made to ascertain the number of wage earners working a given number of hours per week. The inquiry called merely for the prevailing practice followed in each enterprise. Occasional variations in hours in an establishment from one part of the year to another were disregarded, and no attention was paid to the fact that a few wage earners might have hours differing from those of the majority. All the wage earners of each enterprise are therefore counted in the class within which the enterprise itself falls. In most enterprises, however, practically all the wage earners work the same number of hours, so that the figures give a substantially correct representation of the hours of labor.

Capital.—The instructions on the schedule for securing data relating to capital were as follows: "The answer should show the total amount of capital, owned and borrowed, invested by the operator in the enterprise on the last day of the business year reported. Do not include securities and loans representing investments in other enterprises." These instructions were identical with those employed at the Census of 1909. The reports received in respect to capital, however, at both censuses, have in so many cases been defective that the data compiled are of value only as indicating very general conditions. While there are some enterprises maintaining accounting systems such that an accurate return for capital could be made, this is not true of the great majority, and the figures therefore do not show the actual amount of capital invested.

Expenses.—The expenses reported in the Census of 1919 include salaries and wages; the cost of supplies, materials, and fuels, including the freight on these; cost of power purchased; the cost of contract work; royalties and rents paid; and taxes paid or assessed. The Census of 1909 reported in addition to the items of expenses covered by the present census all other items of expense incident to that year's business except interest on indebtedness, dividends, and allowances for depreciation.

Supplies and materials, fuel, and power.—Statistics as to supplies and materials, fuel, and power, relate to the cost of these used during the year which may be more or less than the amount purchased during the year. The term "supplies and materials" covers mine, mill, quarry, and well supplies, and mineral purchased for treatment, resale, or distribution.

Royalties and rents.—The amount is given under this head representing the payment to fee holders or the value of share of product credited to fee holders for mineral output from leased land and also rents paid for plants, equipment, and privileges or easements.

Taxes.—The taxes include Federal capital stock; corporation income, and excess profits tax; and also State, county, and local taxes. The data compiled in respect to Federal taxes are very defective largely for the reason that many mining corporations are engaged in other business and have sources of income other than from mining and do not pay taxes on mining separately. For many of these corporations no data have been obtained; for others satisfactory segregation of mining could not be made.

Expenditures for development work.—The expenses reported as defined above include costs of both productive operation and development work. In the statistics on producing enterprises that part of the expenses for salaries, wages, contract work, supplies and materials, fuel, and power which was credited by the mine operators to development work is shown as expenditures for development work. In the statistics for nonproducing enterprises the total of all these expenses is given as expenditure for development work.

Quantity of products.—In so far as the statistics on quantities of mineral products in 1919 are available for the States, they will be found in the reports of the United States Geological Survey, which has tabulated the statistics on quantities of products collected by the Bureau of the Census in cooperation with the Geological Survey, and will also be presented in the special reports of the Census on the several mining industries.

Value of products.—The amounts given under this heading represent the selling value at point of production or f. o. b. at point of shipment, or such other value as may represent the net value or amount received for the product made in 1919 under the terms by which it was disposed of, and also includes the value at point of production of products used by the operating company.

Cost of mining and profits.—The census data do not show the entire cost of mining and well operations, and consequently can not be used for the calculation of profits. No account has been taken of depreciation or interest; rent of offices and buildings other than mines, quarries, and wells; insurance, selling, and other sundry expenses.

Land controlled.—The inquiry on land tenure was confined to land pertaining to the mining or well operations covered by the report. In many of these, however, land held in reserve for future development and for speculative or other purposes not pertaining to mining was included in the returns, and also a large number of more or less unsatisfactory estimates were included. Nevertheless, it is believed that the data presented reflect fairly the conditions as to land tenure in the mining industries, and correctly show the order of magnitude of land holdings pertaining to mining enterprises.

Power used.—The item, aggregate horsepower, represents the horsepower of prime movers used by the enterprises for generating power plus horsepower of motors, principally electric, and other equipment operated by power purchased from other concerns. It does not cover the power of electric motors taking their current from primary power generators operated by the same enterprise (such equipment is reported separately), because its inclusion would obviously result in duplication. The figures on power represent the rated capacity of the engines, motors, etc., and not the amount of power in actual daily use.

Fuel.—Statistics of the quantity of fuel used are shown only for anthracite and bituminous coal, coke, wood, oil, and gas. They relate to the quantity used during the year, which may be more or less than the quantity purchased. As only the principal varieties of fuel are shown, no comparison can be made with the total cost of all fuel.

MICHIGAN.

Michigan, which ranks twenty-second among the states in size (land area 57,480 square miles) and seventh in population (3,668,412 in 1920), ranked ninth in value of mineral products in 1919. The state ranked eighth in the total number of persons engaged in the mining industries and in the average number of wage earners employed.

The total value of products of the mining enterprises in 1919 amounted to \$103,870,089, which was an increase of 53.4 per cent as compared with the corresponding amount reported at the census of 1909. This increase and the increases in capital, wages, cost of supplies and materials and fuel and power, shown in Table 1, are largely due to general price increases during the census interval and not in contradiction to the decreases in the number of individual mines and quarries and wells operated and average number of wage earners employed in mining. It is difficult to gauge the change in the mining industries as a whole, for the reason that there has been considerable increase in the production of iron ore and limestone and decrease in the amount of coal and copper produced.

The mining industries reported in Michigan in 1919, classified by principal products and listed in order of value of products, were iron ore, copper, bituminous coal, limestone, gypsum, sandstone, basalt, clay, marble, and petroleum and natural gas. The production of salt was an important mineral industry in Michigan in 1919, but was not included in the census of mines and quarries. The industries for which statistics can be shown without disclosure of individual operations are ranked by value of products in Table 2.

The leading mining industry in Michigan in 1919 was the production of iron ore. Sixty-five out of a total of 122 mining enterprises in the state were engaged in this industry, employed 51.6 per cent of the total number of wage earners, and reported \$60,906,692 as value of products, or 58.6 per cent of the total value of products of the state. This amount includes, in addition to the value of iron ore, the value of manganese ore produced as a by-product. The iron-ore mining districts from which production was reported were in Dickinson, Gogebie, Iron, and Marquette Counties. Michigan was second only to Minnesota in the production of iron ore in 1919.

The mining industry second in importance in Michigan was copper, which was reported from Houghton, Keweenaw, and Ontonagon Counties. This industry employed 39.1 per cent of the average number of wage earners and reported products valued at \$34,476,336, or 33.2 per cent of the total value of

products. This amount includes receipts for custom milling and for power sold or for work or miscellaneous services for other enterprises. Michigan ranked second among the states in the total value of products of enterprises in the copper-mining industry.

The bituminous coal-mining industry in Michigan was third in importance among the mining industries of the state. It employed 5.3 per cent of the total number of wage earners and reported products valued at \$3,861,874, or 3.7 per cent of the total value of mineral products. Michigan coal-mining operations are in a basin in the south central portion of the state. Production was reported from Bay, Saginaw, Tuscola, and Calhoun Counties.

In addition to the operation of producing enterprises, mining on unproductive properties for purposes of development was reported by six enterprises in 1919, three in the iron-ore industry and three in the copper industry. These operations were small, less than 1 per cent of the aggregate for the state, measured either by the number of wage earners employed or by expenditures reported.

The character of organizations conducting mining enterprises is brought out in Table 3, which shows that corporations operated 93.4 per cent of the total number of enterprises, employed 99.8 per cent of the average number of wage earners, and reported products valued at \$103,723,550, or 99.9 per cent of the total value. Table 3 also shows that all copper-mining and all coal-mining enterprises were corporations. Similar statistics can not be given for the iron-ore industry without disclosure of statistics relating to minor operations by two individuals; all other iron-ore enterprises were conducted by corporations.

The proportion of small enterprises to large enterprises, as measured by average number of wage earners employed, is shown in Table 4. Forty-five and one-tenth per cent of the total number of mining enterprises in Michigan were in classes having no wage earners or fewer than 101 and the wage earners employed were only 7 per cent of the total number of wage earners. Fifty-five per cent of the total number of enterprises had more than 100 wage earners each, and these enterprises employed 93 per cent of the total number of wage earners. The largest enterprises—that is, those employing more than 500 wage earners—three in the iron-ore industry, eight in the copper-mining industry, and one in the coal-mining industry, employed 13,844 wage earners, or 44.2 per cent of the total number in all industries.

Table 5 shows that in three-fourths of the enterprises employing wage earners and for nearly three-

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fourths of the wage earners employed the hours of labor were 44 to 53 per week and that in all other enterprises and for about one-fourth of the wage earners the hours of labor were 54 to 62 per week. In the iron-ore, copper, and coal mining industries the 8-hour day and 6-day week prevailed, but in the iron-ore mining industry the 9-hour and 10-hour day ruled for a considerable number of wage earners. In the quarrying industries the 10-hour day was the rule.

The statistics for wage earners presented in Table 6, showing changes in the number employed month by month, reflect conditions prevailing in the industries during the census year. The minimum shown in November for the coal industry was very abnormal and due to the great strike.

Table 7 presents for 1919 statistics in detail for the state as a whole and for each industry that can be shown without the disclosure of individual operations.

TABLE 1.—COMPARATIVE SUMMARY, PRODUCING ENTERPRISES: 1919 AND 1909.

	MINING INDUSTRIES.		Per cent of increase. ¹		MINING INDUSTRIES.		Per cent of increase. ¹
	1919	1909			1919	1909	
Number of enterprises.....	122	83	.....	Capital.....	\$283,528,270	\$110,331,087	137.6
Number of mines and quarries.....	105	173	—4.6	Principal expenses:			
Number of petroleum and natural-gas wells.....	19	21	.....	Salaries.....	4,311,550	2,173,522	98.4
Persons engaged.....	33,202	40,905	—18.8	Wages.....	50,400,187	27,000,008	82.2
Proprietors and firm members, total.....	19	118	—83.9	Contract work.....	20,430	470,205	—93.7
Number performing manual labor in or about the mines, quarries, and wells.....	6	75	.....	Supplies and materials.....	15,204,003	9,800,415	55.1
Salaried employees.....	1,891	1,618	16.9	Fuel and power.....	8,444,697	4,193,347	101.4
Wage earners (average number).....	31,202	39,109	—20.1	Royalties and rents.....	6,008,923	4,048,006	64.7
Power used (horsepower).....	337,882	273,861	23.4	Taxes.....	6,275,133	1,948,750	222.0
				Value of products.....	103,870,089	67,714,470	53.4

¹ A minus sign (—) denotes decrease. Percentages are omitted where base is less than 100.

TABLE 2.—PRINCIPAL INDUSTRIES, PRODUCING ENTERPRISES, RANKED BY VALUE OF PRODUCTS: 1919.

INDUSTRY.	Number of enterprises.	WAGE EARNERS.		VALUE OF PRODUCTS.		INDUSTRY.	Number of enterprises.	WAGE EARNERS.		VALUE OF PRODUCTS.	
		Average number.	Per cent distribution.	Amount.	Per cent distribution.			Average number.	Per cent distribution.	Amount.	Per cent distribution.
All industries.....	122	31,202	100.0	\$103,870,089	100.0	Copper.....	22	12,235	39.1	\$34,470,330	33.2
Iron ore.....	65	16,100	51.6	60,906,692	58.6	Coal, bituminous.....	11	1,654	5.3	3,861,874	3.7
						All other industries.....	24	1,243	4.0	4,625,187	4.6

¹ Includes enterprises in industries as follows: Basalt, 1; clay, 4; gypsum, 4; limestone, 11; marble, 1; petroleum and natural gas, 1; sandstone, 2.

TABLE 3.—CHARACTER OF ORGANIZATION, FOR SELECTED INDUSTRIES, PRODUCING ENTERPRISES: 1919.

INDUSTRY AND CHARACTER OF ORGANIZATION.	Number of enterprises.	Number of wage earners.	VALUE OF PRODUCTS.		PER CENT DISTRIBUTION.		
			Total.	Per enterprise.	Enterprises.	Wage earners.	Value of products.
ALL INDUSTRIES.....	122	31,202	\$103,870,089	\$851,394	100.0	100.0	100.0
Corporation.....	114	31,236	103,723,550	909,850	93.4	99.8	99.9
Individual.....	5	51	132,042	26,528	4.1	0.2	0.1
Firm.....	3	5	13,897	4,632	2.5	(1)	(1)
COPPER.....	22	12,235	34,470,330	1,567,106	100.0	100.0	100.0
Corporation.....	22	12,235	34,470,330	1,567,106	100.0	100.0	100.0
COAL, BITUMINOUS.....	11	1,654	3,861,874	351,070	100.0	100.0	100.0
Corporation.....	11	1,654	3,861,874	351,070	100.0	100.0	100.0

¹ Less than one-tenth of 1 per cent.

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TABLE 4.—SIZE OF PRODUCING ENTERPRISES, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED INDUSTRIES: 1919.

INDUSTRY AND WAGE EARNERS PER ENTERPRISE.	ENTERPRISES.		WAGE EARNERS.		INDUSTRY AND WAGE EARNERS PER ENTERPRISE.	ENTERPRISES.		WAGE EARNERS.	
	Number.	Per cent distribution.	Number.	Per cent distribution.		Number.	Per cent distribution.	Number.	Per cent distribution.
ALL INDUSTRIES.....	122	100.0	31,292	100.0	COPPER.....	22	100.0	12,235	100.0
No wage earners.....	1	0.8			21 to 50.....	3	13.6	112	0.9
1 to 5.....	9	7.4	23	0.1	51 to 100.....	3	13.6	224	1.8
6 to 20.....	9	7.4	110	0.4	101 to 500.....	8	36.4	1,787	14.6
21 to 50.....	10	13.1	549	1.7	501 to 1,000.....	5	22.7	3,494	28.6
51 to 100.....	20	16.4	1,492	4.8	Over 1,000.....	3	13.6	0,618	54.1
101 to 500.....	55	45.1	15,271	48.8					
501 to 1,000.....	9	7.4	7,226	23.1	COAL, BITUMINOUS.....	11	100.0	1,654	100.0
Over 1,000.....	3	2.5	6,618	21.1	6 to 20.....	2	18.2	21	1.3
IRON ORE.....	65	100.0	16,160	100.0	51 to 100.....	2	18.2	188	11.4
1 to 5.....	1	1.5	5	(1)	101 to 500.....	6	54.5	784	47.4
6 to 20.....	3	4.6	40	0.2	501 to 1,000.....	1	9.1	661	40.0
21 to 50.....	8	12.3	275	1.7					
51 to 100.....	13	20.0	963	6.0					
101 to 500.....	37	56.9	11,806	73.1					
501 to 1,000.....	3	4.6	3,071	19.0					

¹ Less than one-tenth of 1 per cent.

TABLE 5.—NUMBER OF PRODUCING ENTERPRISES AND AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED INDUSTRIES: 1919.

INDUSTRY.	TOTAL.		NUMBER WHERE THE PRE- VAILING HOURS OF LABOR PER WEEK WERE—				INDUSTRY.	TOTAL.		NUMBER WHERE THE PRE- VAILING HOURS OF LABOR PER WEEK WERE—			
	Enter- prises.	Wage earn- ers.	44 to 53.		54 to 62.			Enter- prises.	Wage earn- ers.	44 to 53.		54 to 62.	
			Enter- prises.	Wage earn- ers.	Enter- prises.	Wage earn- ers.				Enter- prises.	Wage earn- ers.	Enter- prises.	Wage earn- ers.
All industries.....	121	31,292	91	23,341	30	7,951	Copper.....	22	12,235	22	12,235	.....	.....
							Coal, bituminous.....	11	1,654	11	1,654	.....	.....
Iron ore.....	65	16,100	55	9,286	10	6,874	All other industries.....	23	1,243	8	166	20	1,077

¹ Exclusive of 1 enterprise in the sandstone industry employing no wage earners.

TABLE 6.—WAGE EARNERS, BY MONTHS, FOR SELECTED INDUSTRIES: 1919.

[The month of maximum employment for each industry is indicated by **bold-faced** figures and that of minimum employment by *italic* figures.]

INDUSTRY.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
All Industries.....	31,537	34,703	34,962	34,635	30,884	30,019	<i>29,013</i>	20,804	30,585	31,629	32,043	20,442	30,065	83.0
Producing enterprises.....	31,292	34,430	34,729	34,420	30,055	29,765	<i>28,836</i>	20,500	30,303	31,365	31,780	20,202	30,414	83.0
Iron ore.....	16,160	16,684	16,627	16,670	15,927	15,999	15,710	16,115	16,090	16,472	16,404	15,774	<i>15,682</i>	93.5
Copper.....	12,235	15,038	15,177	14,856	12,034	10,688	<i>10,040</i>	10,187	10,023	11,445	11,820	11,879	11,833	66.2
Coal, bituminous.....	1,654	2,047	2,236	2,085	533	1,586	1,617	1,801	1,785	1,937	2,049	<i>176</i>	1,090	7.9
All other industries.....	1,243	767	789	800	1,201	1,492	1,469	1,496	1,499	1,511	1,447	1,373	1,003	50.8
Nonproducing enterprises.....	245	267	233	215	220	254	177	265	282	264	263	240	251	62.8

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TABLE 7.—DETAILED STATISTICS FOR MINING INDUSTRIES: 1919.

	Aggregate.	PRODUCING ENTERPRISES.					Non-producing enterprises.
		Total.	Iron ore.	Copper. ¹	Coal, bituminous.	All other. ²	
Number of enterprises.....	128	122	65	22	11	24	0
Number of mines and quarries.....	171	165	100	28	14	23	0
Number of petroleum and natural-gas wells.....	19	19				19	
Capital.....	\$290,334,808	\$283,528,270	\$110,799,825	\$147,780,000	\$8,137,645	\$12,001,713	\$0,808,620
Principal expenses:							
Salaries and wages—							
Officers.....	\$539,390	\$531,307	\$210,190	\$177,100	\$44,740	\$00,182	\$5,083
Superintendents and managers.....	\$1,389,345	\$1,369,921	\$686,133	\$510,062	\$05,918	\$71,808	\$10,421
Technical employees.....	\$877,713	\$871,740	\$648,095	\$498,180	\$10,000	\$14,811	\$5,907
Clerks, etc.....	\$1,550,282	\$1,535,585	\$800,807	\$618,567	\$51,777	\$131,331	\$14,607
Wage earners.....	\$50,750,490	\$50,400,187	\$32,186,404	\$14,008,804	\$1,087,732	\$1,623,217	\$14,300
Supplies and materials.....	\$15,496,591	\$15,204,083	\$7,845,035	\$5,612,077	\$004,557	\$1,082,391	\$202,408
Fuel.....	\$7,500,221	\$7,455,207	\$2,000,238	\$4,140,775	\$204,876	\$374,328	\$45,014
Power.....	\$1,005,100	\$980,490	\$700,457	\$114,048	\$30,701	\$00,281	\$45,070
Royalties and rents.....	\$0,003,314	\$0,008,023	\$0,508,825		\$10,040	\$20,158	\$24,301
Taxes.....	\$0,807,184	\$0,275,133	\$3,785,500	\$2,328,090	\$20,878	\$131,003	\$32,051
Contract work.....	\$34,783	\$20,430	\$23,580			\$5,800	\$0,347
Expenditures for development (Included in the above items).....	\$3,316,407	\$2,057,800	\$1,012,303	\$550,630	\$143,023	\$42,863	\$058,508
Value of products.....	\$103,870,089	\$103,870,080	\$30,000,002	\$34,470,336	\$3,801,874	\$1,625,187	
Persons engaged in industry.....	33,472	33,202	17,100	12,017	1,741	1,372	270
Proprietors and firm members (total).....	19	19	2			17	
Number performing manual labor.....	6	6				6	
Salaried officers.....	123	121	40	60	13	12	2
Superintendents and managers.....	385	370	185	133	32	20	0
Technical employees.....	333	320	235	182	8	4	4
Clerks, etc.....	1,075	1,032	547	411	37	67	13
Wage earners (average number).....	31,537	31,202	16,100	12,235	1,634	1,243	215
Wage earners, by occupation (Dec. 15):							
Above ground (total).....	11,006	11,804	4,700	3,400	301	1,130	102
Below ground (total).....	20,722	20,575	11,591	7,036	1,837	111	147
Foremen, shift bosses, etc.—							
Above ground.....	301	301	157	154	25	55	3
Below ground.....	657	647	323	208	22	4	10
Enginemen, hoistmen, electricians, mechanics, etc.—							
Above ground.....	4,400	4,357	1,016	1,000	125	320	52
Below ground.....	688	653	390	182	67	5	5
Miners, quarrymen, and drillmen, including their helpers—							
Above ground.....	512	512	117		10	385	
Below ground.....	10,440	10,300	7,050	2,004	1,205	47	44
Timbermen, trackmen, and men engaged in hauling, tramping, etc.—							
Above ground.....	500	587	460	6	24	88	9
Below ground.....	5,857	5,773	2,090	2,710	345	10	84
Muckers, loaders, laborers, and others not classified—							
Above ground.....	3,820	3,788	2,005	1,108	120	432	38
Below ground.....	3,110	3,100	1,120	1,842	108	30	4
Wage earners employed in mills and beneficiating plants—							
Above ground.....	2,250	2,250	33	2,082		144	
Number of females included in wage earners reported above—							
Above ground.....	58	58	4	40		5	
Number of wage earners under 16 years of age included in those reported above—							
Above ground.....	2	2		2			
Mineral and oil land operated..... acres.....	120,045	114,356	20,025	00,531	0,100	18,031	5,080
Land controlled, total..... acres.....	551,076	545,255	252,040	212,806	10,620	18,012	5,821
Mineral and oil land owned.....	05,802	00,083	4,775	05,055	1,021	18,352	5,170
Mineral and oil land leased.....	24,300	23,700	15,370	870	7,248	209	510
Timber and other lands owned and leased.....	430,005	430,773	232,708	100,334	1,800	281	132
Power used: Aggregate horsepower.....	340,842	337,882	142,550	100,580	0,884	18,850	2,000
Prime movers (horsepower, total).....	275,064	274,084	94,778	101,353	0,180	11,704	080
Steam engines—							
Number.....	1,080	1,082	055	326	40	52	4
Horsepower.....	200,447	208,707	60,407	127,001	0,114	5,225	650
Steam turbines—							
Number.....	30	25	13	11		3	2
Horsepower.....	57,100	56,770	17,132	33,230	75	0,333	330
Internal-combustion engines—							
Number.....	15	15	4	4		7	
Horsepower.....	417	417	49	102		203	
Water wheels, turbines, and motors—							
Number.....	10	10	10				
Horsepower.....	8,100	8,100					
Purchased power (horsepower, total).....	65,778	63,798	47,781	8,230	005	7,080	1,080
Electric motors operated by purchased current—							
Number.....	1,006	070	507	201	10	108	30
Horsepower.....	65,778	63,798	47,781	8,230	005	7,080	1,080
Electric motors run by current generated by enterprise using:							
Number.....	1,003	1,003	504	888	170	02	
Horsepower.....	107,750	107,750	40,572	50,088	5,285	5,805	
Fuel used:							
Coal, anthracite..... tons, 2,240 pounds.....	18,801	18,801	1,332	14,800		2,750	
Coal, bituminous..... tons, 2,000 pounds.....	1,377,300	1,371,023	431,700	782,742	83,824	72,007	0,340
Coke..... tons, 2,000 pounds.....	4,017	4,013	255	2,758		1,000	4
Fuel oils..... barrels.....	2,826	2,820	310	2,470		40	
Gasoline and other volatile oils..... barrels.....	1,627	1,570	253	1,000		251	57
Natural gas..... 1,000 cubic feet.....	33,781	33,781		33,450		325	

¹ Includes 1 reduction mill operated independently of mines.² Includes enterprises as follows: Basalt, 1; clay, 4; gypsum, 4; limestone, 11; marble, 1; petroleum and natural gas, 1; sandstone, 2.³ Includes enterprises as follows: Copper, 3; iron, 3.

WISCONSIN.

Wisconsin, which ranks twenty-fifth among the states in size (land area 55,256 square miles) and thirteenth in population (2,632,067 in 1920), ranked twenty-ninth in value of mineral products in 1919. The state ranked thirty-first in the total number of persons engaged in the mining industries and in the average number of wage earners employed.

The gross amount received for products by operators of mines and quarries in Wisconsin in 1919 was \$10,580,833, which was an increase of 41.8 per cent over the corresponding amount reported at the census of 1909. Deducting for 1919 a duplication of \$83,802, the value of lead and zinc ores sold by some operators and again reported as product after treatment by others, and for 1909 a similar duplication of \$156,000, leaves as net value of products, \$10,497,031 for 1919 and \$7,303,404 for 1909, an increase of 43.7 per cent. These values include receipts for mineral and other unspecified by-products, custom milling, power sold, and work or miscellaneous services for other enterprises, which amounted to \$96,326 in 1919.

The increase in value of products and the increases in capital, wages, cost of supplies and materials and fuel and power, shown in Table 1, are largely due to general price increases during the census interval and are, therefore, not a measure of growth in mining. The decreases in number of enterprises, number of individual mines and quarries operated, and in the persons engaged in the mining industries are augmented by the temporarily adverse industrial conditions in 1919.

The mining industries reported for Wisconsin in 1919, classified according to principal products and listed in order of value of products, were iron ore, lead and zinc, granite, limestone, sandstone, basalt, silica, and barytes. The industries for which statistics can be shown without disclosure of individual operations are ranked by value of products in Table 2.

The leading mining industry in Wisconsin in 1919 was the production of iron ore in Iron, Florence, Dodge, and Sauk Counties. The six enterprises in this industry employed 32.3 per cent of the total number of wage earners and reported products valued at \$3,826,872, or 36.2 per cent of the total value of products for the state. Wisconsin ranked fifth among the states in the production of iron ore.

The industry second in importance was lead and zinc mining in Grant, Iowa, and Lafayette Counties. Twenty-three enterprises in this industry employed 30.4 per cent of the total number of wage earners and reported products valued at \$3,816,911, or 36.1 per cent of the total value of products for the state.

This amount includes receipts for pyrite recovered as a by-product in the treatment of lead and zinc ores and also receipts for custom milling. Wisconsin ranked sixth in value of output from lead and zinc mines.

Granite quarrying was third in importance among the mineral industries in Wisconsin in 1919, and the state ranked fourth in the granite industry. Fourteen granite-quarrying industries employed 21.2 per cent of the total number of wage earners and reported products valued at \$1,484,979, or 14 per cent of the total value of products.

The character of organizations conducting mining enterprises in Wisconsin in 1919 is brought out by Table 3, which shows that corporations operated 66.3 per cent of the total number of enterprises, employed 94.3 per cent of the total number of wage earners, and reported products valued at \$10,082,080, or 95.3 per cent of the total value of products for the state. The table also shows the preponderance of the corporate form of organization in lead and zinc mining and in the limestone and sandstone-quarrying industries. Similar statistics can not be given for the iron-ore mining industry and the granite-quarrying industry without disclosure of one minor operation in each, conducted by an individual. All other operations in these industries were conducted by corporations.

The relatively large number of small enterprises, as measured by the average number of wage earners employed, is shown in Table 4. Of the total number of mining enterprises in Wisconsin, 89 per cent had no wage earners or fewer than 101 each and the wage earners employed were only 40.5 per cent of the total number of wage earners. On the other hand, only 10.9 per cent of the total number of enterprises had more than 100 wage earners each and these enterprises employed 59.4 per cent of the total number of wage earners. The larger enterprises were in the iron-ore and lead and zinc mining and the granite-quarrying industries.

Table 5 shows that in two-thirds of the enterprises employing wage earners and for 54 per cent of the wage earners the hours of labor were 54 to 62 per week. In a third of the enterprises and for 46 per cent of the wage earners the hours were 44 to 53 per week. In the iron-mining industry the 8-hour day and 6-day week prevailed. In the lead and zinc-mining industry the 9-hour day and 6-day week ruled for most of the wage earners, particularly those employed underground, but enterprises reporting these hours for wage earners employed below ground also reported the 10-hour day and 6-day week for a considerable number

of the wage earners employed in reduction mills and otherwise above ground. In the quarrying industries the 10-hour day and 6-day week prevailed.

The statistics for wage earners presented in Table 6, showing changes in the number employed month by

month, reflect conditions prevailing in the industries during the census year.

Table 7 presents for 1919 statistics in detail for the state as a whole and for each industry that can be shown without the disclosure of individual operations.

TABLE 1.—COMPARATIVE SUMMARY, PRODUCING ENTERPRISES: 1919 AND 1909.

	MINING INDUSTRIES.		Per cent of increase. ¹		MINING INDUSTRIES.		Per cent of increase. ¹
	1919	1909			1919	1909	
Number of enterprises.....	92	208	-65.7	Capital.....	\$18,631,034	\$11,000,731	50.8
Number of mines and quarries.....	107	286	-62.0	Principal expenses:			
Persons engaged.....	3,880	5,194	-25.1	Salaries.....	618,115	258,472	130.1
Proprietors and firm members, total.....	48	216	-77.8	Wages.....	4,750,235	3,081,350	54.2
Number performing manual labor in or about the mines and quarries.....	19	104	-81.7	Contract work.....	135,293	40,057	230.3
Salaried employees.....	204	208	9.7	Supplies and materials.....	1,000,512	877,925	124.3
Wage earners (average number).....	3,647	4,710	-24.7	Fuel and power.....	857,205	435,993	96.0
Power used (horsepower).....	26,700	24,804	7.6	Royalties and rents.....	535,000	445,146	20.3
				Taxes.....	235,881	62,755	275.9
				Value of products.....	10,580,833	7,450,404	41.8

¹A minus sign (—) denotes decrease.

²Includes cost of ore purchased as material.

TABLE 2.—PRINCIPAL INDUSTRIES, PRODUCING ENTERPRISES, RANKED BY VALUE OF PRODUCTS: 1919.

INDUSTRY.	Number of enterprises.	WAGE EARNERS.		VALUE OF PRODUCTS.		INDUSTRY.	Number of enterprises.	WAGE EARNERS.		VALUE OF PRODUCTS.	
		Average number.	Per cent distribution.	Amount.	Per cent distribution.			Average number.	Per cent distribution.	Amount.	Per cent distribution.
All industries.....	92	3,547	100.0	\$10,580,833	100.0	Granite.....	14	753	21.2	\$1,484,970	14.0
Iron ore.....	6	1,145	32.3	3,826,872	36.2	Limestone.....	33	382	10.8	1,107,790	10.5
Lead and zinc.....	23	1,078	30.4	3,810,911	36.1	Sandstone.....	12	138	3.7	231,078	2.2
						All other industries ¹	4	50	1.6	113,263	1.1

¹Includes enterprises in industries as follows: Barytes, 1; basalt, 2; silica, 1.

TABLE 3.—CHARACTER OF ORGANIZATION, FOR SELECTED INDUSTRIES, PRODUCING ENTERPRISES: 1919.

INDUSTRY AND CHARACTER OF ORGANIZATION.	Number of enterprises.	Number of wage earners.	VALUE OF PRODUCTS.		PER CENT DISTRIBUTION.		
			Total.	Per enterprise.	Enterprises.	Wage earners.	Value of products.
ALL INDUSTRIES.....	92	3,547	\$10,580,833	\$115,000	100.0	100.0	100.0
Corporation.....	61	3,344	10,082,080	165,280	66.3	94.3	95.3
Individual.....	20	133	276,376	13,819	21.7	3.7	2.6
Firm ¹	11	70	222,378	20,210	12.0	2.0	2.1
LEAD AND ZINC.....	23	1,078	3,810,911	165,953	100.0	100.0	100.0
Corporation.....	19	1,038	3,076,721	162,512	82.6	90.3	96.3
Firm.....	4	40	140,190	35,048	17.4	3.7	3.7
LIMESTONE.....	33	382	1,107,790	33,500	100.0	100.0	100.0
Corporation.....	15	205	912,657	60,844	45.5	77.2	82.4
Individual.....	13	66	137,545	10,580	30.4	17.3	12.4
Firm ¹	5	21	57,588	11,518	15.2	5.5	5.2
SANDSTONE.....	12	133	231,078	19,257	100.0	100.0	100.0
Corporation.....	7	112	197,358	28,194	58.3	84.2	85.4
Individual ²	5	21	33,720	6,744	41.7	15.8	14.6

¹Includes 1 other form of organization.

²Includes 1 firm.

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TABLE 4.—SIZE OF PRODUCING ENTERPRISES, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED INDUSTRIES: 1919.

INDUSTRY AND WAGE EARNERS PER ENTERPRISE.	ENTERPRISES.		WAGE EARNERS.		INDUSTRY AND WAGE EARNERS PER ENTERPRISE.	ENTERPRISES.		WAGE EARNERS.	
	Number.	Per cent distribution.	Number.	Per cent distribution.		Number.	Per cent distribution.	Number.	Per cent distribution.
ALL INDUSTRIES.....	92	100.0	3,547	100.0	GRANITE.....	14	100.0	753	100.0
No wage earners.....	2	2.2	.....	.....	1 to 5.....	4	28.6	13	1.7
1 to 5.....	27	29.3	61	1.7	6 to 20.....	3	21.4	32	4.2
6 to 20.....	27	29.3	310	8.7	21 to 50.....	1	7.1	22	2.9
21 to 50.....	20	21.7	614	17.3	51 to 100.....	3	21.4	243	32.3
51 to 100.....	6	6.5	464	12.8	101 to 500.....	3	21.4	443	58.8
101 to 500.....	10	10.0	2,108	59.4					
IRON ORE.....	6	100.0	1,145	100.0	LIMESTONE.....	33	100.0	382	100.0
21 to 50.....	1	16.7	40	3.5	1 to 5.....	15	45.5	20	7.6
51 to 100.....	1	16.7	51	4.5	6 to 20.....	11	33.3	120	31.4
101 to 500.....	4	66.7	1,054	92.1	21 to 50.....	6	18.2	168	44.0
					51 to 100.....	1	3.0	65	17.0
LEAD AND ZINC.....	23	100.0	1,078	100.0	SANDSTONE.....	12	100.0	133	100.0
No wage earners.....	2	8.7	.....	.....	1 to 5.....	4	33.3	7	5.3
1 to 5.....	3	13.0	11	1.0	6 to 20.....	7	58.3	91	68.4
6 to 20.....	4	17.4	41	3.8	21 to 50.....	1	8.3	35	26.3
21 to 50.....	10	43.5	320	29.7					
51 to 100.....	1	4.3	95	8.8					
101 to 500.....	3	13.0	611	56.7					

TABLE 5.—NUMBER OF PRODUCING ENTERPRISES AND AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED INDUSTRIES: 1919.

INDUSTRY.	TOTAL.		NUMBER WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—				INDUSTRY.	TOTAL.		NUMBER WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—			
	Enter-prises.	Wage earners.	44 to 53.		54 to 62.			Enter-prises.	Wage earners.	44 to 53.		54 to 62.	
			Enter-prises.	Wage earners.	Enter-prises.	Wage earners.				Enter-prises.	Wage earners.	Enter-prises.	Wage earners.
All industries.....	100	3,547	30	1,030	60	1,917	Granite.....	14	753	8	317	6	436
Iron ore.....	6	1,145	6	1,145	.....	.....	Limestone.....	33	382	5	40	28	342
Lead and zinc.....	21	1,078	7	80	14	902	Sandstone.....	12	133	2	24	10	109
							All other.....	4	56	2	18	2	38

¹ Exclusive of 2 enterprises employing no wage earners in the lead and zinc industry.

TABLE 6.—WAGE EARNERS, BY MONTHS, FOR SELECTED INDUSTRIES: 1919.

[The month of maximum employment for each industry is indicated by bold-faced figures and that of minimum employment by italic figures.]

INDUSTRY.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
All industries.....	3,052	3,519	3,420	3,511	3,744	3,857	3,812	3,843	3,844	3,710	3,708	3,503	<i>3,248</i>	84.2
Producing enterprises.....	3,547	3,461	3,308	3,452	3,630	3,720	3,670	3,712	3,717	3,604	3,606	3,479	<i>3,153</i>	84.2
Iron ore.....	1,145	1,200	1,242	1,211	1,179	1,178	1,131	1,115	1,099	<i>1,047</i>	1,108	1,100	1,118	84.3
Lead and zinc.....	1,078	1,413	1,234	1,237	1,118	1,078	980	987	1,040	970	970	980	<i>917</i>	64.0
Granite.....	753	<i>583</i>	608	622	707	778	833	840	821	860	854	809	652	67.8
Limestone.....	382	<i>178</i>	187	232	400	487	509	517	501	477	444	377	266	34.4
Sandstone.....	133	<i>60</i>	72	121	131	144	168	168	181	108	151	131	111	33.1
All other industries.....	56	<i>21</i>	25	20	32	55	59	76	75	76	79	76	69	26.6
Nonproducing enterprises.....	105	<i>58</i>	<i>58</i>	50	108	137	136	131	127	115	102	114	115	42.3

TABLE 7.—DETAILED STATISTICS FOR MINING INDUSTRIES: 1919.

	Aggregate.	PRODUCING ENTERPRISES.							Nonproducing enterprises.
		Total.	Iron ore.	Lead and zinc. ¹	Granite.	Limestone.	Sandstone.	All other. ²	
Number of enterprises.....	90	92	0	23	14	33	12	4	4
Number of mines and quarries.....	111	107	8	34	16	33	12	4	4
Capital.....	\$19,375,112	\$18,031,034	\$5,003,004	\$7,824,755	\$1,700,740	\$2,200,100	\$341,500	\$450,215	\$744,078
Principal expenses:									
Salaries and wages—									
Officers.....	\$148,031	\$148,351	\$7,040	\$25,200	\$07,427	\$12,375	\$5,043	.....	\$280
Superintendents and managers.....	\$272,847	\$250,247	\$53,512	\$109,061	\$37,403	\$34,339	\$13,072	\$4,800	\$10,000
Technical employees.....	\$50,481	\$57,000	\$21,420	\$34,234	\$1,355	\$400	.....	.....	\$1,872
Clerks, etc.....	\$158,608	\$155,908	\$33,002	\$00,105	\$30,750	\$25,803	\$3,020	\$1,050	\$2,700
Wage earners.....	\$1,892,745	\$4,750,235	\$1,872,021	\$1,300,340	\$750,500	\$333,180	\$133,002	\$00,875	\$142,510
Supplies and materials.....	\$1,014,067	\$1,885,710	\$400,012	\$030,000	\$208,140	\$158,011	\$54,023	\$40,028	\$28,357
Cost of ore purchased as material.....	\$83,802	\$83,802	.....	\$83,802	.....	.....	.....	.....	.....
Fuel.....	\$303,853	\$300,187	\$155,030	\$31,143	\$07,817	\$70,439	\$0,500	\$1,503	\$54,000
Power.....	\$548,078	\$548,078	\$00,158	\$405,830	\$23,748	\$48,020	\$1,010	\$4,403	.....
Royalties and rents.....	\$543,000	\$555,000	\$277,815	\$233,708	\$5,007	\$10,807	\$8,003	\$20	\$8,000
Taxes.....	\$230,005	\$235,881	\$144,568	\$41,770	\$23,101	\$21,004	\$3,775	\$1,507	\$3,124
Contract work.....	\$252,171	\$135,293	\$31,003	\$00,027	.....	\$0,253	\$1,050	.....	\$110,878
Expenditures for development (included in the above items).....	\$1,000,707	\$050,622	\$404,154	\$140,802	\$0,802	\$23,014	\$0,070	.....	\$350,085
Value of products.....	\$10,580,833	\$10,580,833	\$3,820,872	\$3,810,011	\$1,484,070	\$1,107,700	\$231,078	\$113,203	.....
Persons engaged in industry.....	4,008	3,880	1,194	1,214	798	402	154	07	119
Proprietors and firm members (total).....	54	48	1	14	1	23	0	3	0
Number performing manual labor.....	19	19	.....	13	1	5	.....	.....	.....
Salaried officers.....	38	38	1	10	10	15	2	.....	.....
Superintendents and managers.....	109	105	11	50	14	18	7	5	4
Technical employees.....	27	24	0	13	1	1	.....	.....	3
Clerks, etc.....	128	127	27	49	10	23	6	3	1
Wage earners (average number).....	3,052	3,547	1,145	1,078	753	383	133	50	105
Wage earners by occupation (Dec. 15):									
Above ground (total).....	12,203	12,228	258	484	772	477	100	08	65
Below ground (total).....	1,680	1,627	004	003	.....	.....	.....	.....	02
Foremen, shift bosses, etc.—									
Above ground.....	70	70	12	10	21	10	4	4	5
Below ground.....	70	65	35	30	.....	.....	.....	.....	.....
Enginemen, holstmen, electricians, mechanics, etc.—									
Above ground.....	376	361	88	140	58	42	0	18	15
Below ground.....	84	79	73	0	.....	.....	.....	.....	5
Miners, quarrymen, and drillmen, including their helpers—									
Above ground.....	043	627	20	18	304	174	04	17	16
Below ground.....	834	782	585	197	.....	.....	.....	.....	52
Timberman, trackmen, and men engaged in hauling, tramming, etc.—									
Above ground.....	01	74	20	3	30	12	.....	.....	17
Below ground.....	335	335	172	103	.....	.....	.....	.....	.....
Muckers, loaders, laborers, and others not classified—									
Above ground.....	655	638	116	104	130	210	46	23	17
Below ground.....	300	300	00	207	.....	.....	.....	.....	.....
Wage earners employed in mills and beneficiating plants—									
Above ground.....	458	458	2	203	220	11	16	6	.....
Number of females included in wage earners reported above—									
Above ground.....	10	10	.....	10	.....	.....	.....	.....	.....
Mineral land operated..... acres..	12,800	12,004	2,700	6,201	712	1,348	403	520	805
Land controlled, total..... acres..	10,075	10,050	2,780	12,333	1,260	1,580	508	520	925
Mineral land owned.....	0,078	0,038	1,040	2,381	505	1,332	220	510	40
Mineral land leased.....	5,801	5,120	700	3,910	147	20	273	10	705
Timber and other lands owned and leased.....	7,100	0,980	80	0,042	548	232	75	.....	120
Power used: Aggregate horsepower.....	28,246	20,700	0,782	0,758	2,850	5,772	1,000	045	1,480
Prime movers (horsepower, total).....	0,184	7,704	2,885	88	1,175	2,472	000	175	1,480
Steam engines—									
Number.....	104	07	10	2	26	34	10	0	7
Horsepower.....	8,306	0,071	2,700	30	1,175	2,140	002	105	1,335
Internal-combustion engines—									
Number.....	21	16	.....	3	.....	8	4	1	5
Horsepower.....	603	458	.....	58	.....	173	217	10	145
Water wheels, turbines, and motors—									
Number.....	6	6	4	.....	.....	2	.....	.....	.....
Horsepower.....	275	275	125	.....	.....	150	.....	.....	.....
Purchased power (horsepower, total).....	10,002	10,002	3,847	0,070	1,075	3,300	100	470	.....
Electric motors operated by purchased current—									
Number.....	500	500	45	334	33	73	1	14	.....
Horsepower.....	10,002	10,002	3,847	0,070	1,075	3,300	100	470	.....
Electric motors run by current generated by enterprise using:									
Number.....	16	14	6	.....	4	4	.....	.....	2
Horsepower.....	1,480	1,080	385	.....	550	145	.....	.....	400
Fuel used:									
Coal, anthracite..... tons, 2,240 pounds..	15	15	.....	.....	15	.....	.....	.....	.....
Coal, bituminous..... tons, 2,000 pounds..	50,518	50,000	20,154	5,050	5,334	12,000	1,100	800	8,913
Coke..... tons, 2,000 pounds..	00	00	00	.....	.....	.....	.....	.....	.....
Wood..... cords.....	2,128	1,778	.....	42	1,634	202	.....	.....	350
Fuel oils..... barrels.....	1,950	1,950	288	1,402	.....	100	100	.....	.....
Gasoline and other volatile oils..... barrels.....	1,031	020	08	100	1	468	72	100	102

¹ Includes 1 reduction mill operated independently of mines.² Includes enterprises as follows: Barytes, 1; basalt, 2; silica, 1.³ Includes enterprises as follows: Iron ore, 2; lead and zinc, 2.⁴ Includes 1 wage earner under 16 years of age.

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Minnesota, which ranks eleventh among the states in size (land area 80,858 square miles) and seventeenth in population (2,387,125 in 1920), ranked eighth in value of mineral products in 1919. The state ranked thirteenth in the total number of persons engaged in the mining industries and twelfth in the average number of wage earners employed.

The total value of mineral products for the state in 1919 was \$130,399,254, an increase of 122.3 per cent over the value reported at the census of 1909. This increase and the increases in capital, wages, cost of supplies and materials and fuel and power, shown in Table 1, are largely due to general price increases during the census interval and therefore may not be used properly to measure the growth of mining. The large increase in taxes is due to special taxes imposed by the state on iron-ore lands and mining and also to Federal income tax added since 1909. The slight increase in the number of wage earners employed, in the face of the temporarily adverse industrial conditions in 1919, is indicative of progress in the mining industries.

The mining industries reported for 1919, classified by principal products and listed in order of value of products, were iron ore, granite, manganese ore, limestone, abrasive materials, clay, and sandstone. The industries for which statistics can be shown without disclosure of individual operations are ranked according to value of products in Table 2.

The principal mining industry in Minnesota was the mining of iron ore, in which Minnesota leads all other states. The industry third in importance in the state, herein designated as the mining of manganese ores, is virtually a part of the iron-ore mining industry as its products are, strictly speaking, manganiferous iron ores obtained by the same methods and in the same localities as are the iron ores proper. The enterprises mining iron and manganiferous ores in Minnesota in 1919 included 95 out of a total of 135 enterprises, employed 96 per cent of the total number of wage earners, and reported products valued at \$128,780,284, or 98.8 per cent of the total value of mineral products of the state. These industries are located in St. Louis, Itasca, and Crow Wing Counties.

Granite quarrying ranked second among the mineral industries in Minnesota in 1919. Although small in comparison with iron-ore mining, the granite industry in the St. Cloud region in Stearns and Sherburne Counties is nevertheless important, supplying stone which is widely used for building and paving.

In addition to the operation of the producing mines and quarries, some mining work was done in

Minnesota on mineral properties which were not productive in 1919; ten such enterprises in the iron-ore mining industry were reported. These enterprises, with a combined capital of \$6,427,966, employed 275 wage earners and expended \$1,583,584 for development. The number of wage earners employed and the expenditures for development represented 1.6 per cent of the aggregate number of wage earners and the aggregate expenditures reported for all mining operations in the state.

The character of organizations conducting mining enterprises in Minnesota in 1919 is brought out in Table 3, which shows that corporations were most important not only as to number of enterprises operated, but also as to total number of wage earners employed and total value of products reported. Practically all iron-ore and manganese enterprises were controlled by corporations. Only two enterprises reported other forms of ownership and their operations were small as compared with those conducted by corporations.

The relatively large number of small enterprises, as measured by the average number of wage earners employed, is shown in Table 4. Of the total number of mining enterprises in Minnesota, 73.3 per cent had no wage earners or fewer than 101 each and the wage earners employed were only 19.8 per cent of the total number of wage earners. On the other hand, only 26.7 per cent of the total number of enterprises had more than 100 wage earners each and employed 80.2 per cent of the total number of wage earners. The larger enterprises were in the iron-ore and manganese-mining industries.

Table 5 shows that in a majority of enterprises but for only 33.6 per cent of the wage earners the prevailing hours of labor were 44 to 53 per week. In about one-third of the enterprises, employing 63.9 per cent of the total number of wage earners, the hours of labor were 54 to 62 per week. In the principal industry, iron-ore mining, the 8-hour day and 6-day week was reported by a majority of the enterprises but for less than one-third of the wage earners. Thirty-three out of 88 enterprises in this industry, employing 65.3 per cent of the total number of wage earners in the industry, reported hours of labor ranging from 54 to 62 per week. In most of these enterprises the 10-hour day and 6-day week prevailed. In the quarry industry the 8-hour day and 6-day week was the rule.

The statistics for wage earners presented in Table 6, showing changes in the number employed month by month, reflect conditions prevailing in the industries

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during the census year. The normal seasonal control of iron mining in Minnesota is indicated by the figures in this table.

Table 7 presents for 1919 statistics in detail for the state as a whole and for each industry that can be shown without disclosure of individual operations.

TABLE 1.—COMPARATIVE SUMMARY, PRODUCING ENTERPRISES: 1919 AND 1909.

	MINING INDUSTRIES.		Per cent of increase. ¹		MINING INDUSTRIES.		Per cent of increase. ¹
	1919	1909			1919	1909	
Number of enterprises.....	135	153	-11.8	Capital.....	\$310,005,550	\$170,950,309	75.2
Number of mines and quarries.....	196	250	-2.2	Principal expenses:			
Persons engaged.....	18,502	18,068	2.7	Salaries.....	3,048,421	1,568,740	94.3
Proprietors and firm members, total....	40	109	-70.3	Wages.....	20,383,021	11,007,049	146.8
Number performing manual labor in or about the mines and quarries.....	19	99	-4.3	Contract work.....	1,512,000	2,157,108	-29.9
Salaried employees.....	1,257	1,313	4.1	Supplies and materials.....	14,101,002	6,736,806	109.3
Wage earners (average number).....	17,265	16,586	-5.0	Fuel and power.....	4,681,052	2,024,006	131.3
Power used (horsepower).....	144,199	151,834	-5.0	Royalties and rents.....	17,042,811	10,731,959	64.4
				Taxes.....	26,074,051	2,824,101	823.3
				Value of products.....	130,309,254	58,064,852	122.3

¹ A minus sign (-) denotes decrease. Percentages are omitted where base is less than 100.

TABLE 2.—PRINCIPAL INDUSTRIES, PRODUCING ENTERPRISES, RANKED BY VALUE OF PRODUCTS: 1919.

INDUSTRY.	Number of enterprises.	WAGE EARNERS.		VALUE OF PRODUCTS.		INDUSTRY.	Number of enterprises.	WAGE EARNERS.		VALUE OF PRODUCTS.	
		Average number.	Per cent distribution.	Amount.	Per cent distribution.			Average number.	Per cent distribution.	Amount.	Per cent distribution.
All industries.....	135	17,265	100.0	\$130,309,254	100.0	Manganese.....	6	347	2.0	\$403,110	0.3
Iron ore.....	89	16,236	94.0	128,377,174	98.4	Limestone.....	10	150	0.9	311,180	0.2
Granite.....	27	392	2.3	1,135,391	0.9	All other industries ¹	3	134	0.8	172,390	0.1

¹ Includes enterprises in industries as follows: Abrasive materials, 1; clay, 1; sandstone, 1.

TABLE 3.—CHARACTER OF ORGANIZATION, PRODUCING ENTERPRISES: 1919.

CHARACTER OF ORGANIZATION.	Number of enterprises.	Number of wage earners.	VALUE OF PRODUCTS.		PER CENT DISTRIBUTION.		
			Total.	Per enterprise.	Enterprises.	Wage earners.	Value of products.
All industries.....	135	17,265	\$130,309,254	\$965,020	100.0	100.0	100.0
Corporation.....	112	16,884	120,580,822	1,157,052	83.0	97.8	99.4
Individual.....	12	157	205,400	22,117	8.9	0.9	0.2
Firm.....	11	224	544,032	49,467	8.1	1.3	0.4

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TABLE 4.—SIZE OF PRODUCING ENTERPRISES, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED INDUSTRIES: 1919.

INDUSTRY AND WAGE EARNERS PER ENTERPRISE.	ENTERPRISES.		WAGE EARNERS.		INDUSTRY AND WAGE EARNERS PER ENTERPRISE.	ENTERPRISES.		WAGE EARNERS.	
	Number.	Per cent distribution.	Number.	Per cent distribution.		Number.	Per cent distribution.	Number.	Per cent distribution.
ALL INDUSTRIES.....	135	100.0	17,265	100.0	GRANITE.....	27	100.0	392	100.0
No wage earners.....	2	1.5	38	0.2	No wage earners.....	1	3.7	24	6.1
1 to 5.....	14	10.4	307	1.8	1 to 5.....	0	33.3	77	19.6
6 to 20.....	26	19.2	612	3.5	6 to 20.....	9	33.3	157	40.1
21 to 50.....	26	19.2	2,155	12.5	21 to 50.....	0	22.2	134	34.2
51 to 100.....	31	23.0	13,853	80.2	51 to 100.....	2	7.4		
101 to 500.....	36	26.7			MANGANESE.....	6	100.0	347	100.0
IRON ORE.....	89	100.0	16,236	100.0	6 to 20.....	2	33.3	31	8.9
No wage earners.....	1	1.1	4	(1)	21 to 50.....	3	50.0	90	25.9
1 to 5.....	11	12.4	154	0.9	101 to 500.....	1	16.7	226	65.1
6 to 20.....	15	16.9	617	3.8	LIMESTONE.....	10	100.0	156	100.0
21 to 50.....	20	20.2	1,834	11.3	1 to 5.....	4	40.0	10	6.4
51 to 100.....	26	30.3	13,627	83.9	6 to 20.....	3	30.0	36	23.1
101 to 500.....	35				21 to 50.....	2	20.0	48	30.8
					51 to 100.....	1	10.0	62	39.7

¹ Less than one-tenth of 1 per cent.

TABLE 5.—NUMBER OF PRODUCING ENTERPRISES AND AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED INDUSTRIES: 1919.

INDUSTRY.	TOTAL.		NUMBER WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—									
	Enter-prises.	Wage earners.	35 and under.		36 to 43.		44 to 53.		54 to 62.		63 to 71.	
			Enter-prises.	Wage earners.	Enter-prises.	Wage earners.	Enter-prises.	Wage earners.	Enter-prises.	Wage earners.	Enter-prises.	Wage earners.
All industries.....	133	17,265	2	25	1	8	81	5,793	45	11,030	4	409
Iron ore.....	88	16,236	1	11	1	8	50	5,240	33	10,598	3	379
Granite.....	26	302					23	346	2	16	1	30
Manganese.....	6	347	1	14			3	68	2	205		
Limestone.....	10	156					4	74	6	82		
All other.....	3	134					1	65	2	69		

¹ Exclusive of 2 enterprises employing no wage earners in the following industries: Granite, 1; iron ore, 1.

TABLE 6.—WAGE EARNERS BY MONTHS, FOR SELECTED INDUSTRIES: 1919.

[The month of maximum employment for each industry is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

INDUSTRY.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		Janu-ary.	Febru-ary.	March.	April.	May.	June.	July.	Aug-ust.	Sep-tember.	Octo-ber.	Novem-ber.	Decem-ber.	
All industries.....	17,540	16,496	16,050	16,285	17,346	18,969	18,883	19,079	18,960	18,398	17,510	16,563	15,555	80.4
Producing enterprises.....	17,265	16,033	16,304	16,010	17,054	18,043	18,587	18,804	18,667	18,178	17,348	16,383	15,109	80.3
Iron ore.....	16,236	14,961	15,252	15,132	16,088	17,710	17,605	17,753	17,574	17,069	16,225	15,338	14,119	79.5
Granite.....	302	333	353	351	351	378	387	413	413	422	437	444	422	75.0
Manganese.....	347	520	555	291	302	232	205	306	362	359	359	307	297	41.8
Limestone.....	156	52	53	105	159	190	217	198	203	201	185	166	143	24.0
All other industries.....	134	158	161	131	154	127	113	134	115	127	142	128	128	71.5
Nonproducing enterprises—iron ore.....	275	463	286	275	292	326	296	275	293	220	168	180	226	36.3

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TABLE 7.—DETAILED STATISTICS FOR MINING INDUSTRIES: 1919.

	Aggregate.	PRODUCING ENTERPRISES.						NONPRO- DUCING EN- TERPRISES.
		Total.	Iron ore.	Granite.	Manganese.	Limestone.	All other. ¹	Iron ore.
Number of enterprises.....	145	135	80	27	6	10	3	10
Number of mines and quarries.....	206	106	141	34	8	10	3	10
Capital.....	\$310,523,525	\$310,005,559	\$304,386,006	\$771,586	\$1,060,854	\$107,618	\$373,405	\$6,427,066
Principal expenses:								
Salaries and wages—								
Officers.....	\$101,908	\$305,013	\$306,267	\$10,806	\$5,350	\$0,500	.....	\$0,985
Superintendents and managers.....	\$305,518	\$851,248	\$818,510	\$6,850	\$13,247	\$7,178	\$5,133	\$14,270
Technical employees.....	\$406,743	\$101,518	\$452,857	\$7,124	\$1,537	.....	.....	\$5,225
Clerks, etc.....	\$1,353,043	\$1,340,042	\$1,313,203	\$10,050	\$11,092	\$5,397	.....	\$12,401
Wage earners.....	\$29,835,002	\$29,383,021	\$28,333,475	\$477,028	\$279,735	\$158,605	\$134,118	\$152,071
Supplies and materials.....	\$14,442,274	\$14,101,062	\$13,870,807	\$98,092	\$80,275	\$27,642	\$18,180	\$340,312
Fuel.....	\$4,233,367	\$4,156,158	\$4,050,203	\$55,475	\$22,898	\$11,747	\$5,745	\$78,300
Power.....	\$553,822	\$520,704	\$455,323	\$33,074	\$27,616	\$9,267	\$1,514	\$27,028
Royalties and rents.....	\$17,740,402	\$17,642,811	\$17,532,030	\$4,371	\$48,401	\$9,006	\$8,103	\$103,591
Taxes.....	\$26,382,843	\$26,074,051	\$26,013,086	\$17,805	\$31,044	\$8,099	\$607	\$308,102
Contract work.....	\$2,188,704	\$1,512,000	\$1,444,250	\$2,130	\$13,315	\$23,202	.....	\$675,705
Expenditures for development (included in the above items).....	\$11,537,204	\$0,053,680	\$0,812,648	\$15,735	\$121,073	\$3,321	.....	\$1,583,594
Value of products.....	\$130,399,254	\$130,399,254	\$128,377,174	\$1,135,301	\$403,110	\$311,180	\$172,309	.....
Persons engaged in industry.....	18,864	18,502	17,422	445	378	170	141	302
Proprietors and firm members (total).....	40	40	2	25	1	8	4	.....
Number performing manual labor.....	19	19	.....	18	.....	1	.....	.....
Salaried officers.....	60	63	50	7	4	2	.....	6
Superintendents and managers.....	250	253	232	4	9	5	3	6
Technical employees.....	100	187	170	5	3	.....	.....	3
Clerks, etc.....	700	754	723	12	14	5	.....	12
Wage earners (average number).....	17,540	17,265	16,236	302	347	150	134	275
Wage earners by occupation (Dec. 15):								
Above ground (total).....	9,012	9,342	8,350	436	213	201	142	270
Below ground (total).....	9,312	9,263	8,777	.....	476	.....	.....	50
Foreman, shift bosses, etc.—								
Above ground.....	440	434	400	10	5	7	3	15
Below ground.....	275	200	249	.....	20	.....	.....	0
Engineers, hoistmen, electricians, mechanics, etc.—								
Above ground.....	3,340	3,207	3,165	25	50	21	6	73
Below ground.....	208	257	253	.....	4	.....	.....	11
Miners, quarrymen, and drillmen, including their helpers—								
Above ground.....	1,040	1,010	552	313	.....	112	33	30
Below ground.....	5,370	5,302	4,074	.....	388	.....	.....	8
Timbermen, trackmen, and men engaged in hauling, tramming, etc.—								
Above ground.....	800	775	742	5	28	.....	.....	34
Below ground.....	1,514	1,403	1,431	.....	62	.....	.....	21
Muckers, loaders, laborers, and others not classified—								
Above ground.....	3,453	3,335	3,052	16	130	37	100	118
Below ground.....	1,885	1,872	1,870	.....	2	.....	.....	13
Wage earners employed in mills and beneficiating plants—								
Above ground.....	521	521	430	58	.....	24	.....	.....
Mineral land operated..... acres.....	20,128	24,830	21,071	1,074	970	371	450	1,202
Land controlled, total..... acres.....	287,073	285,541	282,508	1,152	970	371	450	1,532
Mineral land owned.....	5,899	5,899	4,073	1,027	.....	350	440	.....
Mineral land leased.....	21,190	19,874	18,835	47	970	12	10	1,202
Timber and other lands owned and leased.....	200,008	250,768	259,600	78	.....	.....	.....	240
Power used: Aggregate horsepower.....	148,015	144,190	135,024	3,075	2,564	1,504	452	3,816
Prime movers (horsepower, total).....	116,220	114,354	110,831	1,770	700	605	362	1,875
Steam engines—								
Number.....	1,315	1,293	1,212	48	14	14	5	22
Horsepower.....	113,374	111,508	108,430	1,020	600	599	250	1,806
Steam turbines—								
Number.....	4	4	4	.....	.....	.....	.....	.....
Horsepower.....	1,020	1,020	1,020	.....	.....	.....	.....	.....
Internal-combustion engines—								
Number.....	37	30	18	5	5	1	7	1
Horsepower.....	1,226	1,217	772	150	187	6	102	9
Purchased power (horsepower, total).....	31,786	29,845	25,093	1,005	1,758	989	100	1,941
Electric motors operated by purchased current—								
Number.....	603	578	462	42	39	33	2	25
Horsepower.....	31,786	29,845	25,093	1,005	1,758	989	100	1,941
Electric motors run by current generated by enterprise using:								
Number.....	436	436	436	.....	.....	.....	.....	.....
Horsepower.....	13,563	13,563	13,563	.....	.....	.....	.....	.....
Fuel used:								
Coal, anthracite..... tons, 2,240 pounds.....	3,248	3,248	3,248	.....	.....	.....	.....	.....
Coal, bituminous..... tons, 2,000 pounds.....	738,750	720,302	714,873	6,315	2,836	1,578	700	12,358
Coke..... tons, 2,000 pounds.....	758	758	758	.....	.....	.....	.....	.....
Wood..... cords.....	477	477	322	125	.....	30	.....	.....
Fuel oils..... barrels.....	1,230	1,230	1,200	.....	30	.....	.....	.....
Gasoline and other volatile oils..... barrels.....	2,716	2,606	2,223	200	20	7	150	50

¹ Includes enterprises as follows: Abrasive materials, 1; clay, 1; sandstone, 1.
² Includes 3 females and 2 wage earners under 16 years of age.

³ Includes 2 females and 2 wage earners under 16 years of age.
⁴ Includes 1 female.