THE CLIFFS POWER & LIGHT CO.
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YEAR 1952

The total energy delivered to the transmission system in the year 1952 was 149,812,100 Kwh which was 1.4% less than that delivered to the transmission system in the previous year. Of this amount, 101,750,500 Kwh were generated by hydro, 8,337,600 Kwh by Diesel and 32,639,000 Kwh by steam. This gave a total energy produced on our system of 142,727,100 Kwh. The total amount of energy purchased during the year was 7,085,000 Kwh. The energy sales for the year showed a decrease of 1.1% below those of 1951, but the revenue showed an over-all increase for the year of approximately 1.7%. This over-all increase in revenue was caused by a combination of greater collections under the fuel clause in our rate schedules and the fact that there was a rate increase to the City of Negaunee of approximately 20% which took effect on July 1 of the year. The decrease in both energy delivered to the transmission lines and energy sales was caused by the strike in the iron mining industry which took place during June and July. With the exception of these two months which showed decreases in energy delivered to the transmission system of 25% and 40% respectively, the remainder of the period showed increases which would average approximately 5%.

In spite of the fact that there were nearly 102,000,000 Kwh generated in the hydro plants, 1952 was a poor water year. We entered the year with approximately 40,000,000 Kwh in storage which was caused by the extremely good rainfall conditions experienced in 1951. The total precipitation in 1952 amounted to 24.35" compared to 43.50" in 1951. The net benefit from water which was in storage at the end of the year and which was used during the year amounted to approximately 27,000,000 Kwh which is illustrated by the fact that we entered the year with approximately 40,000,000 Kwh in storage but finished with approximately 13,000,000 Kwh in storage. This lack of rainfall during the year will be reflected in the energy production which will be obtained in 1953 because of the small amount which it will be possible to generate by hydro between the first of the year and the spring breakup.

During 1951 negotiations had been opened with the Michigan Gas & Electric Company relative to a rate increase to be effective January 1, 1952 in accordance with the provisions of the contract between our company and that company for the sale of power. These negotiations were started in the latter part of 1951 and were continued into 1952. There were conferences in Cleveland on the matter in January and February, and late in February a meeting was held with Mr. Lefferson, of Ebasco Services Inc., who was retained to assist us in preparing data for the case. The data regarding this matter was prepared in the New York office of Ebasco Services Inc., and on Monday, May 5, there was a meeting in Chicago with the Michigan Gas & Electric Company, at which time the results of the study were presented to Mr. Vennard of the Mid West Service Corporation and Mr. L. L. Perry, General Manager of the Michigan Gas & Electric Company. These gentlemen accepted the data which had been compiled and said that they would recommend that the proposed rate be accepted by Mr. Rosenthal, Chairman of the Board of the Michigan Gas & Electric Company. Later in May word was received that Mr. Rosenthal did not accept Mr. Vennard's recommendations. Following this there was a series of contacts between Mr. Geffine and Mr. Rosenthal which arrived at no satisfactory conclusion to the problem and resulted in our serving notice on the Michigan Gas & Electric Company on July 25 that we did not intend to renew the contract after its expiration in January, 1954, and that no further service would be supplied to them under that contract subsequent to that date. This resulted in more correspondence and conversations between Mr. Geffine and Mr. Rosenthal

which in turn resulted in a meeting between Mr. Geffine, Mr. Preston, representatives from Ebasco Services, and Mr. Rosenthal in his office in New York on September 23. This meeting was not at all satisfactory to our company and no conclusions or decisions were reached which would indicate an immediate solution to either of the problems being considered. Subsequent to that time negotiations were continued, but at the end of the year the status of the situation had not changed except to the extent that Mr. Rosenthal had notified us that he intended to file a petition with the Michigan Public Service Commission, requesting that the Commission order us to continue the service after the expiration of the contract.

In the early part of the year it was realized that the load growth which was being experienced by the company was greater than that which had been anticipated and, accordingly, recommendations were made that the load forecast be revised and that a study be conducted to determine whether or not the increased speed of load growth justified proceeding with the installation of additional generating capacity at an earlier date than was recommended by the engineers based upon previous load studies. On February 23 the Board of Directors authorized Stone & Webster Engineering Corporation to make a revised estimate of construction schedules and to make further recommendations as to the advisable size and location of additional facilities if needed. Feeling that the engineering report of the Stone & Webster Engineering Corporation in regard to additional capacity might not be as convincing as was desired by the company, a meeting was held and Ebasco Services Inc. of Chicago were requested to make a study of the situation and make their recommendation in regard to the power supply problem of the company. Specifically attention of Ebasco Services was called to the possibility of obtaining power from some outside source such as the Wisconsin Michigan Power Company or of disposing of a portion of The Cliffs Power & Light Company for the purpose of reducing the load demands which would be placed upon its generating facilities. Many methods of accomplishing this were discussed and conferences were held both in Ishpeming and Cleveland, but at the end of these conferences no definite plan of action had been taken. During the time that this study was being made, there also came into the situation the possibility of purchasing a hydroelectric generating station which had been built by the Ford interests in Iron Mountain but which was owned by the Kingsford Corporation. After study by our engineers and by Ebasco Services Inc., it was decided that no advantage was to be obtained by purchasing this plant.

Studies on the installation of additional capacity continued with both of the engineering companies making various recommendations on the matter until October. On October 15, realizing that time was getting very short and that unless active steps were taken there would probably be a power shortage in 1955, the Directors authorized the start for plans, specifications and purchase of materials for an 11,500 KW plant to be installed in the Ishpeming Steam Electric Station at a total cost of approximately $2,600,000. This authorization was given with the understanding that if other plans were developed within a four-month period, the arrangements with Stone & Webster could be canceled upon payment to that company of the engineering fees for the work which was done up to that time and that all orders would be placed on a basis of cancellation at no cost being permitted up to January 31, 1953. At the end of the year active steps had been taken towards ordering the major pieces of equipment and the obtaining of the necessary plans and installation details to enable the company to proceed with the plans for the entire station. At the same time negotiations and studies were still being conducted relative to the possibility of disposing of part of the Cliffs Power & Light Company system, the building of a larger plant in conjunction with some other operating company in the Upper Peninsula, and other various plans which might affect the installation of the station in Ishpeming. At the end of the year no definite conclusions in regard to the advisable procedure had been reached.

At the end of 1951 there was under construction a temporary addition to the office building occupied by The Cliffs Power & Light Company and the Mechanical Department of The Cleveland-Cliffs Iron Company in Ishpeming. All of the work on this building was completed during the month of February with the exception of the outdoor work, and the building was occupied at that time. The yard work, steps and other work outdoors was completed in early spring.

The Ishpeming Steam Electric Station was scheduled for shutdown early in the year. Due to the undecided situation of the mining industry relative to whether or not a strike would take place in the early part of the year, this shutdown was postponed from time to time until March 2, at which time it was decided that no strike was pending in the immediate future and that the plant should be shut down for its inspection. The plant was actually taken out of operation on March 1 and was given a complete inspection and overhaul of the turbine and the boiler. Operation was not resumed until March 27. There were major changes made in the boiler installation in addition to the overhaul, and the General Electric Company inspected the generator. In addition to this, they made some changes in the rotor of the generator which resulted in better balance of the machine. No unsatisfactory conditions were noted in the turbo-generator installation and nothing serious was detected in the condition of the boiler. It is anticipated that the turbine will be operated for at least two more years before being inspected again; however, the boiler will be closed down for cleaning and overhaul in the early part of 1953.

After the signing of the contract effective on January 1 with the Wisconsin Michigan Power Company for the supply of 4000 KW of emergency power to our lines at Gwinn, that company inspected and repaired their transmission line and placed this line in service on January 15. This source of supply was utilized several times during the year for emergency service and will constitute a source of stand-by service until the expiration of the contract five years from its effective date.

On January 25, failure of the automatic equipment in the AuTrain Power Plant resulted in a runaway of the #2 machine which did considerable damage to the bearings, flywheel and other equipment. This machine was completely overhauled and was placed in service on February 25, exactly a month from the date of the accident.

During March and April, work was completed taking all of the 30,000 volt equipment out of the Brownstone Substation and installing it in the outdoor substation adjacent to the Steam Plant. This change in switching equipment removed a considerable fire hazard from the Brownstone building and leaves operating in that building no equipment of more than 2300 volts.

The synchronous condenser which is installed at the Inland Lime & Stone Company quarry for the purpose of voltage correction developed a bad vibration which was detrimental to the bearings and caused an unwelcome vibration throughout the entire building in which it is located. This matter was taken up with the General Electric Company Shops at Milwaukee, and upon their recommendation, the rotor was sent to them for checking and balancing. It was returned to us and placed in operation on April 3. At the time the condenser was placed in operation, the vibration seemed to have been remedied and the operation was satisfactory. However, in the latter part of the month it was reported that the machine was again vibrating. Many attempts were made to balance this machine during the remainder of the year, but nothing was successful until December, at which time a man was sent from the General Electric Turbine Works at Lynn to inspect and balance the machine on the site. This balancing was accomplished and all indications are that the machine is now operating entirely satisfactorily and will continue to do so in the future.

On May 9, Mr. Philip Murray, President of the United Steelworkers of America, served notice upon the company that he desired to negotiate the terms and conditions of a new labor agreement. A meeting was held with the Union but it was agreed by the representatives of both the Union and the company that the actual negotiation of the contract would be postponed until after the settlement of the controversy which was at that time under way between the Union and the iron mining and steel industries. The actual contract was negotiated after the signing of the iron ore contract and this new agreement, together with a retroactive pay agreement, were signed on November 12, 1952. The new schedules of pay were put into effect on the payrolls beginning October 16, 1952, and calculations were immediately started for retroactive payments to cover the agreed upon wage scales which were effective under the signed agreement for the period between December 1, 1950 and October 15, 1952 inclusive. Parts of these retroactive payments were made during the year 1952, but the major portion of them were carried forward into 1953 and will be paid in the early part of that year.

On June 30, a letter was forwarded to the City of Negaunee, canceling their contract as of July 1, 1952, and requesting that they substitute a revised contract which would incorporate a rate schedule equivalent to that which was being paid by the mining industry in the area. After several discussions during the succeeding months, a contract was finally accepted and signed on November 13. The City accepted billings on the new rate from the date of cancellation of the old contract, that is, July 1, 1952.

After the spring breakup, inspection showed that the downstream side of the dam at the Republic Power Plant, which was constructed about 1914, had been undermined by the spring floods. It was decided that this situation constituted a hazardous condition and that it should be repaired during the summer. Accordingly, Intrusion-Prepakt moved to Republic on August 18 to do the work necessary to reinforce this dam. The repairs were completed on September 29 and were very satisfactory. We think that the dam is now in condition to serve without further attention for a number of years.

During June and July while the iron ore strike was under way, the opportunity was taken to shut down the Carp pipeline and make extensive repairs on it. These repairs were not completed at the time the strike ended but were completed a few days thereafter. Intrusion-Prepakt was retained to do this work and they were occupied with it and with the repair of the Republic Dam mentioned above throughout the summer and until October 20. The repairs of this pipeline constitute a very difficult problem, and although it is felt that the latter part of last year we had the most satisfactory solution to it which has been obtained so far, there are still some leaks on this pipeline and the work should be continued during 1953 until all repairs are satisfactorily accomplished.

The company had two serious accidents during the year which involved three employees. The first one occurred on August 6 when one of two college students working through the summer months cleaning around substation structures came in contact with a high voltage line in the Maas Substation. Both boys were burned by the resulting electrical arcs. Although this was a very serious accident, neither of the boys was seriously burned and neither had any permanent disability or scarring because of the accident. The other accident occurred on October 16 when a lineman's helper climbing a pole near the Negaunee Mine ascended one which had been weakened by rot at the base to the point that when he cut the wires at the top of the pole, the pole fell with him to the ground. This also could have been a serious accident resulting in a fatality, but again we were furtunate and the only result was a broken arm and a severe shake-up to the employee. It is not anticipated that any permanent disability will result from this accident.

THE CLIFFS POWER & LIGHT CO.

STATISTICAL DATA - 1952

	McCLURE	CARP	HOIST	AuTRAIN	REPUBLIC	ESCANABA	TOTAL HYDRO	DIESEL	STEAM	TOTAL GENERATED
Jan.	4,869,000	2,716,000	1,719,000	790,800	166,100	306,000	10,566,900	0	1,673,000	12,239,900
Feb.	5 134 000	2 678 000	1 795 000	425 800	133 700	311 000	10 477 500	28 000	2 336 000	12 841 500
Mar.	5 192 000	2 349 000	1 759 000	599 600	146 000	264 000	10 309 600	1 198 400	673 000	12 181 000
Apr.	5 394 000	2 397 000	1 726 000	621 300	195 500	636 000	10 969 800	314 800	2 058 000	13 342 600
May	4 966 000	2 056 000	1 692 000	806 300	359 800	954 000	10 834 100	7 900	2 784 000	13 626 000
June	3 734 000	1 233 000	1 395 000	638 300	279 900	453 000	7 733 200	87 900	870 000	8 691 100
July	2 837 000	1 245 000	1 069 000	449 100	255 800	526 000	6 381 900	0	675 000	7 056 900
Aug.	4 172 000	677 000	1 456 000	515 800	257 800	486 000	7 564 600	43 400	3 550 000	11 158 000
Sept.	4 423 000	1 505 000	1 513 000	525 500	42 900	200 000	8 209 400	54 500	4 315 000	12 578 900
Oct.	3 967 000	1 087 000	1 350 000	361 100	34 000	204 000	7 003 100	1 506 700	4 631 000	13 140 800
Nov.	3 326 000	1 089 000	1 094 000	197 600	14 500	212 000	5 933 100	2 659 300	4 566 000	13 158 400
Dec.	2 917 000	1 349 000	952 000	188 900	60 400	300 000	5 767 300	2 436 700	4 508 000	12 712 000
	50,931,000	20,381,000	17,520,000	6,120,100	1,946,400	4,852,000	101,750,500	8,337,600	32,639,000	142,727,100

THE CLIFFS POWER & LIGHT CO.

STATISTICAL DATA - 1952

	TOTAL GENERATED	PURCHASED	TOTAL GEN. AND PURCH.	STATION USE	NET ENERGY FOR LOAD	KWH SOLD	TRANSMISSION LOSSES KWH	TRANSMISSION LOSSES %
Jan.	12,239,900	8,000	12,247,900	280,780	11,967,120	11,017,267	949,853	7.93
Feb.	12 841 500	25 000	12 866 500	313 629	12 552 871	11 444 987	1 107 884	8.82
Mar.	12 181 000	207 000	12 388 000	140 357	12 247 643	11 209 361	1 038 282	8.47
Apr.	13 342 600	124 000	13 466 600	299 334	13 167 266	12 373 301	793 965	6.02
May	13 626 000	539 000	14 165 000	318 074	13 846 926	12 846 328	1 000 598	7.22
June	8 691 100	384 000	9 075 100	112 409	8 962 691	7 890 033	1 072 658	11.96
July	7 056 900	0	7 056 900	109 230	6 947 670	6 396 321	551 349	7.93
Aug.	11 158 000	1 664 000	12 822 000	359 350	12 462 650	11 803 985	658 665	5.28
Sept.	12 578 900	1 067 000	13 645 900	376 199	13 269 701	12 205 956	1 063 745	8.01
Oct.	13 140 800	1 082 000	14 222 800	371 981	13 850 819	12 980 619	870 200	6.28
Nov.	13 158 400	789 000	13 947 400	369 065	13 578 335	12 629 102	949 233	6.99
Dec.	12 712 000	1 196 000	13 908 000	388 945	13 519 055	12 470 210	1 048 845	7.75
	142,727,100	7,085,000	149,812,100	3,439,353	146,372,747	135,267,470	11,105,277	7.58

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STATISTICAL DATA - 1952

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Precipitation -	1.60	0.40	1.67	1.26	3.83	3.26	4.90	2.72	0.95	0.73	1.52	1.51

Total precipitation at Ishpeming during 1952 - 24.35" (2.03 ft.)
Average " " Marquette - 32.80" (46 year record)

CARP RIVER PLANT:

Drainage area above intake dam	66.66 sq. miles
Cubic feet precipitation in 1952	3,772,499,512
Kilowatt hours generated in 1952	20 381 000
Cubic feet water utilized (90 cu. ft. - 1 Kwh)	1 834 290 000
" " " wasted over intake dam in 1952	177 840 000
" " " in Carp storage basin Dec. 22, 1951	836 352 000
" " " " " " " Dec. 22, 1952	277 574 000
" " " taken from Carp storage in 1952	558 778 000
Total run-off for year 1952 (cubic feet)	1 453 352 000
Run-off per sq. mile of drainage area (cubic feet)	21 802 310
Second-feet of run-off	0.69

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
Total Precip.	30.11	26.53	38.40	36.83	25.46	31.05	29.50	27.40	30.38	33.67	21.90	22.95	20.71
Sec.-ft. Run-off	1.03	0.67	0.93	1.29	0.70	0.79	0.83	0.73	0.68	1.06	0.59	0.50	0.25

	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Total Precip.	35.69	29.86	36.06	32.28	23.14	36.70	31.20	32.72	32.87	27.10	30.23	30.10	35.32
Sec.-ft. Run-off	0.85	0.98	1.11	0.67	1.10	0.83	1.13	1.14	1.00	0.79	0.89	0.86	1.33

	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Total Precip.	33.58	30.34	32.20	34.26	32.04	32.77	30.81	26.12	32.88	22.87	37.23	30.64	43.50
Sec.-ft. Run-off	1.47	1.05	0.83	0.84	1.17	0.70	0.81	0.56	0.88	0.44	0.77	1.09	1.54

	1952
Total Precip.	24.35
Sec.-ft. Run-off	0.69

McCLURE PLANT:

Drainage area above intake dam	140.52 sq. miles
Cubic feet precipitation in 1952 (Hoist Plant-29.27"-2.44')	9,558,643,553
Kilowatt hours generated in 1952	50 931 000
Cubic feet water utilized (125 cu. ft. - 1 Kwh)	6 366 375 000
" " " wasted over intake dam in 1952	0
" " " in Hoist storage basin Dec. 22, 1951	2 118 395 000
" " " " " " " Dec. 22, 1952	946 906 000
" " " taken from Hoist storage in 1952	1 171 489 000
" " " in Silver Lake Dec. 22, 1951	970 000 000
" " " " " " Dec. 22, 1952	79 530 000
" " " taken from Silver Lake in 1952	890 470 000
Total run-off for year 1952 (cubic feet)	4 304 416 000
Run-off per sq. mile of drainage area (cubic feet)	30 632 052
Second-feet of run-off	0.97

	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Total Precip.	35.10	42.03	26.60	30.49	24.06	43.95	35.51	43.80	38.75	30.81	37.02	32.54	35.07
Sec.-ft. Run-off	1.02	1.54	0.85	0.92	0.52	1.52	1.80	2.22	1.36	1.45	1.10	1.23	1.30

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946
Total Precip.	35.02	29.96	32.16	38.18	40.93	41.22	36.59	38.15	40.20	35.64	37.62	37.94	31.91
Sec.-ft. Run-off	1.16	0.90	1.05	1.19	1.75	1.69	1.47	1.28	1.15	1.43	1.17	1.36	0.86

	1947	1948	1949	1950	1951	1952
Total Precip.	37.27	28.81	43.28	40.65	50.90	29.27
Sec.-ft. Run-off	1.22	0.78	1.24	1.37	2.09	0.97

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SUBSTATION TRANSFORMERS:

Substation transformers installed as of December 31, 1952.

	Phase	No.	KVA	Total KVA	
66,000/2300 Volts					
Munising Substation	1	6	500	3,000	
Seney "	1	1	25	25	
Inland #1 "	1	3	500	1 500	
Inland #2 "	1	3	667	2 000	6,525 KVA
2300/66,000 Volts					
AuTrain Substation	1	3	333	1,000	1,000
33,000/66,000 Volts					
Gwinn Substation	1	3	1,250	3,750	3,750
33,000/6600 Volts					
Princeton Substation	1	1	37.5	37.5	37.5
33,000/2300 Volts					
Cliffs Shaft Substation	1	3	590	1,770	
Gwinn (old) "	1	3	150	450	
Morris-Lloyd "	3	1	2 500	2 500	
Cambria-Jackson "	1	3	500	1 500	
Mather Mine "B" Shaft Substation	3	1	5 000	5 000	
Mather Mine "A" Shaft "	3	1	5 000	5 000	
Maas Substation	1	3	1 250	3 750	
Volunteer "	1	1	625	625	
" "	1	1	500	500	
Greenwood "	1	2	500	1 000	
Princeton "	1	1	25	25	
Tilden "	1	3	150	450	
Palmer Rural (3 Substations)	1	4	15	60	
Negaunee-Athens Substation	1	3	1 000	3 000	
Champion Mine "	3	1	1 250	1 250	
Tracy Mine "	1	3	1 500	4 500	
Ohio Mine "	1	2	625	1 250	
Lindberg's Gravel Pit Substation	1	3	200	600	
Humboldt Mine Substation	1	2	625	1 250	
Twin City Gravel Pit Substation	1	2	75	150	34,630
2300/33,000 Volts					
Republic Substation	1	3	250	750	
Hoist Plant "	1	3	667	2 000	
" " "	3	1	2 500	2 500	
Escanaba Plant Substation	1	6	400	2 400	
McClure Plant "	3	2	5 000	10 000	
Carp Plant "	1	3	1 900	5 700	
Diesel Plant "	1	3	2 000	6 000	
" " "	3	1	5 000	5 000	34,350
4160/33,000 Volts					
Steam Plant Substation	3	1	10,000	10,000	10,000

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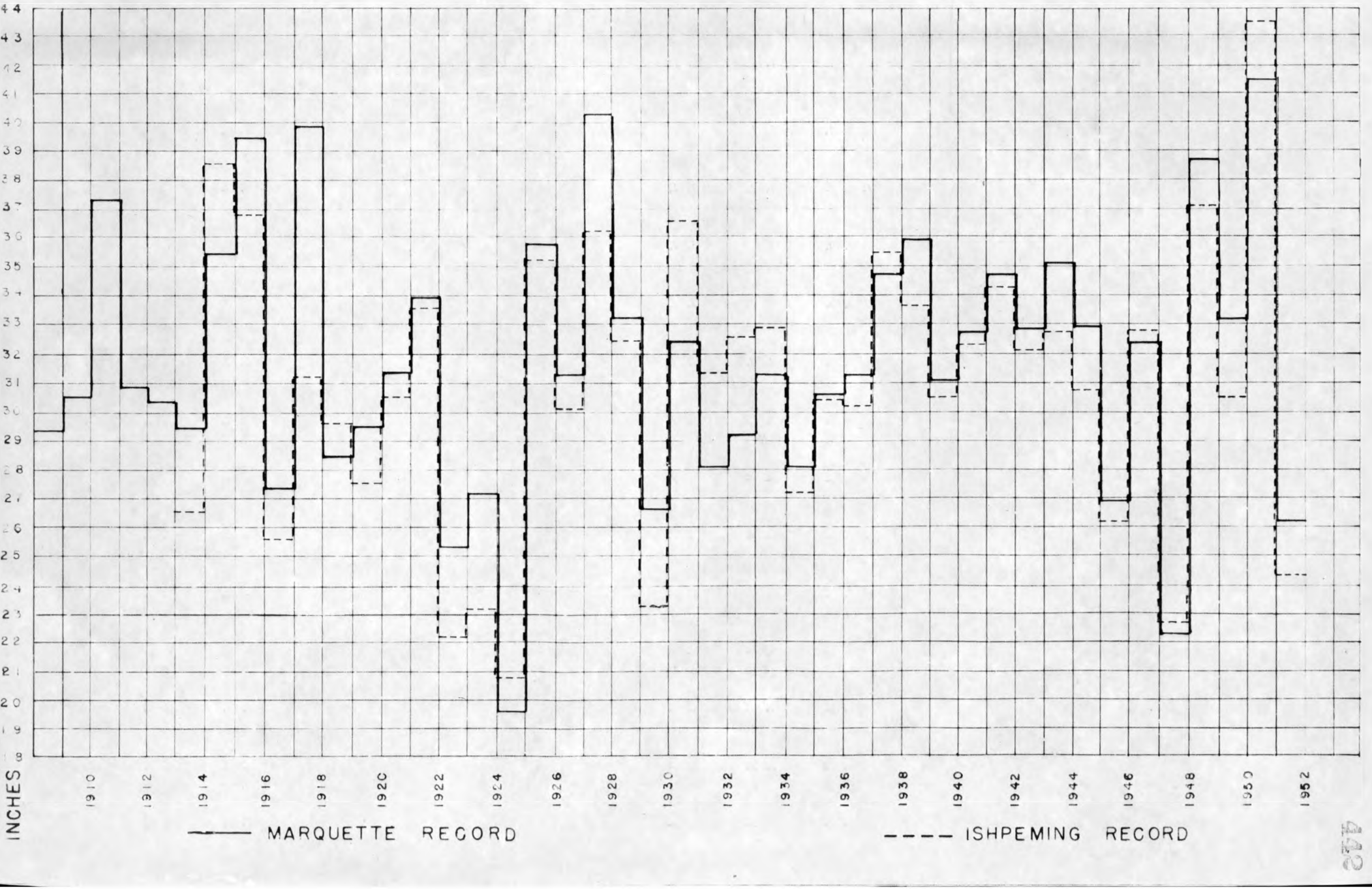
SUBSTATION TRANSFORMERS: (continued)

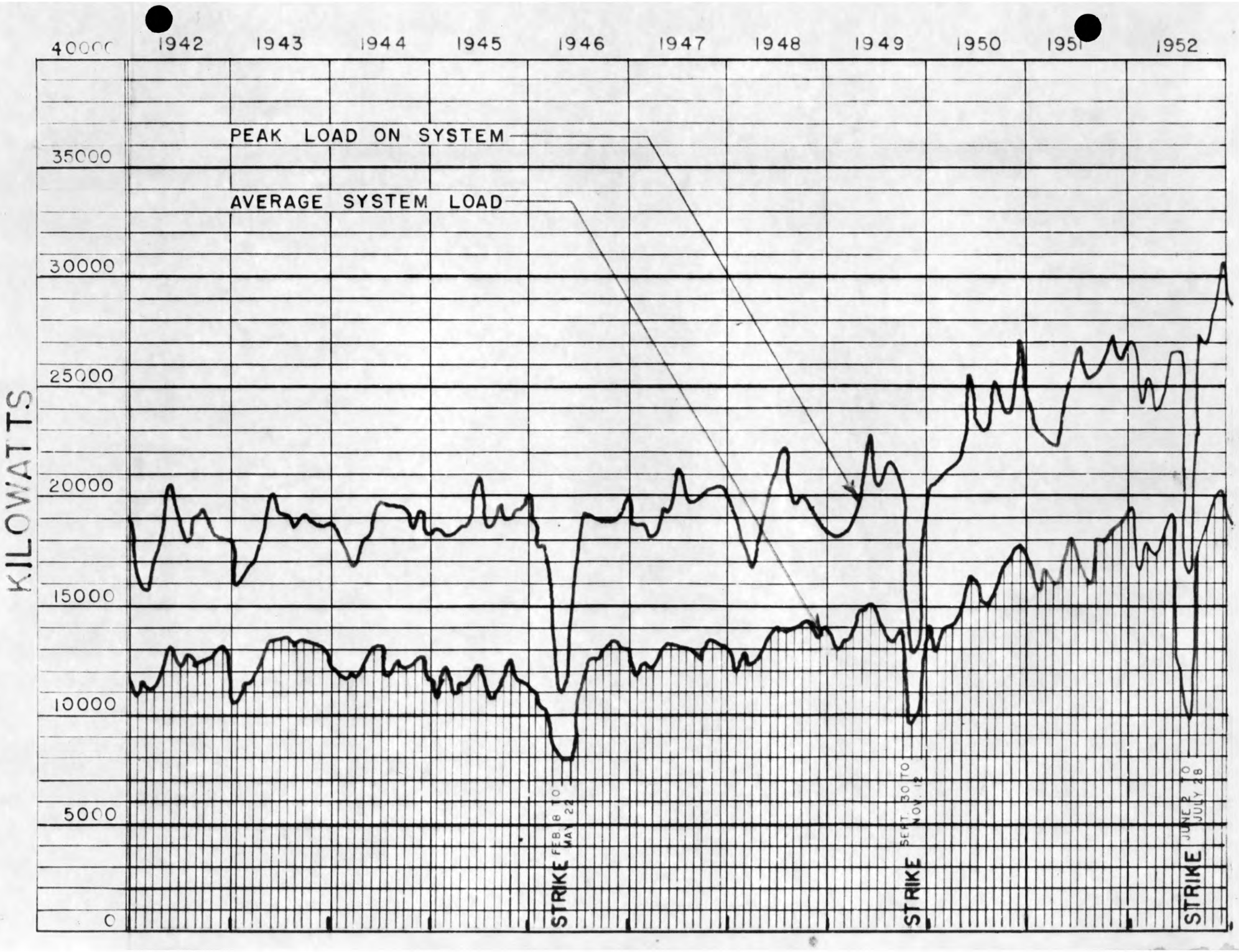
12,000/2300 Volts	Phase	No.	KVA	Total KVA	
Green School	1	1	15	15	
McClure Plant (Furnace Line)	3	1	1 250	1 250	
Inland #1 Substation	3	1	1 250	1 250	
AuTrain "	1	3	185	555	
Chatham "	1	3	185	555	
Eben "	1	1	25	25	
Rumley "	1	1	25	25	3,675 KVA
12,000/440 Volts					
Piqua Substation	1	3	500	1,500	1,500
6600/2300 Volts					
Rumley Substation	1	1	15	15	
Inland #1 "	1	2	75	150	
Blaney Park "	1	2	25	50	
" " "	1	1	15	15	
Sundell "	1	1	15	15	
Gwinn (old) "	1	1	100	100	
Little Lake "	1	1	50	50	
AuTrain Lake Substation	1	1	50	50	
Princeton "	1	1	50	50	495
6600/115-230 Volts					
Furnace Substation (Lighting)	1	1	1.5	1.5	1.5
2300/120-240 Volts					
C.C.I.Co. Research Lab. Sub.	1	3	50	150	150
				Grand Total . . .	96,114 KVA

DISTRIBUTION TRANSFORMERS:

	Number	KVA
Total at first of year	750	4600.5
Purchased	21	465
Installed	27	264
Sold	14	131
Total at close of year	757	4934.5
In stock at close of year	106	838.5
In service at close of year	613	3717
In service at plants and auxiliaries	38	379
	757	4934.5

PRECIPITATION BY YEARS

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PEAK LOAD ON SYSTEM
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35000
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20000
15000
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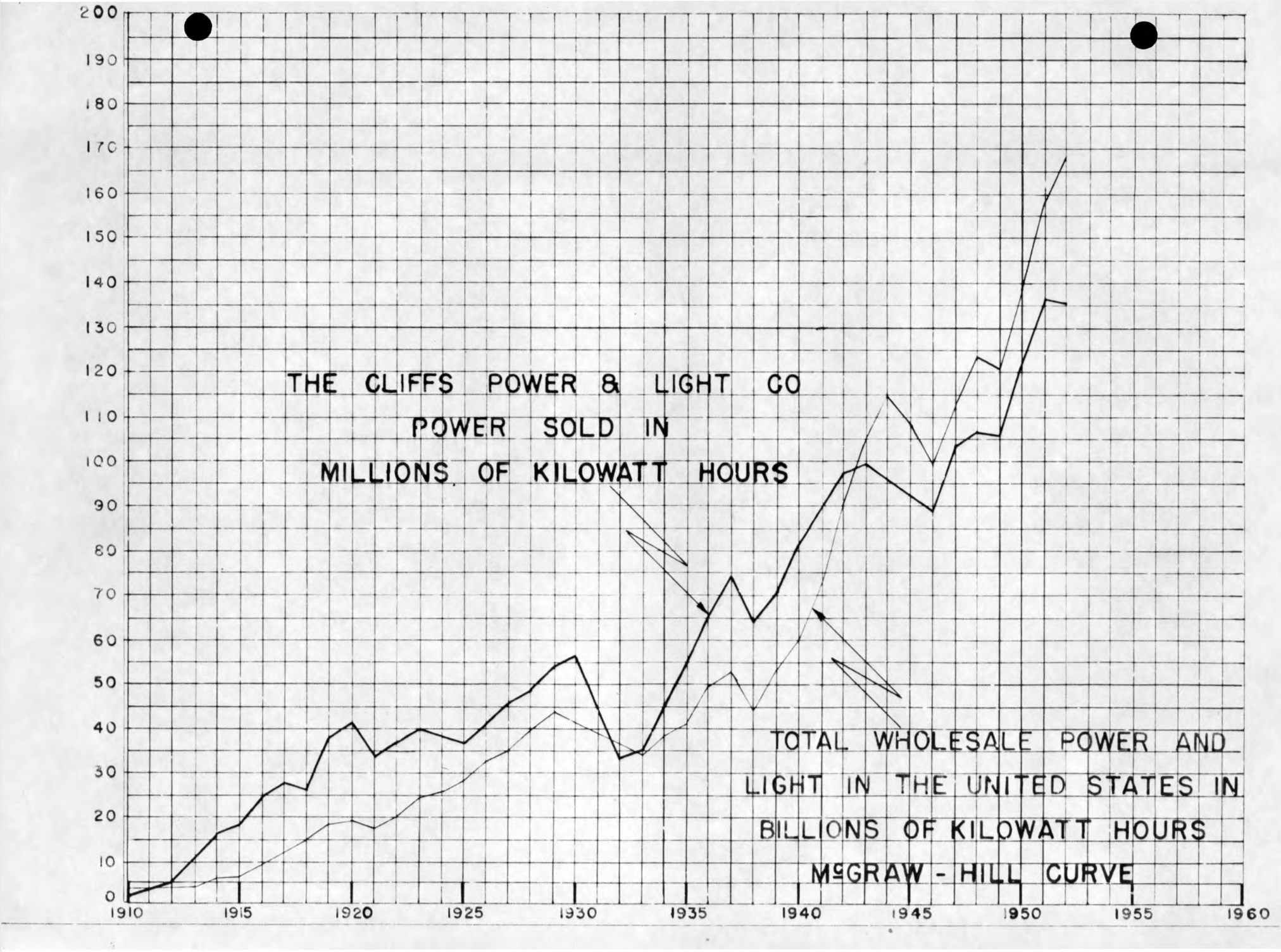
5000
0
KILOWATTS
STRIKE FEB. 8 TO MAY 22
STRIKE SEPT. 30 TO NOV. 12
STRIKE JUNE 2 TO JULY 28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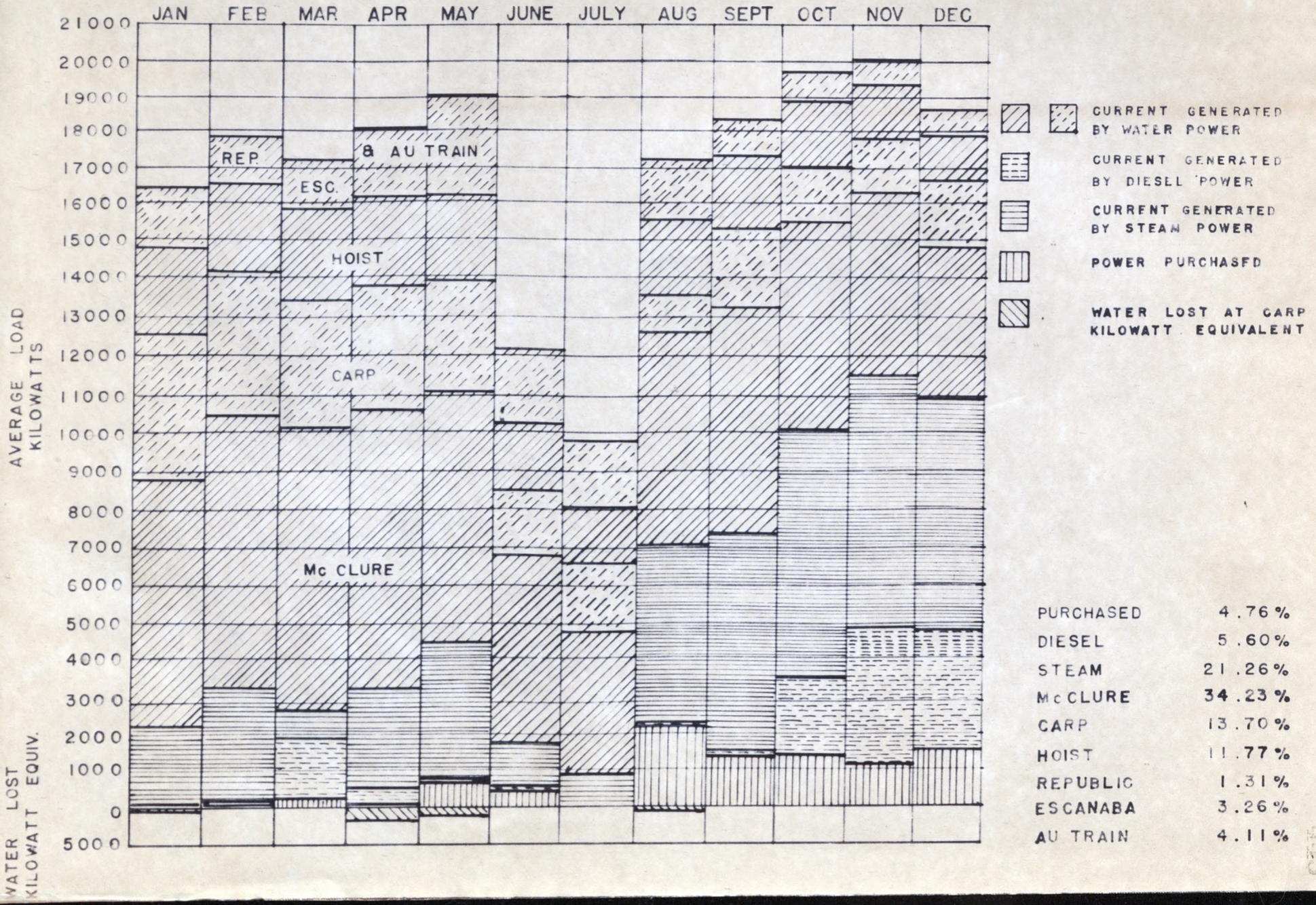
THE CLIFFS POWER & LIGHT CO
POWER SOLD IN
MILLIONS OF KILOWATT HOURS
TOTAL WHOLESALE POWER AND
LIGHT IN THE UNITED STATES IN
BILLIONS OF KILOWATT HOURS
McGRAW - HILL CURVE

1952



PURCHASED	4.76%
DIESEL	5.60%
STEAM	21.26%
McCLURE	34.23%
CARP	13.70%
HOIST	11.77%
REPUBLIC	1.31%
ESCANABA	3.26%
AU TRAIN	4.11%

WELFARE DEPT. ANNUAL REPORT YEAR 1952

The Welfare Department carried on its usual functions and activities during the Year 1952. These activities cover various programs including those associated with the welfare, the health, and the best interests of The Cleveland-Cliffs Iron Company's employees and matters which affect the general welfare of the entire community.

The program of this department includes matters associated with employee welfare and relief, workmen's compensation, group insurance, social welfare, pensions, safety, police and plant protection, publication of the "Cliffs News," matters involving public relations, and company-sponsored employee activities, and in a more general way, matters associated with the civic and community affairs and public health problems.

The Superintendent of the Welfare Department has also served until March 1952 as administrator of the Ishpeming Hospital. Since the Ishpeming Hospital has been taken over by the Ishpeming-Negaunee Hospital Association, Inc., this department no longer has any official connection with the hospital. We do, however, cooperate in every way possible to assist the new hospital association.

For the purpose of the record, it is here again stated that this department was formerly known as the Pension Department and for many years Mr. W. H. Moulton, who retired on July 1, 1938, headed the department with the title of Secretary. In July 1938, the name of the department was changed from the Pension Department to the Welfare Department and Mr. Walter F. Gries became the head of the department with the title of Superintendent. It has been previously recorded in these Annual Reports that because this department deals with various matters of Company interest that are of concern as far as the health, welfare, and happiness of our employees are concerned in this community, it is felt that the department has outgrown its present name and is not properly classified as a Welfare Department. The word "welfare" does not fully describe the various activities in which this department is engaged. Some of the activities formerly undertaken by this department are now assigned to the new Department of Industrial Relations under the direction of Mr. Ogden E. Johnson, Director.

This department works very closely with the Safety Department and we have had very excellent cooperation from the Safety Department under the leadership of Mr. A. J. Stromquist, Director. Undoubtedly, the continued cooperative efforts of the Welfare and Safety Departments have resulted in considerable benefit to the Company and its employees.

Mr. Walter E. Johnson, Compensation Agent, has been in charge of the Compensation Department since 1926. During 1952 his continued cooperation and his superior experience have again proved an invaluable asset to the entire department, to the Company, and to its employees. His extended loyal and faithful service and cooperation are greatly appreciated.

WELFARE DEPARTMENT

WELFARE DEPT. ANNUAL REPORT YEAR 1952

Mr. Lowell C. Holmgren continued his association with our department assuming all the detail work in connection with our group insurance program and our pension and other payrolls. His cooperation and his loyal service have meant a great deal to the proper functioning of this department.

Miss Marilyn A. Holmgren, who has acted as secretary to Mr. Walter E. Johnson of the Compensation Department until December 1952, has become the secretary to the Superintendent of the Welfare Department. Mrs. Shirley H. Ban, who served as secretary to the Superintendent of the Welfare Department, resigned in December and Miss Marilyn A. Holmgren was promoted to the position of secretary to the Superintendent of the Welfare Department. We express here our appreciation of the years of faithful service given by Mrs. Ban.

We also express our appreciation for the continued efficiency and cooperation of Miss Marilyn Holmgren who has been associated with the department for five years. Miss Holmgren, because of her past experience in the department, is well qualified to assume the position of secretary to the Superintendent. During the year Mrs. Lorelei V. Pascoe became associated with the department and assists in the various matters dealing with compensation and group insurance. Mrs. Pascoe has assumed the responsibilities of her work in a fine fashion. We also employed Miss Ann L. Sundblad, who formerly was employed at the hospital, for the insurance department. Miss Sundblad has had several years of experience and we are very fortunate in having her join the department because she is very familiar with the procedures dealing with all phases of the compensation work and the group insurance program.

We wish also to express our appreciation for the continued cooperation of Mr. Robert J. Veale, our Chief of Police, who works directly under the supervision of the Superintendent of the Welfare Department. Mr. Veale presently heads a staff of forty uniformed policemen and special deputy sheriffs. Mr. Veale contacts the head of this department daily and matters dealing with police supervision, plant protection, and related problems are discussed continually.

During the year, Mr. John S. Bowen, who came from the Cleveland Office to become associated with the Welfare Department, was transferred to the Industrial Relations Department as an assistant to Mr. Ogden E. Johnson, the Director.

The personnel of the Welfare Department is made up of the following:

Walter F. Gries, Superintendent
Walter E. Johnson, Compensation Agent
Lowell C. Holmgren, Assistant, Compensation and Group Insurance Division
Robert J. Veale, Chief of Police
Miss Marilyn A. Holmgren, Secretary to the Superintendent
Mrs. Lorelei V. Pascoe, Secretary, Compensation and Group Insurance Division
Miss Ann L. Sundblad, Secretary, Compensation and Group Insurance Division

WELFARE DEPT. ANNUAL REPORT YEAR 1952

11.

a. WORKMEN'S COMPENSATION

The direct work of the Compensation Department has been taken care of by Mr. Walter E. Johnson as has been the plan since 1926.

While there were a number of cases that required extra attention during the year most of them were largely routine. However, the following case was a little unusual.

ALEX POCHUCHA - SARGENT MINE

Mr. Pochucha was caught by a fall of ground while employed as a miner at the Sargent Mine on February 2, 1952. The miners had drilled three holes in the breast and were drilling the fourth and last hole before blasting when a large slab fell from the side and pinned him against a post. It was necessary to use a tugger to pull the slab away so that Mr. Pochucha could be released. He was immediately hospitalized at the Hibbing General Hospital where it was found that he had a severe fracture of the 11th and 12th dorsal vertebrae with paralysis of both legs from the hips down. An open reduction was performed by Dr. S. S. Houkom of the Duluth Clinic but the paralysis was not relieved and at the present writing there has been no change in the condition. He was hospitalized until July 2nd at the Hibbing Clinic and was then transferred to the Swedish Hospital at Minneapolis for further treatment and attempted rehabilitation. It was subsequently found that he had a fracture of the right femur, the treatment of which interferred with his rehabilitation, but towards the end of the year he was able to walk tripod fashion with the aid of braces and crutches. He will be kept at the Swedish Hospital until he becomes accustomed to the braces. This hospital is fairly well equipped to take care of cases of this kind up to a certain point. After that it will be necessary to remove him to some other institution--possibly the Bellevue Hospital in New York--where he will receive further rehabilitation physically and will also receive some training of an occupational nature. However, this will not transpire until sometime in 1953. The Minnesota law provides for unlimited medical treatment so undoubtedly this will be an expensive case from the medical standpoint. The problem here will be to fit this man for some occupation so that he will eventually become self-sustaining. The maximum compensation that he can receive is $ 18,000.00.

11.

a. WORKMEN'S COMPENSATION (Continued)

There were some changes in the Michigan Workmen's Compensation Law effective on September 18, 1952, the following being the more important ones:

Under the old law the minimum compensation for a man with no dependents was $ 11.00 and the maximum $ 24.00. This increased in $ 2.00 steps for each dependent up to five dependents at which point the minimum would be $ 21.00 per week and the maximum $ 34.00 per week. Under the present law the minimum is $ 14.00 and the maximum is $ 28.00 for a man without dependents and the increase in $ 2.00 steps gives us a minimum of $ 24.00 and a maximum of $ 38.00 for five dependents.

There was no change in the number of weeks provided for death benefits this remaining for 400 weeks, but the compensation rate was increased under the present law. One dependent would receive $ 28.00 per week and this would increase in $ 2.00 steps up to $ 36.00 per week for five dependents. This is an increase of $ 4.00 per week in each step over the previous law.

The allowance for burial expense was increased from $ 300.00 to $ 400.00.

Medical benefits in accident cases are payable for six months from the date of the injury with not more than three additional six-month periods at the discretion of the Commission. The law does not definitely state that the additional three six-month periods would necessarily date from the date of the injury, but there has never been a decision on this point. The present law provides that the commencement of suit against the third party is not a bar to the proceeding under the Workmen's Compensation Act. This is a radical change since up to September 18, 1952 the Michigan Law has always held that the commencement of a suit against a third party barred proceedings under the Workmen's Compensation Act.

11.

a. WORKMEN'S COMPENSATION (Continued)

Following is a list of the more serious cases other than fatalities which occurred in 1952:

Mine and Report No.	Name	Nature of Injury	Compensation Paid to 12-31-52
Athens 573	Geno J. Paris	Hematoma, right thigh. Nerve injury.	1,320.00*
Maas 748	Frank Bollero	Back injury.	550.00
Lloyd 914	Glen Robar	Fracture, both bones, left leg	915.00
Negaunee Shaft 3	Werner Manninen	Back injury and five fractured ribs, right side.	750.00
Mather "A" Shaft 179	Leslie Abramson	Contused back and right side.	1,054.00
Mather "A" Shaft 184	Albert Williams	Contused fracture, right femur.	1,144.00*
Mather "A" Shaft 193	Leo Johns	Dislocation and compound fracture of ankle.	1,306.67
Mather "A" Shaft 210	Graham Hopper	Fracture dislocation, cervical spine	224.00*
Spies 185	Wade Comish	Ruptured disc.	988.00*
Cliffs-Shaft Lab Sample Crusher 1	Charles Simons	Amputation, left hand.	224.00*
Cambria-Jackson 93	Emelio Gelmi	Fractures, upper and lower left arm.	1,428.00*
Mather "B" Shaft 37	Steve Schuster	Amputation, one-half, right thumb.	980.00
Mather "B" Shaft 43	Heimo Laitinen	Fracture, crest of right pelvis. Bruised bladder.	728.00
Agnew 34	Lyle Bloom	Compound fracture, right leg.	800.00
Hawkins 21	Herbert Lance	Burns, right leg and buttocks.	876.80
Hawkins 24	Waino Raki	Fracture, right knee.	1,489.28*
Sargent 36	Alex Pochucha	Paralysis, both legs.	1,472.00*

*Payments still being made.

WELFARE DEPT. ANNUAL REPORT YEAR 1952

11.

a. WORKMEN'S COMPENSATION (Continued)

Settlements on a partial disability basis were made in the following cases during 1952.

Joseph Minerich	Agnew Mine	10% permanent disability left ankle	528.00
Anton Cerkvenik	Atkins Mine	5% permanent disability right hand	300.00
LeRoy Foix	Canisteo Mine	10% permanent disability right hand	624.00
Waino Raki	Hawkins Mine	35% permanent disability right leg	2464.00
Ervin Bockhoven	Hawkins Mine	40% permanent disability left thumb	832.00
Franz E. Johnson	Hill-Trumbull Mine	50% permanent disability left ring finger 10% permanent disability right leg	1280.00
Nick Rapich	Hill-Trumbull Mine	10% permanent disability of back 30% permanent disability left arm	2700.00
Morton Mortensen	Hill-Trumbull Mine	5% permanent disability right thumb	90.00
George A. Howg	Hill-Trumbull Mine	10% permanent disability left ring finger	60.00
Paul Finckbone	Holman-Cliffs Mine	20% permanent disability right little finger 4% permanent disability right ring finger	114.00
Steve Furlong	Holman-Cliffs Mine	50% loss of right eye	2270.23
Peter N. Dimich	Holman-Cliffs Mine	35% permanent disability left index finger	480.00
Lee Jackson	Sargent Mine	35% permanent disability right thumb	630.00
Matt Gregorich	Sargent Mine	Loss of right index finger	1280.00
Ernest Glavich	Wanless Mine	5% permanent disability left foot	225.00

WELFARE DEPARTMENT

WELFARE DEPT. ANNUAL REPORT YEAR 1952

11.

a. WORKMEN'S COMPENSATION (Continued)

FATALITIES

The following fatalities occurred in 1952:

LOUIS TERZAGHI
Age 65

Athens Mine
Occurred January 29, 1952
The air line had been punctured by a blast interferring with the operation of the ventilation door. Mr. Terzaghi and his partner tried to open the door by fastening a chain between the door and the motor, attempting to pull it open. They managed to open it partially. Mr. Terzaghi stepped into the opening trying to pass through when the chain slipped off and the pressure caught him between the door and the doorjamb.
Died on January 29, 1952
Dependents - none

Redemption of Liability as per order of Workmen's Compensation Commission, dated October 30, 1952	$ 1,410.00
Compensation at $ 3.00 per week	90.00
Funeral expense	300.00
	$ 1,800.00

FRANK TOMCZAK
Age 50

Hawkins Mine
Occurred February 28, 1952
Steel workers were moving a fabricated steel bent with a mobile crane. Mr. Tomczak was in the act of trying to steady the bent with his right hand when the boom of the mobile crane came in contact with a high power line carrying 22,000 volts and he was electrocuted.
Died on February 28, 1952
Dependents - wife and daughter

Compensation at $ 32.00 per week	$ 10,000.00
Funeral expense	350.00
	$ 10,350.00

VITO ROTI
Age 57

Mather Mine "A" Shaft
Occurred April 1, 1952
Mr. Roti had been barring a mill raise, trying to dislodge a large chunk that prevented the flow of ore. He could not get the chunk down by barring so was leaning into the mouth of the raise while placing a dynamite charge in position to blast the chunk. As he was doing this, the chunk started to move and it is thought that he slipped in when trying to get out of the way and was caught by the moving chunk.
Died on April 1, 1952
Dependents - wife

Compensation at $ 24.00 per week	$ 9,600.00
Funeral expense	300.00
	$ 9,900.00

WELFARE DEPT. ANNUAL REPORT YEAR 1952

11.

a. WORKMEN'S COMPENSATION (Continued)

FATALITIES (Continued)

WILLIAM COPLEY
Age 26

Maas Mine
Occurred April 2, 1952
While loading a car with ore at the chute, a rush of dirt prevented chuteman from closing the chute resulting in overloading of the car and considerable spillage. The motor was moving the car to a siding to make room for an empty car to be loaded with the spilled ore. Mr. Copley had thrown the switch to the siding and was standing at the side of the track. As the loaded car passed him, the cage opened dumping the contents of the car on him.
Died on April 2, 1952
Dependents - wife and son

Compensation at $ 26.00 per week	$ 10,400.00
Funeral expense	300.00
	$ 10,700.00

ARVO SIPPOLA
Age 26

Mather Mine "A" Shaft
Occurred October 13, 1952
When Mr. Sippola had finished loading a cut of rock, he ran the loader towards the breast and the right front wheel went over the end of the slide rail and the dipper caught in the right side of the breast. This caused the loader to tip and Mr. Sippola was pinned between the skirt of the loader and a sprag which was between the legs of two steel sets along the right rib of the drift, approximately shoulder height to the operator.
Died on October 13, 1952
Dependents - wife and two daughters

Compensation at $ 32.00 per week	$ 12,800.00
Funeral expense	400.00
	$ 13,200.00

11.

a. WORKMEN'S COMPENSATION (Continued)

Compensation Payments including Medical and Special Expense

Year	C.C.I. Co.	Negaunee Mine Co.	Athens Ir. Mng. Co.	Cliffs Pr. & Light Co.	Mesaba-Cl. Mng. Co.	CCI Co. Opt. Agt. Atkins	Humboldt Mng. Co.	Miscellaneous Companies	TOTAL
1912 to 1942	1,411,995.09	225,216.12	150,812.38	17,950.67	100,753.75			10,282.71	1,927,010.72
1943	53,607.70	17,270.60	8,993.40	1,715.25	9,337.43				90,924.38
1944	66,219.66	21,147.85	11,489.34	1,594.75	6,325.95				106,777.55
1945	85,558.58	32,400.22	7,152.70	1,468.50	5,630.00				132,210.00
1946	84,009.42	25,391.20	5,373.63	1,528.50	7,693.03	174.50			124,170.28
1947	76,355.69	28,582.02	14,540.71	1,153.75	9,186.43	1,353.77			131,172.37
1948	73,727.12	28,162.82	8,548.15	687.00	9,083.73	824.57			121,033.39
1949	96,910.98	37,433.06	15,401.72	916.50	9,356.57	1,248.75			161,267.58
1950	87,512.40	35,352.22	12,815.81	740.00	10,757.22	3,522.62			150,700.27
1951	111,447.53	45,102.62	10,814.25	734.50	13,757.87	1,286.55			183,143.32
1952	125,226.20	51,320.60	13,005.82	1,187.22	20,234.46	1,159.70	56.40		212,190.40
	2,282,570.37	547,379.33	258,947.91	29,676.64	202,116.44	9,570.46	56.40	10,282.71	3,340,600.26

Detail of Miscellaneous Companies:

Holman-Cliffs Mining Company	2,131.39
Canisteo-Cliffs Mining Company	2,768.69
Alexandria Mine	5,382.63
	10,282.71

WELFARE DEPARTMENT

ANNUAL REPORT - 1952
STATEMENT OF COMPENSATION PAYMENTS FROM
JANUARY 1, 1952 TO DECEMBER 31, 1952

	Average No. of Employees	No. of Fatal Accs.	No. of Non-Fatal Accidents			Actual Comp. Paid in 1952	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	Estimated Compensation Still Pending	Medical & Special Expense	Cases Pending		
																				Fatal	Acc.	O.D.
Cambria-Jackson	247		3	12	27	7,734.00		1,134.00				1,458.00	1,204.00	1,092.00	1,248.00		1,598.00	15,779.50	3,356.85	3	2	1
Cliffs-Shaft	496		11	20	63	16,411.33		648.00		1,134.00		1,092.00	91.00		8,754.00	3,392.66	1,299.67	7,396.00	4,787.26	1	4	1
General Storehouse	235		1	3	42														1,886.75			
Ishpeming Office	267																		1,923.60			
Lloyd	123		3	7	20	7,969.83			1,302.00				2,719.50		345.00	2,470.00	1,133.33	11,831.50	903.85	1	2	1
Maas	400	1	17	24	79	12,224.67				1,456.00		2,338.00		2,332.00	2,416.00	604.00	3,078.67	31,957.50	3,947.67	5	2	2
Negaunee Shaft E & A cc345	98		7	5	28	2,905.34										816.00	2,089.34	180.00	1,658.88		1	
Ohio	59		1	2	11														473.10			
Princeton						987.84				987.84								769.82			1	
Spies	93		5	3	9	7,658.50					66.50		3,500.00			2,444.00	1,648.00	4,720.00	3,034.95		2	1
Tilden	9																		63.00			
Cleveland Roll	35																		249.75			
Research Laboratory						5.00									5.00				530.50			
Cliffs-Shaft Lab Sample Crusher			1			224.00											224.00	5,376.00	664.00		1	
Miscellaneous	36			2	14														256.65			
Cliffs Power & Light Company	84		3		6	574.67											574.67		612.55			
Negaunee						10,628.00		1,548.00		1,134.00	1,092.00		3,276.00	2,226.00	1,352.00			11,084.00			5	5
Mather Mine "A" Shaft	730	2	15	45	202	20,828.95						2,583.28	988.00		1,352.00	4,807.00	11,098.67	44,148.00	6,900.71	4	12	
Mather Mine "B" Shaft	560		22	51	156	8,652.29							1,242.00		1,385.97	712.33	5,311.99	11,196.00	4,310.65	2	1	
Athens Iron Mining Company	342	1	17	19	87	8,954.33	25.67				1,047.00			1,404.00		1,478.66	4,999.00	2,402.00	4,051.49		2	1
Humboldt Mining Company	16				3														56.40			
Total - Michigan Mines	3,830	4	106	193	747	105,758.75	25.67	3,330.00	1,302.00	4,711.84	2,205.50	7,471.28	13,020.50	7,054.00	16,857.97	16,724.65	33,055.34	146,840.32	39,668.61	16	35	12
Hibbing Office	74																		666.00			
Miscellaneous - Hibbing	42			1	2														375.75			
Agnew	122		5	8	61	3,819.80							53.22		995.00	1,923.58	848.00	448.00	1,230.30		2	
Canisteo	177		4	6	57	4,122.42									1,560.00	1,870.15	692.27	397.50	2,354.81		1	
Hawkins	279	1	9	11	87	7,982.57										3,411.66	4,570.91	10,442.67	3,225.26	1	2	
Hill-Trumbull	188		2	10	47	5,875.53							1,485.00		3,460.20	143.13	787.20	384.00	2,564.73		1	
Holman-Cliffs	155		6		51	7,056.82			584.37		1,296.00					4,085.89	1,090.56	2,250.40	4,071.38		2	
Sargent	110		4	9	50	6,399.04									2,319.64	642.60	3,436.80	24,096.80	14,997.18	1	3	
Wanless	44			1	12	459.00									459.00				402.75			
Atkins						1,132.20								826.20	306.00				27.50			
Total - Minnesota Mines	1,191	1	30	46	367	36,847.38			584.37		1,296.00		1,538.22	826.20	9,099.84	12,077.01	11,425.74	38,019.37	29,915.66	2	11	
Total - All Mines	5,021	5	136	239	1,114	142,606.13	25.67	3,330.00	1,886.37	4,711.84	3,501.50	7,471.28	14,558.72	7,880.20	25,957.81	28,801.66	44,481.08	184,859.69	69,584.27	18	46	12

WELFARE DEPT. ANNUAL REPORT YEAR 1952

11.

a. WORKMEN'S COMPENSATION (Continued)

ANNUAL STATEMENT OF COMPENSATION PAYMENTS
FROM JANUARY 1st, 1952 to DECEMBER 31st, 1952

Compensation paid on 1952 cases	44,481.08	
Estimated compensation still pending	184,859.69	
Cost of medical and hospital service and special expenses	69,584.27	
		298,925.04
Less pending for years 1943 to 1951 inclusive	113,702.89	
Less medical and special expense on accidents occurring prior to January 1, 1952	9,898.03	
		123,600.92
		175,324.12
Less compensation paid on 1952 occupational disease cases		1,011.66
Estimated cost of 1952 accidents		174,312.46
Percentage of payrolls on accidents		.0084
Percentage of payrolls including Occupational Disease cases		.0085
Number of fatal accidents		5
Number of compensable accidents		136
Number of lost-time accidents -non-compensable		239
Number of slight accidents		1,114

The following occupational disease cases occurred during 1952. The cost of these cases is included in the regular compensation costs, but for statistical purposes they are not included in the accident table.

Number of deaths	0
Number of disability cases	5

During 1952 a total of $ 17,523.16 was paid on occupational disease cases, and it is estimated it will cost $ 22,925.50 to complete payments on the twelve cases still active on December 31, 1952. Of these, four originated in 1948, four in 1949, three in 1950, and one in 1951.

WELFARE DEPARTMENT

11.

c. GROUP INSURANCE (Continued)

The following statement shows the amount of claims paid under the group insurance and hospitalization plan during the policy year from March 1, 1952 to February 28, 1953.

	Hospitalization	Health & Accident	Death Claims	Total
Cambria-Jackson	9,090.94	2,333.72	7,500.00	18,924.66
Cliffs-Shaft	26,899.89	12,595.42	2,500.00	41,995.31
Cleveland Roll	1,591.20	480.00		2,071.20
General Roll	9,345.87	3,741.72	7,500.00	20,587.59
General Storehouse	12,109.64	5,218.87	12,500.00	29,828.51
Ishpeming Hospital	797.16	742.86		1,540.02
Inactive			24,250.00	24,250.00
Lloyd	6,968.16	3,027.43		9,995.59
Maas	19,906.40	8,815.74	10,000.00	38,722.14
Miscellaneous	3,244.36	954.29		4,198.65
Negaunee Shaft	6,525.02	2,077.71	7,500.00	16,102.73
Ohio	3,402.53	120.00		3,522.53
Spies	3,652.38	971.71	7,500.00	12,124.09
Tilden	358.50			358.50
Total - C. C. I. Co.	103,892.05	41,079.47	79,250.00	224,221.52
Mather Mine "A" Shaft	40,109.12	16,404.01	21,250.00	77,763.13
Mather Mine "B" Shaft	27,853.86	7,799.44	5,000.00	40,653.30
Total - Negaunee Mine Co.	67,962.98	24,203.45	26,250.00	118,416.43
Athens Iron Mining Co.	15,377.31	6,892.60	2,500.00	24,769.91
Cliffs Power & Light Co.	3,008.06	225.42		3,233.48
Humboldt Mining Co.	377.50	475.72		853.22
TOTAL-MICHIGAN DISTRICT	190,617.90	72,876.66	108,000.00	371,494.56
Bargaining Unit	169,537.27	64,329.24	92,250.00	326,116.51
Salaried & Non Bargaining Unit	21,080.63	8,547.42	15,750.00	45,378.05
	190,617.90	72,876.66	108,000.00	371,494.56
Number of Claims				
Bargaining Unit	1,673.	398	39	2,110
Salaried & Non Bargaining Unit	226	65	6	297
	1,899	463	45	2,407

WELFARE DEPARTMENT

11.

c. GROUP INSURANCE (Continued)

The following death claims were paid during the period from March 1, 1952 through February 28, 1953:

Name	Mine	Date of Death	Amount of Insurance
Charles R. Renfree	Athens Mine	8-13-52	2500.00
Armidas Hart	Cliffs-Shaft Mine	1-18-53	2500.00
Carlo Beltrame	Cambria-Jackson Mine	5-14-52	2500.00
Ole Olson	Cambria-Jackson	9-30-52	5000.00
Florence Hanna	General Payroll	10-18-52	2500.00
William P. Cromwell	General Payroll	11-16-52	5000.00
James P. Kenney	General Storehouse	3-22-52	2500.00
Arne W. Parkkonen	General Storehouse	5-5-52	5000.00
James P. Beer	General Storehouse	12-31-52	2500.00
William Harvey	General Storehouse	1-10-53	2500.00
William R. Copley	Maas Mine	4-2-52	2500.00
Alex Talo	Maas Mine	5-30-52	5000.00
Adolph Laitinen	Maas Mine	7-10-52	2500.00
Vito Roti	Mather Mine "A" Shaft	4-1-52	6250.00
William M. Kyrola	Mather Mine "A" Shaft	8-7-52	2500.00
Harold Salmer, Sr.	Mather Mine "A" Shaft	9-29-52	2500.00
Arvo Sippola	Mather Mine "A" Shaft	10-13-52	2500.00
John Bond	Mather Mine "A" Shaft	12-1-52	5000.00
Edward J. LaForge	Mather Mine "A" Shaft	2-9-53	2500.00
John H. Parkkonen	Mather Mine "B" Shaft	11-9-52	2500.00
Dominic M. Cavallo	Mather Mine "B" Shaft	11-21-52	2500.00
William J. Uren	Negaunee Shaft	5-12-52	2500.00
William Waters	Negaunee Shaft	11-17-52	5000.00
Edward J. Pidgeon	Spies Mine	2-13-52	2500.00
John J. Wojner	Spies Mine	6-5-52	5000.00
John Niemisto	Inactive	2-14-52	1875.00
John G. Wuorenmaa	Inactive	2-25-52	750.00
Nick Reichel	Inactive	3-18-52	500.00
Matthew B. Richards	Inactive	5-28-52	500.00
Isaac Tuuri	Inactive	7-22-52	1250.00
Thomas Hosking	Inactive	7-20-52	750.00
John Peel	Inactive	7-7-52	5000.00
John Tremayne	Inactive	8-3-52	1250.00
Samuel Haines	Inactive	8-14-52	750.00
Michael McNamara	Inactive	8-24-52	750.00
John R. Jones	Inactive	9-19-52	1250.00
Joseph Bollero, Sr.	Inactive	9-10-52	500.00
John H. Kermode	Inactive	11-22-52	500.00
William St. Onge	Inactive	11-29-52	2500.00
William J. Roberts, Sr.	Inactive	12-9-52	750.00
Joseph Marra	Inactive	12-3-52	1250.00
Abraham Lahtinen	Inactive	12-15-52	750.00
John Francis	Inactive	12-24-52	1250.00
Sam Stephens	Inactive	1-16-53	500.00
Nestor Mattila	Inactive	2-1-53	1250.00

WELFARE DEPARTMENT

11.

c. GROUP INSURANCE

A group life, disability, hospitalization and surgical fee insurance plan with the Aetna Life Insurance Company of Hartford, Connectucut under group policies 14,440, GS-14,440, and H-14,440 continued in force during the year. This plan originated on September 1, 1947, was liberalized on March 1, 1950 and was again changed on June 1st of this year. For the details of the plan prior to this year reference is made to the Annual Reports of 1947 and 1950. On June 1, 1952 the following changes in benefits under the plan became effective:

1. Weekly Sickness and Accident Benefits increased from $26.00 to $30.00.
2. Daily Hospital Benefit increased from $6.00 to $7.50 for employees and from $5.00 to $6.50 for dependents.
3. Reimbursement for Miscellaneous Hospital Charges increased from a maximum of $60.00 to a maximum of $75.00 for employees and from a maximum of $50.00 to a maximum of $65.00 for dependents.
4. Reimbursement for surgical fees according to new Surgical Fee Benefit schedule with a maximum of $200.00 for both employees and dependents whereas the maximum under the old schedule was $150.00.

These changes were provided with no increase in premium cost to the employee.

Reference is made to the Annual Reports of 1936 and 1937 for a description of the Company's first group insurance plan which included only group life and disability insurance.

On March 1, 1950 a separation between bargaining unit and non-bargaining unit employees was made in both premium computation and payment of claims. Two sets of premium rates are used because of this separation in the computation of total premium cost. The rates for the policy year from 3/1/1952 through 2/28/1953 follow. It will be noted that the increase in benefits on June 1st resulted in a change in premium rates.

		From 3/1/52 thru 5/31/52	From 6/1/52 thru 2/28/53
Bargaining Units:			
Life	- Per month per $1,000	1.39	1.25
Disability	- Per month per $1.00	.088	.088
Hospitalization Insurance:			
Employee Daily Hosp. Benefit	- Per month per $1.00	.17	.17
Employee Surgical Fee Benefit	- Per month per employee	.36	.45
Dependent Daily Hosp. Benefit	- Per month per $1.00	.374	.374
Dependent Surgical Fee Benefit	- Per month per employee	1.50	1.66
Non-Bargaining Units:			
Life	- Per month per $1,000	1.84	1.71
Disability	- Per month per $1.00	.088	.088
Hospitalization Insurance:			
Same as for Bargaining Units			

WELFARE DEPARTMENT

11.

c. GROUP INSURANCE (Continued)

The following table shows a tabulation from the group insurance premium statements prepared by this office of the total premium cost by unit of our group insurance plan for the policy year from March 1, 1952 through February 28, 1953:

Unit	Premium Cost Bargaining Units	Non-Bargaining Units
Cambria-Jackson	29,120.17	3,040.44
Cliffs-Shaft	62,282.67	5,420.09
General Storehouse & Shops	25,847.94	1,202.61
General Payroll - Ishpeming Office	-	44,511.28
" - Ishpeming Hospital	-	383.50
Ishpeming Office Inactive	4,683.43	1,802.79
Lloyd	15,314.82	1,767.66
Maas	52,311.97	3,709.45
Misc. Payroll - C. S. Lab.	3,971.00	-
" - Ishpeming Hospital	-	240.45
Negaunee Shaft	13,155.92	1,642.86
Ohio	6,298.70	467.03
Spies	13,764.24	1,724.44
Tilden	468.77	483.85
C. C. I. Co. - Plan of 9/1/1947	121.55	-
" - " 3/1/1950	730.26	80.73
Mather Mine "A" Shaft	87,237.77	9,630.07
Mather Mine "B" Shaft	62,907.19	6,577.78
Negaunee Mine Co. - Plan of 9/1/1947	151.00	-
Negaunee Mine Co. - Plan of 3/1/1950	642.63	15.59
Athens	42,348.28	4,203.02
Ath. Iron Mng. Co. - Plan of 3/1/1950	228.86	-
C. P. & L. Co.	6,939.69	1,479.86
Humboldt	1,201.06	-
TOTALS	429,727.92	88,383.50

WELFARE DEPARTMENT

23.

a. PENSION SYSTEM (Continued)

Retirement Payrolls

The purpose of the Retirement Payrolls was to provide retirement to employees of 65 years or over under Social Security benefits. This program began on March 16, 1939 and continued as the major Company retirement plan through February 1950 when the Pension Plan of 3/1/1950 took effect. This latter plan all but eliminated additions to the Retirement Payrolls, and any additions now are in the nature of special or unusual cases.

Through the Retirement Payrolls it was the original policy of the Company to supplement an employee's Social Security benefit by $10.00 per month. Beginning with July 1948 all retirement allowances were increased by $10.00 per month, so that the usual allowance became $20.00 per month. As in the past our retired employees continued to carry fifty percent of their group life insurance and since March 1, 1950 this has been done without premium cost to them.

The following two men were added to the Mining Department Retirement Payroll during 1952:

William A. Mudge - General Payroll-Ishpeming Hospital - Eff. 3/1/52--$150.00
Andrew Nocenti - Cambria-Jackson-Transf. from Donation Payroll - Eff. 4/1/52--$20.00

Twelve deaths were recorded on the Mining Department Retirement Payroll during 1952 and one retired employee was transferred from the Retirement Payroll to other pension status.

Axel Hendrickson	Died	1/29/1952
Simon Luoma		1/11/1952
Nick Reichel		3/18/1952
Matthew B. Richards		5/28/1952
Thomas Hosking		7/20/1952
Michael McNamara		8/24/1952
Samuel Haines		8/14/1952
John Tremayne		8/ 3/1952
Joseph Bollero		9/10/1952
John H. Kermode		11/22/1952
Abram Lahtinen		12/15/1952
William J. Roberts, Sr.		12/9/1952
William A. Mudge	Transferred to Other Pension Status	

Canisteo		
John D. Murray	Died	11/9/1952

WELFARE DEPARTMENT

23.

a. PENSION SYSTEMS (Continued)

Retirement Payrolls (Cont'd)

This office continued to handle payments by Retirement Payroll to retired employees of our Minnesota properties. Two payrolls are prepared, one for the Canisteo Mine and the other for the Mesaba-Cliffs Mining Company.

The only change on the Canisteo Mine Retirement Payroll during the year was the death of John D. Murray on November 9, 1952.

There were no changes to the Mesaba-Cliffs Mining Company Retirement Payroll during the year.

A resume of the 1952 Retirement Payrolls follows:

Number of Mining Department Retired Employees 12/31/1951	173
Number of Mining Department Retired Employees 12/31/1952	162
Total Expenditure to above employees for year 1952	45,443.84
Number of Canisteo Mine Retired Employees 12/31/1951	6
Number of Canisteo Mine Retired Employees 12/31/1952	5
Total Expenditure to above employees for year 1952	1,400.00
Number of Mesaba Cliffs Mng. Co. Retired Employees 12/31/1951	22
Number of Mesaba Cliffs Mng. Co. Retired Employees 12/31/1952	22
Total Expenditure to above employees for year 1952	5,280.00
Total Number of Retired Employees 12/31/1951	201
Total Number of Retired Employees 12/31/1952	189
Total Expenditure to retired employees for year 1952	52,123.84

WELFARE DEPARTMENT

23.

a. PENSION SYSTEM

The pension system which went into effect on January 1, 1909 completed the forty-fourth year of its operation in 1952.

No changes in the rates of pensions were made during the year. On January 1, 1933 the pension payments were reduced fifty per cent, those under $20.00 remaining the same and those over $20.00 having a minimum rate of $20.00. There have been no additions to the pension rolls since January 1, 1932.

There were two deaths on the Mining Department pension payroll during the year.

No.	Name	Pension Began	Date of Death
229	John Lindquist	1/1/1928	8/29/1952
110	Leon Decaire	4/1/1921	11/18/1952

Number of deaths during year 1952	2
Number of pensions in force 1/1/1952	5
Number of pensions in force 12/31/1952	3

Average annual pension for 1952	$215.20
Average annual pension for 1951	$179.85

The Holmes Mine pension payroll became inactive in April 1949 and will remain inactive.

The total expenditure over the Mining Department pension payroll for 1952 was $1,076.00.

23.

a. PENSION SYSTEM (Continued)

The table below shows pension payments for the Mining Department and Holmes Mine Department combined for the years 1908 through 1952. The Holmes Mine pension payroll became inactive with the death of its last pensioner on April 23, 1949.

Year	Old Age	Widows and Orphans	Total
1908 thru 1941	754,251.33	22,547.00	776,798.33
1942	11,632.15	0.00	11,632.15
1943	10,246.66	0.00	10,246.66
1944	8,485.25	0.00	8,485.25
1945	7,446.32	0.00	7,446.32
1946	5,648.60	0.00	5,648.60
1947	4,156.68	0.00	4,156.68
1948	3,840.68	0.00	3,840.68
1949	3,260.68	0.00	3,260.68
1950	2,400.68	0.00	2,400.68
1951	1,438.78	0.00	1,438.78
1952	1,076.00	0.00	1,076.00
	813,883.81	22,547.00	836,430.81

Includes payment of $2,500.00 made by the Cleveland office in 1930.

Republic Mine Department

Mr. Frank Vierela was the only pensioner on this payroll for the year, and he was paid a total of $240.00.

The table below shows the pension payments made over this roll for the years 1920 through 1952.

Year	Amount
1920 thru 1941	141,759.84
1942	1,488.00
1943	1,285.00
1944	995.04
1945	995.04
1946	856.04
1947	715.04
1948	515.04
1949	240.00
1950	240.00
1951	240.00
1952	240.00
	149,569.04

WELFARE DEPARTMENT

23.
a. PENSION SYSTEM (Continued)

Land Department

Mr. Erick Johnson remained the only pensioner on this payroll during the year. He was paid a total of $240.00.

The table below shows the pension payments made over this roll for the years from 1927 through 1952.

Year	Amount
1927 thru 1941	4,076.88
1942	240.00
1943	240.00
1944	240.00
1945	240.00
1946	240.00
1947	240.00
1948	240.00
1949	240.00
1950	240.00
1951	240.00
1952	240.00
	6,716.88

Furnace Department

This payroll became inactive in 1948. During the years when it was active - 1910 through 1948 - a total of $66,155.22 was expended over the roll.

23.

a. PENSION SYSTEMS (Continued)

Pension Plan of 3/1/1950

The Pension Plan of 3/1/1950 continued in force during the year without change. As in the past this Department has handled the initial processing of pension applications, referring them to the Pension Committee in Cleveland for final action. Details of the Plan may be found in the Annual Report for 1950.

Since federal Social Security benefits are an inseparable part of the Plan, it is here noted that a new formula for the computation of Social Security benefits went into effect June 1, 1952 as a result of the 1950 amendments to the Social Security Act. The new formula - fifty per cent of the first $100.00 of the average monthly wage plus 15 per cent of the remainder to a maximum of $200.00 - produces a higher Social Security benefit and is applicable only to those men retiring after 6/1/1952 and having the necessary quarters of coverage. The maximum benefit under this new formula is $80.00. A further amendment to the Act resulted in the following formula effective September 1, 1952: 55 per cent of the first $100.00 of average monthly wage plus 15 per cent of remainder to a maximum of $200.00. This formula produces a maximum benefit of $85.00. All Social Security benefits were increased on September 1, 1952 with net pensions as paid by the Company being reduced correspondingly. The increase amounted to a flat five dollars for those men who retired after June 1, 1952. For those men who retired prior to June 1, 1952 it amounted to 12 1/2 per cent or five dollars whichever was greater. All of our pensions were, of course, reviewed in the light of this increase.

During 1952 the following age pensions were granted:

Name	Mine	Eff. Date	Gross Pens.	Net Pension Orig.	Net Pension 9/1/52
Iver J. Hongisto	Canisteo	1/1/1952	62.68	4.00	0.00
John Savala	Cambria-Jackson	"	73.68	11.00	3.00
Alfred E. Wills	"	"	73.68	13.00	5.00
Herbert J. Tonkin	Cliffs-Shaft	2/1/1952	117.47	55.00	47.00
Dominic Roncoglione	Maas	"	100.00	40.00	33.00
Nels Luoma	Cliffs-Shaft	4/1/1952	93.68	31.00	23.00
Angelo Suardini	Lloyd	7/1/1952	100.00	21.00	16.00
Victor Oja	Cliffs-Shaft	"	100.00	36.00	28.00
Attilio Zappa	Maas	8/1/1952	92.32	14.00	9.00
Beatrice A. Pryor	Misc. P/R-Ishp.Hosp.	9/1/1952	100.00	43.00	43.00
James Ryan	Cliffs-Shaft	12/1/1952	100.00	33.00	33.00
John A. Carlson	Gen. Storehouse	10/1/1952	100.00	18.00	18.00
Gust Walline	Cliffs-Shaft	12/1/1952	100.00	16.00	16.00
Julius S. Wetanen	Mather "A" Shaft	1/15/1952	100.00	39.00	31.00
Jacob Annola	"	9/1/1952	100.00	18.00	18.00
Wilfred J. Manning	"	11/1/1952	100.00	21.00	21.00
Jacob Aho	Athens	2/1/1952	100.00	38.00	30.00
Charles E. Ojala	"	"	98.68	37.00	29.00
Charles C. Snyder	"	3/1/1952	100.00	38.00	30.00
Luigi Sartori	"	8/1/1952	100.00	28.00	23.00

23.

a. PENSION SYSTEMS (Continued)

Pension Plan of 3/1/1950 (Continued)

Name	Mine	Eff. Date	Gross Pens.	Net Pension Orig.	Net Pension 9/1/52
Dayton F. Scott	Hill-Trumbull	12/1/1952	100.00	17.00	17.00
John A. Nadeau	C. P. & L. Co.	6/1/1952	100.00	26.00	21.00

The following disability pensions were approved during the year:

Henry Olson	Cliffs-Shaft	2/1/1952	50.00	50.00
Spaso Glusica	Agnew	12/1/1951	50.00	50.00
George Makinen	Cliffs-Shaft	12/1/1952	50.00	50.00
Fred Roberts	Maas	7/1/1952	59.00	59.00
John A. Johnson	Cliffs-Shaft	12/1/1952	74.00	74.00

Pensions were discontinued as follows:

Bert LaRock	Canisteo	CC-8	Died 11/21/1952
Joseph Marra	Cliffs-Shaft	CC-66	" 12/3/1952
John R. Jones	"	CC-67	" 9/19/1952
Isaac Tuuri	Negaunee	NM-1	" 7/22/1952
Jacob Aho	Athens	AM-15-D	Transferred to age pension 2/1/1952
Frank Hill	Hill-Trumbull	MC-4	Died 8/20/1952

23.

a. PENSION SYSTEMS (Continued)

Pension Plan for Salaried Employees

The Pension Plan for Salaried Employees, which became effective 1/1/1951, continued in force without change during the year. This plan is in addition to the Contributory Retirement Plan which the Company has had in effect for salaried employees since December 31, 1940. The details of the Pension Plan for Salaried Employees may be found in the Annual Report of 1951.

As with the hourly-wage employees this Department handles the initial processing of pension applications for salaried employees with final action resting with the Pension Committee in Cleveland.

During the year the following pensions were granted under this plan:

Name	Former Occupation	Eff. Date	Gross Pens.	Net Pens.
Charles P. Johnson (Disability Pension)	Caretaker-Negaunee Dispensary	4/1/1952	56.64	57.00
Matilda E. Wallenstein	Chief Cook-Ishpeming Hospital	9/1/1952	76.00	14.00
Joseph P. Skues	Shift Boss - Maas	8/1/1952	112.48	0.00
Fred Staples	Mechanical Foreman - Negaunee Shaft	7/1/1952	142.47	0.00
Joseph Spelgatti	Timber Foreman - Athens	"	132.00	0.00
William Ghischia	Shift Boss - Athens	"	100.00	0.00
Edward J. Young	Electrical Shop Foreman - General Shops	8/1/1952	136.05	47.00 *
Guy E. Williams	Chief Electrician - Hawkins	7/1/1952	90.00	0.00
Leo S. Voelker	Line Crew Foreman - C. P. & L. Co.	12/1/1951	134.93	0.00

* Net Pension reduced to $42.00 effective 9/1/1952 because of increase in Social Security benefit.

The following pension was discontinued:

John Peel	Surface Foreman - Negaunee Mine	$72.00	Died 7/7/1952

23.

b. REPUBLIC MINE FUNDS

Each year we make a statement in our Annual Report regarding the Republic Mine Funds. Since these funds are no longer existent, we recommend referring to our Annual Report of 1949 if information regarding these funds is sought.

c. SUSPENSE FUNDS

These funds have been closed out and in case it becomes necessary to review the background, the statement made in our 1949 Annual Report will give the information.

d. VISITING NURSES

During 1952 the visiting nurses' services were continued and extended. The nurses now report directly to the office of the Superintendent of the Welfare Department. These industrial nursing services are appreciated by our people, particularly, the older people who have retired or who have been pensioned. We have here a fine example of industrial nurses rendering social medical service to our employees. We feel that this type of service develops good public relations. Miss Myrtle Welander, who is assigned to the Ishpeming District, has been our industrial nurse for thirty years. Mrs. Milton Cain, also a registered nurse assigned to the Negaunee District, succeeded Miss Ina Atkin and has been with us for two years. Our two nurses are well trained and tactful people. They make a weekly report and conferences are held in the office of the Superintendent of the Welfare Department almost every week. We are proud of the excellent work which has been carried on throughout the years by our industrial nursing staff.

The work of the visiting nurses was started in Ishpeming on May 1, 1908 and in Negaunee on September 8, 1912. These services were also available in Gwinn from September 1, 1910 until October 1, 1927, when the Gwinn mines were closed.

During 1952 the following nurses were employed:

Ishpeming Area - Miss Myrtle Welander
Negaunee Area - Mrs. Milton Cain

We shall continue to submit a monthly report of the visiting nurses with our regular monthly report.

i. SAFETY WORK

Under the direction of Mr. A. J. Stromquist, Safety Director, the Central Safety Committee held monthly meetings during 1952. Mr. Stromquist submits brief reviews of all accidents previous to the meetings and a general discussion is had at the meetings and a study is made of the possibility of preventing like accidents in the near future. Each accident is then classified.

WELFARE DEPARTMENT

WELFARE DEPT. ANNUAL REPORT YEAR 1952

23.
i. SAFETY WORK (CONT'D)

Central Safety Meetings were held on the following dates in 1952:

January 11	July 11
February 14	August - no meeting
March 7	September 29
April 18	October 24
May 16	November 10
June 6	December 12

The following are members of the Central Safety Committee:

C. W. Allen	Dr. G. M. Waldie
W. R. Atkins	R. G. Schaal
C. R. Sundeen	H. H. Korpinen
S. W. Sundeen	H. C. Swanson
F. J. Haller	J. S. Bowen
Onnie Marjama	L. J. Erck
J. S. Westwater	H. W. Rembold
W. F. Gries	G. T. Hollett
A. J. Stromquist	A. E. Lillstrom
T. W. Hill	M. A. Swanson
W. E. Johnson	R. M. DeGabriele
L. C. Holmgren	J. M. Haivala
J. D. Preston	G. A. Dawe
H. W. Sundberg	T. A. Kauppila
E. D. Cory	R. L. Tobie
O. E. Johnson	L. C. Binon
A. Andelin	K. C. Olson

LeRoy Hosking

23.
j. HOSPITALS AND MEDICAL SERVICE

The Superintendent of the Welfare Department acted in the capacity as administrator of the Ishpeming Hospital until the hospital was taken over by the new Board of Trustees in March 1952. The hospital now becomes the Ishpeming-Negaunee Hospital Association, Inc. The Superintendent of the Welfare Department continues to serve as a member of the Board of Trustees of the General Hospital of the Iron River District and contacts are made with that hospital at regular intervals. Since March 1952, the contacts with the new Ishpeming-Negaunee Hospital Association, Inc. are purely on a consultant basis and at times when the new administrator may be seeking some information. The new Board of Trustees of the Ishpeming-Negaunee Hospital Association, Inc. now carry on the administration of the hospital. Mr. Ray Satterley, General Superintendent of the Inland Steel Company, is now President of the new hospital Board of Trustees.

We no longer employ doctors. The medical plan which was carried on for a great many years has been dropped and we no longer collect any medical fees from our employees.

WELFARE DEPARTMENT

23.

j. HOSPITALS AND MEDICAL SERVICE (CONTINUED)

GWINN DISTRICT

In the Gwinn District we repurchased the home known as the doctor's home and which was last occupied by Doctor S. J. Green. The home is now rented to Doctor Kronschnabel who is engaged in a private practice in the Gwinn area.

NEGAUNEE DISPENSARY

The Negaunee Dispensary building has been sold to Doctor R. L. Paine who was formerly a member of our medical staff.

We have entered into an agreement with Doctors A. W. Erickson of Ishpeming and R. L. Paine of Negaunee for coverage and care of all occupational injuries and accidents. This agreement guarantees us medical service on the part of our doctors in cases of accidents and injuries. The agreement between the Company and the doctors, thus far, has worked out very satisfactorily.

IRON RIVER HOSPITAL

During the year several calls were made at the General Hospital of the Iron River District at Stambaugh, Michigan. The Superintendent of the Welfare Department attended the Annual Meeting. The General Hospital of the Iron River District provided for the medical and hospital needs of our employees at the Spies-Virgil Mine at Iron River, Michigan. This hospital is managed by a Board of Trustees representing the different stockholding mining companies and it is administered and operated in a very business-like manner. The Superintendent of the Welfare Department represents our Company on the Board of Trustees of the Iron River General Hospital.

Doctor L. E. Irvine continues to provide the necessary medical attention for our Spies-Virgil employees. He also gives the physical examinations, both pre-employment and periodical. Doctor Addison at Crystal Falls, who is associated with the hospital there, provides medical care for a small group of our employees who request his services.

PHYSICAL EXAMINATION OF EMPLOYEES

The Industrial Hygiene Department, under the direction of Doctor George McL. Waldie, continues to give the physical examinations to employees and to counsel with them regarding physical deficiencies and whose cases require consideration and study. Doctor Bert Moore assists Doctor Waldie in this work.

23.

j. HOSPITALS AND MEDICAL SERVICE (CONTINUED)

INDUSTRIAL HYGIENE DEPARTMENT

Our Industrial Hygiene Department was organized on April 1, 1939. Doctor George McL. Waldie continues to have charge of this department assisted by Doctor Bert Moore. The department continues the usual physical examination program, as well as the follow-up program in cases where employees have been found to have some deficiency. Considerable valuable information has been gathered by this department during the past several years and we feel that we have excellent records on all employees from the standpoint of their physical condition.

The work of the Department of Industrial Hygiene has increased since we did not renew our Saranac Contract in the fall of 1945. All films which formerly were sent to Saranac for reading and interpretation are being read and interpreted locally by Doctor Waldie. This work covers also the Inland Steel Company and the North Range Mining Company's employees on the Marquette and Menominee Ranges, as well as the employees of the Hercules Powder Company and Jones & Laughlin Ore Company. Doctor Waldie submits monthly reports, as well as periodical reports, covering the work of his department. The department makes an effort to correct any defect or some type of illness, a follow-up program is instituted and a check-up is made from time to time to determine what the employee's condition is.

The expansion of operations on the part of our Company made it necessary to employ additional manpower in the fall of 1951. Doctor Bert Moore was engaged to assist Doctor Waldie in the fall of last year.

The following is the total of examinations made through December, 1952:

The Cleveland-Cliffs Iron Co.	19,286
Negaunee Mine	3,979
Mather "A" Shaft	3,473
Mather "B" Shaft	1,217
Athens Mine	4,080
C. P. & L. Co.	891
Land Department	49
Inland Steel Co.	4,801
Other Cos. Misc.	3,118
Pickands Mather	149
Jones & Laughlin Ore Co.	134
Oliver Iron Mining Co.	725
Marq. Co. Rd. Comm.	10
Hercules Powder Co.	391
Humboldt Mine	16
TOTAL	42,319

WELFARE DEPARTMENT

WELFARE DEPT. ANNUAL REPORT YEAR 1952

23.
k. COMMUNITY HEALTH

Each year we include in this report a statement concerning the general health conditions in Marquette County. It is pleasing to again report that the general health conditions in the county were very good and there were no serious epidemics or loss of time at the mines because of illness.

The three cities in Marquette County each have a health officer and a full time school nurse. The City of Marquette also employes a full-time nurse whose services are made available for the most part to the township districts. The townships also have health officers.

The city health officers in Marquette County are:

Ishpeming - Dr. W. A. Corcoran
Negaunee - Dr. R. L. Paine
Marquette - Dr. C. P. Drury

The Northern Michigan Children's Clinic at Marquette, operated in connection with St. Luke's Hospital and supported largely by funds from the Michigan Children's Fund, has continued to serve children throughout the entire Northern Peninsula. The counties of the Northern Peninsula are very fortunate in having available such a fine clinic. The Superintendent of the Welfare Department has been elected a member of the new Board of Directors of the Northern Michigan Children's Clinic, Inc.

The Bay Cliff Health Camp at Big Bay was in session again during the summer of 1952, completing seventeen years of service. There was a large group of children at the camp from the counties in the Northern Peninsula. These children are cared for for about six or seven weeks and special services are rendered for various groups, such as services for poliomyelitis convalescent children, cardiac cases, rheumatic hearts, speech and hearing defects, diabetics and under-nourished children. The Superintendent of the Welfare Department has continued to serve as Chairman of the Board of Directors of Bay Cliff Health Camp.

23.
m. RELIEF WORK

During the Year 1952 we carried on our usual program of extending assistance to certain special cases.

WELFARE DEPARTMENT

23.

m. RELIEF WORK (CONTINUED)

The following is a statement of assistance, not including cash assistance, rendered in 1952:

	Princeton	Ishpeming	Negaunee	Total
January			21.20	21.20
February			20.80	20.80
March			21.20	21.20
April			21.00	21.00
May			61.20	61.20
June		12.36	21.00	33.36
July			21.20	21.20
August		41.12	61.20	102.32
September			21.15	21.15
October		15.00	21.51	36.51
November			81.30	81.30
December	25.00		41.51	66.51
TOTAL	$ 25.00	$ 68.48	$ 414.27	$ 507.75

n. EMPLOYMENT

The Welfare Department keeps in touch with the Employment Office in charge of Mr. H. W. Sundberg. In cases where there may be some question regarding the employment of a certain individual the case is reviewed. Every effort is made to protect the best interests of the Company in connection with the employment of people.

q. IMPROVEMENT WORK

The program of improvement of grounds is now under the direction of Mr. Peter Derocher who succeeded Mr. Julian Payen. Mr. Derocher had several years of experience under the supervision of Mr. Payen and is doing a very good job.

s. COMMUNITY SERVICE WORK

The American Legion Building in Negaunee is leased from our Company. We continue to keep the building in condition and regular inspections are made. Considerable of the community activities centers around the Negaunee Legion Clubhouse.

The number of fraternal organizations in the district is rather large for a community of this size. Many of the fraternal orders maintain their own club rooms and considerable of the social life of the community centers around these organizations.

WELFARE DEPARTMENT

23.

o. INCAPACITATED EMPLOYEES (DONATION PAYROLL)

During the year payments have continued over our Donation Payroll to certain men who did not have sufficient service to bring them within the provisions of the original pension plan, or, more recently, who were not employed long enough under the Social Security system to bring them adequate benefits from that source. Some of these men were totally disabled through mine accidents while others became incapacitated from illness or disease and required assistance because of large families. During the past few years additions to the payroll have been at a minimum, and any addition now is in the nature of a special or unusual case.

For the purpose of record it is mentioned that on February 1, 1947 those individuals who were receiving regular Company aid in the form of grocery, fuel, or clothing orders were granted monetary allowances over this payroll and the orders were discontinued.

The Mining Department Donation Payroll included 20 people on December 31, 1951 and on December 31, 1952 there were 18 payees. The total expenditure over this payroll for the year was $7,296.80.

The following additions were made to the payroll during the year:

John Toms	Monthly allowance - $25.00	Effective 2/1/1952
Beatrice A. Pryor	" - $50.00	" 3/1/1952
Matilda E. Wallenstein	" - $21.00	" 4/1/1952

The following were dropped from the payroll during the year:

Mrs. Charles Hill	Monthly allowance - $15.00	Dropped 2/29/1952 -former recipient of grocery order - no further need
Andrew Nocenti	" - $50.00	Transferred to Retirement Payroll 4/1/1952
Beatrice A. Pryor	" - $50.00	Transferred to Pension Plan of 3/1/50 effective 9/1/52
Matilda E. Wallenstein	" - $21.00	" "
Dorothy Hewitt	" - $50.00	Dropped 12/31/1952 - Pay't of agreed-upon sum completed

The monthly payment to Mrs. Lyda M.G. Turgeon, who is being carried on this payroll rather than the Pension Plan of 3/1/1950, was reduced from $49.00 to $43.00 effective 9/1/1952 because of an increase in her Social Security benefit.

WELFARE DEPARTMENT

23.

o. INCAPACITATED EMPLOYEES (DONATION PAYROLL) (Continued)

The Furnace Department donations, after being granted, were paid originally by the Furnace Department itself and later by the Cliffs-Dow Chemical Company. By directions from Cleveland on September 1, 1937 the donations were paid by this office until the payroll was closed out in August 1950 with the death of its last recipient. The roll will remain inactive.

The Mesaba-Cliffs Mining Company Donation Payroll continued inactive during the year. The last payment over this roll was made in March 1948.

There are six widows receiving Donation payments, all included on the Mining Department payroll. Two of these widows, Mrs. J. H. Tregoning and Mrs. Fiina Kampinen, have been granted regular donations; two, Mrs. Johanna Forstrom and Mrs. Hilma Maunula, appear on the payroll because of the conversion of direct aid orders to monetary allowances; and Mrs. Lyda M.G. Turgeon is paid over this payroll rather than under the Pension Plan of 3/1/1950.

Amount of Mining Department Donations (including widows)	$7,296.80
Amount of Holmes Mine Donations	240.00
	$7,536.80

WELFARE DEPARTMENT

23.

u. OUTDOOR ACTIVITIES

The interest in outdoor activities in the community has increased considerably in recent years. The Winter Sports Club, which maintains a clubhouse north of the city, is a very popular organization and there is greater activity there each winter. This area is also made available during the summer months for various types of outdoor meetings.

The Ishpeming Ski Club conducted its 65th Annual Ski Tournament on February 24, 1952. These tournaments seem to interest more people every year. Several of the employees of our Company participate in the ski jumping.

v. THE MATHER INN

The Mather Inn continues to be the most popular hotel in the Northern Peninsula. It is serving the public in a very fine manner. Many of the civic and community meetings are held here.

w. VARIOUS DEPARTMENTS AND ACTIVITIES

The Superintendent of the Welfare Department serves as First Vice-President of the Michigan Society for Crippled Children and Adults, Inc., and Vice-President of the Michigan Tuberculosis Association. He is also Director of District XI for the University of Michigan Memorial-Phoenix Project.

The Superintendent of the Welfare Department continues to serve as Chairman of the Board of Directors of Bay Cliff Health Camp at Big Bay, Michigan. He also serves as a member of the Advisory Consultant Staff to the State Department of Public Instruction on community planning and programming.

On December 23, 1952, the employees of the Central Office held their annual Christmas Party.

x. POLICE DEPARTMENT

The Police Department is under the supervision of the Superintendent of the Welfare Department and is in direct charge of Mr. R. J. Veale, Chief. Almost daily conferences are held with Mr. Veale, dealing with police work and plant protection. Mr. Veale submits a monthly report. Our police have been uniformed for several years and we have felt that we get excellent service from them. New men for the department are selected with care and we no longer follow the old policy of using older men in their declining years as members of the police force.

WELFARE DEPARTMENT

WELFARE DEPT. ANNUAL REPORT YEAR 1952

APPRECIATION

It is a privilege to again record in this report my appreciation for the cooperation, the guidance and the understanding which have always been given this department by Mr. C. W. Allen, General Manager, and Mr. F. J. Haller, Manager of Michigan Mines. I wish also to express my appreciation for the cooperation which has always been received from Mr. A. J. Stromquist, Safety Director, and his staff. We shall strive to coordinate and cooperate with the work of this department at all times.

WELFARE DEPARTMENT

REPORT OF GEOLOGICAL DEPARTMENT FOR YEAR ENDING DECEMBER 31, 1952

The following is the report of the Geological Department for the year 1952:

CONTENTS

This report has been prepared through the cooperative efforts of each of the staff members. The geologist in charge of each project prepared the summary of his assignment. The editorial board consisted of E. L. Derby, Jr., H. W. Rembold, Gerald J. Anderson, Mrs. Belle Bloch and Burton H. Boyum.

I. STAFF

A. Distribution

As in the past, Ishpeming continued to be the headquarters and base from which the Geological Department operated. During the year the Company's staff was augmented along with the increase in exploration activities. Tables I, II and III show the distribution of staff members.

TABLE I

E. L. Derby, Jr., Chief Geologist
Burton H. Boyum, Ass't. Chief Geologist

EXPLORATION DRILLING DEPARTMENT (A)

H. Walter Rembold, Sup't.
Edwin Jacka, Foreman
Swante Merrila, Foreman
Carl Ostlund, Foreman

GEOLOGISTS

Gerald J. Anderson
Robert M. Becker
David M. Bennett
Rolland L. Blake (B)
William P. Cromwell (C)
Donald L. Gilbert (D)
Kenneth H. Johnson (E)
James P. Meyers (F)
Charles R. Pace, Jr. (G)
Joseph L. Patrick
E. Richard Randolph (H)
Eric J. Rex
Robert W. Riedel (I)

TECHNICIANS

George M. Olson, Chief
Robert W. Ryan
Bruce G. Cain (K)
Sidney T. Holman (L)

DRAFTSMEN

Archie Minnear
Pat S. Johnson
John V. Larson (M)

SECRETARIAL

Mrs. Belle Bloch, Office Secretary
Mrs. Esther Fandrem (N)
Miss Jean Jensen (O)
Miss Inga W. Eckstrom (P)
Miss Dora E. Swanson (Q)
Douglas K. Pohlman (R)

CONSULTANTS

Prof. William A. Longacre, Geophysics
Dr. Melville W. Bartley, Geology, Canada (J)
Dr. James M. Neilson, Geology, Canada
Dr. Frederick C. Kruger, Geology, Canada

MICHIGAN FIELD ASSISTANTS, TEMPORARY

John P. Brooke, Geologist
Norman Brown, Geologist
Roy T. Hutchings, Jr., Geologist
Karl R. Meyer, Geologist
Jack Wescott, Geologist

MINNESOTA FIELD ASSISTANTS, TEMPORARY

William P. Cromwell, Geologist (C)
Charles B. Archambeau, Notekeeper
Roger M. Hill, Compassman
Charles A. Steppan, Compassman

(A) Nov. 1952 - Recognized as separate department
(B) Oct. 17, 1952 - Transferred to Minnesota office
(C) June 17 to Nov. 5, 1952 - Field Geologist, temporary
Nov. 5 to Nov. 16, 1952 - Geologist, permanent
Nov. 16, 1952 - Drowned
(D) Nov. 10, 1952 - Joined permanent staff as Geologist
(E) Nov. 19, 1952 - Granted leave of absence - became Geologist for SECA
(F) June 18, 1952 - Joined permanent staff as Geologist
(G) April 4, 1952 - Joined permanent staff as Geologist
(H) Sept. 15, 1952 - Joined permanent staff as Geologist
(I) April 15, 1952 - Transferred to Minnesota as Geologist
Oct. 8, 1952 - Inducted into army
(J) June, 1952 - Became Resident Manager of Canadian Cliffs, Ltd.
(K) Aug. 1, 1952 - Transferred to Humboldt Mine
(L) Aug. 14, 1952 - Joined permanent staff as technician
(M) March 5, 1952 - Joined permanent staff as draftsman
(N) June 30, 1952 - Resigned
(O) April 1, 1952 - Transferred from shared basis with Engineering Department to Engineering Department only
(P) Aug. 11, 1952 - Resigned -(Hired March 11, 1952)
(Q) Sept. 22, 1952 - Joined permanent staff as stenographer for Messrs. Derby and Sundeen
(R) June 16, 1952 - Joined permanent staff as stenographer

B. Man-Hour Summary

The following Table II is the hourly rate personnel carried on the General Storehouse payroll as members of the Exploration Drilling Department:

TABLE II

DISPOSITION OF HOURLY RATE PERSONNEL
GENERAL STOREHOUSE PAYROLL

Total Days Worked	- 254
Sundays	- 52
Holidays	- 5
Days Lost to Strike, etc.	- 54
Total	365

Description	Total No. of Men	New Hire	Separations	Total Hours Worked	Statistical Men	Labor Cost
Runners	22	0	4	40,662	16 4/6	$ 73,078.53
Helpers	25	21	15	47,432	19 2/3	74,337.97
Total	47	21	19	88,094	36 1/2	$147,416.50

Table III shown below is a recapitulation of the various components of the Geological staff:

TABLE III

MAN-HOUR SUMMARY

MICHIGAN

Exploration Drilling Department*	Hours	Men
Labor	88,094	47
Supervisors	8,271	4
Sub-Total	96,365	51
Geological Department		
Permanent	40,065.5	27
Temporary	2,680	5
Sub-Total	42,744.5	32

*Exclusive of mine employed personnel and drill contractors

MINNESOTA

Permanent	1,284	2
Temporary	2,680	4
Sub-Total	3,964	6

C. Photographs

Figures 1, 2 and 3 are photographs of the 1952 staff of the Geological Department including both permanent and temporary personnel. Figure 1 shows the 1952 Michigan staff including those members of our field crews who were employed as compassmen, members of the Engineering Department.

Figure 2 shows the Minnesota exploration staff employed on the Vermilion Range including both permanent and temporary personnel.

Figure 3 shows the principals in the Canadian exploration program with the exception of Dr. James M. Neilson, Consultant, absent at the time the photograph was taken.

D. GENERAL SUMMARY

During the year 1952, the Company established a permanent geologist for the Minnesota operation based in the Hibbing office and working jointly under the supervision of Mr. Ralph E. Magnuson, Jr., District Engineer and under Messrs. Derby and Boyum. Also during the year, the formation of the Canadian Cliffs Company modified our personnel with respect to Canadian exploration. Dr. M. W. Bartley became Resident Manager of Canadian Cliffs effective June, 1952. In October, Dr. F. C. Kruger terminated his consulting relationship with Canadian Cliffs to become Chief Geologist with the Reynolds Mining Company, Little Rock, Arkansas.

The Department employed a total of 15 professional geologists, including Messrs. Derby and Boyum for part or all of 1952. At the end of 1952, we had a net of 10 permanent staff members identical to the end of 1951. The Department lost a valued staff member through the tragic drowning of Mr. William P. Cromwell. Mr. Robert W. Riedel was inducted into the army and Mr. Kenneth H. Johnson was granted a six months leave of absence to be employed as a geologist by SECA, our contracting firm in the Venezuelan exploration.

Our staff was increased by one draftsman and one stenographer. In Michigan, we had 5 two-man field parties, in Minnesota, we had 4 field parties and in Canada, we had 3 field parties.

In November, a reorganization of the Department was made emphasizing the district organization, together with the tentative organization of the Exploration Drilling Division into the Exploration Drilling Department. Under the new plan, the Drilling Department will be responsible for personnel and equipment and both departments continue to be responsible for technique and records.

II. GEOLOGICAL & GEOPHYSICAL FIELD WORK

In previous Annual Reports, we have discussed the geological and geophysical field work in separate sections. This year, we are considering these two aspects in this one section.

As in previous years, our field work has been done by two-man parties. One member acted as the geologist and the other as the compassman or with one member as the geophysicist and the other as the notekeeper.

GEOLOGICAL DEPARTMENT - SUMMER 1952

Back Row: P. S. Johnson, D. K. Pohlman, R. M. Becker, K. H. Johnson, C. R. Pace, Jr., J. P. Meyers, E. J. Rex, R. W. Ryan, S. T. Holman, G. M. Olson, D. M. Bennett, R. L. Blake

Middle Row: G. J. Anderson, J. L. Patrick, B. H. Boyum, Mr. E. L. Derby, Jr., Mr. S. W. Sundeen, Mrs. B. Bloch, A. Minnear, J. V. Larson, C. Ostlund, H. W. Rembold, S. Merrila

Front Row: W. Larsen, M. Kiel, K. Meyer, R. Frazer, N. Brown, J. Brooke, W. Dolezal, J. Wescott, R. Hutchings

Figure 1

MINNESOTA SUMMER EXPLORATION STAFF - JULY 1952

Back Row: Charles B. Archambeau, Charles D. Palmer, Charles A. Steppen, Roger M. Hill

Front Row: Party Chief Robert W. Riedel, Prof. William A. Longacre, William P. Cromwell

Figure 2

CANADIAN EXPLORATION STAFF - SEPTEMBER 1952

Left to Right: M. W. Bartley, B. H. Boyum, E. L. Derby, Jr., S. W. Sundeen, F. C. Kruger

Absent: J. M. Neilson

Figure 3

In general, the reconnaissance work was done with sundial compass survey lines, together with the mapping of outcrops, dumps and pits, the sampling of iron-formation and the collecting of representative hand specimens of the various rock types encountered.

This Section II is sub-divided into the five principal areas in which geological and geophysical field work has been done.

A. Michigan

We employed 5 two-man field parties in Michigan during the summer of 1952.

1. Cascade District - Kenneth H. Johnson, Geologist

a. Richmond Area - Crew #1 worked the entire summer in the Cascade District. Figure 4 is a plan map showing the location of this work. A total of 14 miles of traverse line was surveyed and mapped, and is shown in red. A total of 7¼ miles of line was traversed for magnetic determination and is shown in blue. Figure 5 is the photograph of the base camp from which the field work was done. The following table shows the distribution of each type of work:

	Miles	Hours	Amount
Surveying	14	608	$1006.73
Mapping and Sampling	14	705½	1581.06
Magnetic Survey	7¼	282	631.52

In general, the field work confirmed the anticipated geological structure of the district. However, additional field work is warranted, particularly to complete and correlate the geophysics. In addition, the 1952 work demonstrated that the hematitic mineralization in Section 22, 47-26, is not of economic importance.

b. Empire Area - No field work was done in this area during 1952.

2. Ishpeming-Negaunee District - Joseph L. Patrick, Geologist

a. Cliffs-Shaft Area - The western part of Section 4, 47-27 in the Cliffs-Shaft Area, was surveyed and mapped in conjuntion with the so-called North Lake Project. This is discussed under Section 3-A.

3. North Lake-Saginaw District

a. North Lake Area - Joseph L. Patrick, Geologist

The W½ of Section 4, all of Section 5 and the E½ of Section 6, 47-27 constitutes the North Lake Project, an exploration to determine the metallurgical characteristics of the iron-formation extending along the north limb in this area.

Figure 4

CASCADE EXPLORATION

Red Geological Surveying & Mapping

Blue Geophysical Prospecting

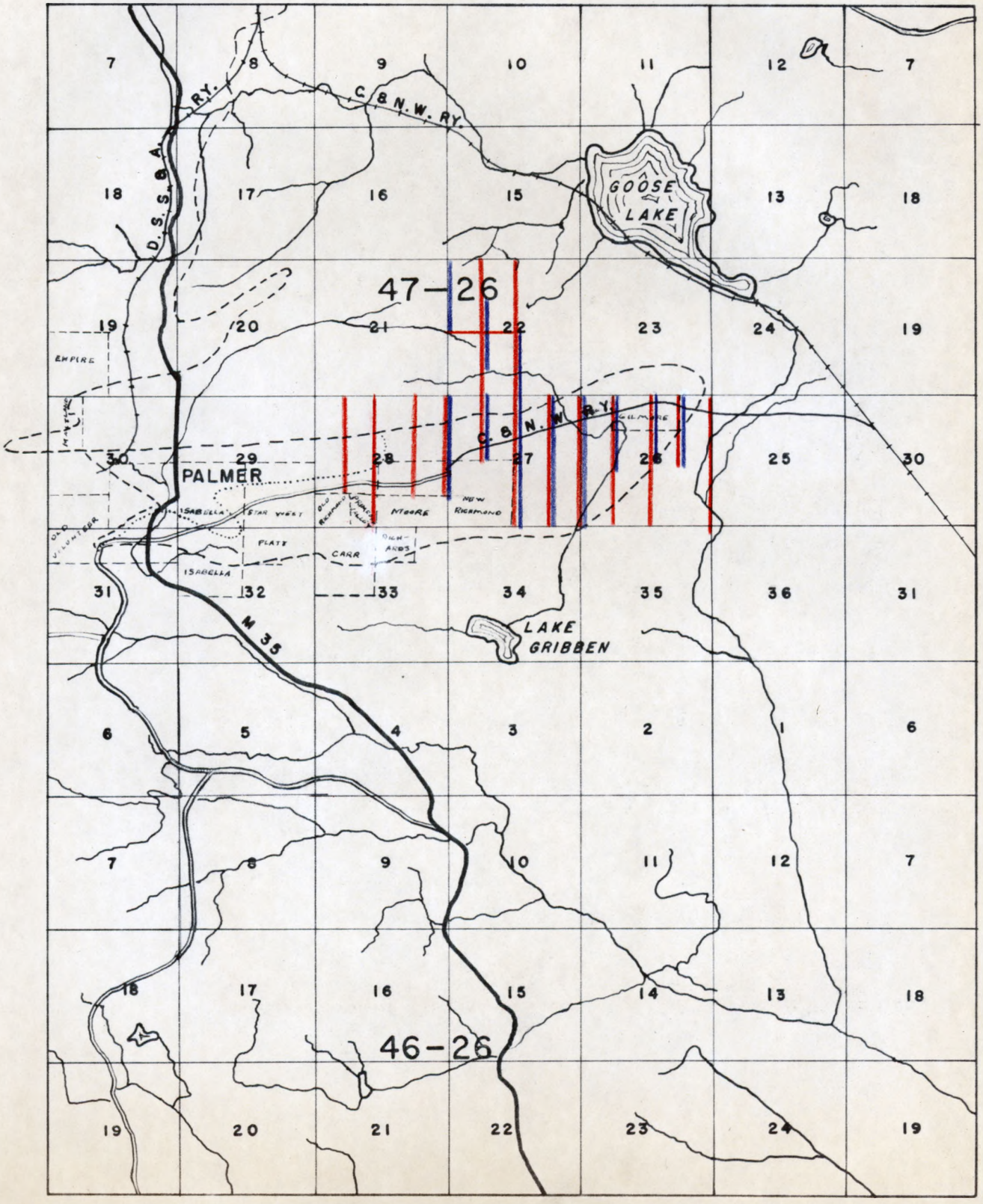


Figure 5: Cascade Range Summer Field Camp.

Figure 6: Central Basin Summer Field Camp.

The following table shows the distribution of field time:

	Miles	Hours	Amount
Surveying	3.6	978	$1586.72
Mapping & Sampling	3.6	364	560.37
Geophysics	---	4	9.05

In general, the field work confirmed the anticipated structure.

b. Saginaw Area - Robert M. Becker, Geologist

During the latter part of the summer, Crew #2 worked on the Fitch Mine Surface, Section 24, 47-28, Saginaw Area. A series of North-South profiles were cut and mapped preparatory to drilling, to determine the metallurgical characterists of the iron-formation at the Fitch Mine. The following table summarizes the distribution of the field work:

	Miles	Hours	Amount
Surveying	8610'	824	$1388.07
Mapping & Sampling	7510'	282	481.16
Geophysics	---	---	---

Figure 7 shows the location of this field work.

c. Dexter-Greenwood Areas - Charles R. Pace, Jr., Geologist

Crew #3 worked the entire summer in the so-called Central Basin Project in the Dexter-Greenwood Area east of Humboldt. Figure 6 is a photograph of the tent arrangement used by the field crew as their base camp. Figure 7 is a plan map showing the location of the field work done in 1952 with this project. A total of 2 miles of elevations were run with the Paulin Altimeter. A total of 7 North-South lines were laid out so that they would cross the north and south limbs of the Marquette Range Synclinorium. The Negaunee Iron-Formation was known to exist on the north limb, but no iron-formation was known on the south limb in this area. Our exploration further confirmed this. The central portion of the area was drift covered and only occasional outcrops of Michigamme Slate were found.

A total of 12 metallurgical samples were taken during the summer. Of these, 7 were taken in the Greenwood Formation, a magnetic slaty quartzitic formation, 2 from possible iron-formation outcrops, and 3 from mine dumps. With the exception of the mine dump samples, the metallurgical results can best be summed up as unfavorable.

The following table shows the distribution of the field work:

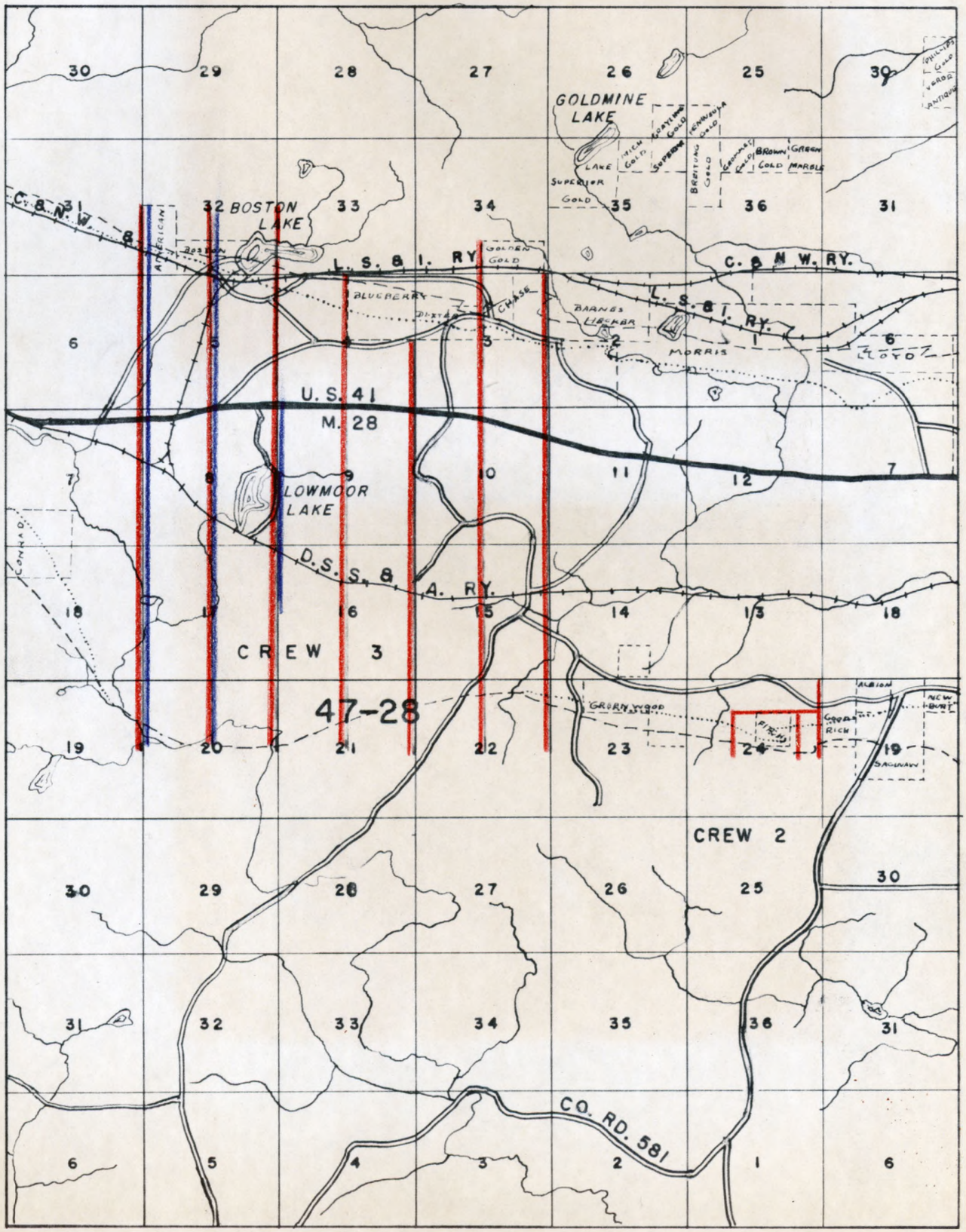
	Miles	Hours	Amount
Surveying	26½	512	$ 873.40
Mapping & Sampling	26½	411	1005.71
Magnetic Prospecting	9.25	144	352.80

Figure 7

CENTRAL BASIN EXPLORATION

Red Geological Surveying & Mapping.

Blue Geophysical Prospecting.



4. Michigamme District - Rolland L. Blake, Geologist

a. South Michigamme Area - Field Crew #4 and #5 worked the entire summer in the so-called Fence Lake Project extending to the south in the South Michigamme Area. Figure 8 shows the distribution of the field work on the Fence Lake Project. The lines shown in red were surveyed, mapped and sampled. The lines in blue were traversed magnetically. The field work disclosed several magnetic anomalies which may be important. It is of interest to note that the area was being worked by 4 separate organizations this summer, namely; the U. S. Geological Survey, the M. A. Hanna Company, the Ford Motor Company and The Cleveland-Cliffs Iron Company. The following tabulation shows the distribution of the general work:

	Miles	Hours	Amount
Surveying	16½	936	$1598.07
Mapping & Sampling	16½	1276	2367.10
Magnetic Prospecting	16½	152	278.10

5. Land Offer 2815 - Ford Motor Company Lands - J. P. Meyers, Geologist

In the fall of 1952, a program of rapid prospecting was inaugurated in which Mr. J. P. Meyers reviewed the previous mapping and collected samples for metallurgical test work. The lands investigated may be sub-divided into 3 areas as follows:

a. The Western Half of T. 46 N., R. 30 W. - This area is underlain by two bodies of the Negaunee Iron-Formation. One body, the eastern-most in this area, is called the "Pumpelly Flank" and the other body, the western-most in the area, is one part of the so-called "Smyth Oval". Five samples were collected.

b. The North Champion Area - This area includes lands north of Champion including the old Phoenix Mine, etc. These lands are underlain by the Bijiki Iron-Formation. Seventeen samples were collected.

c. The Old Taylor Mine Property in Baraga County - These lands are underlain by an iron formation similar lithologically to the Bijiki Iron-Formation of the Ohio Mine. Twelve samples were collected.

Figure 9 shows the distribution of this field work.

B. Minnesota

Four, two-man parties were used during the 1952 field season.

1. Mesabi Range - Leonard P. Larson, Engineer

Field work on the Mesabi Range was done by Mr. Leonard P. Larson, Mining Engineer and his notekeeper. A base station was established in Section 26, T. 40 N., R. 20 W. Supplementary base stations were established at Bovey and Keewatin and tied into the network. The intention was to use previous surveys of Professors G. M. Schwartz and W. A. Longacre. It was found that the three surveys correlated well.

Figure 8

FENCE LAKE EXPLORATION

Red Geological Surveying & Mapping

Blue Geophysical Prospecting

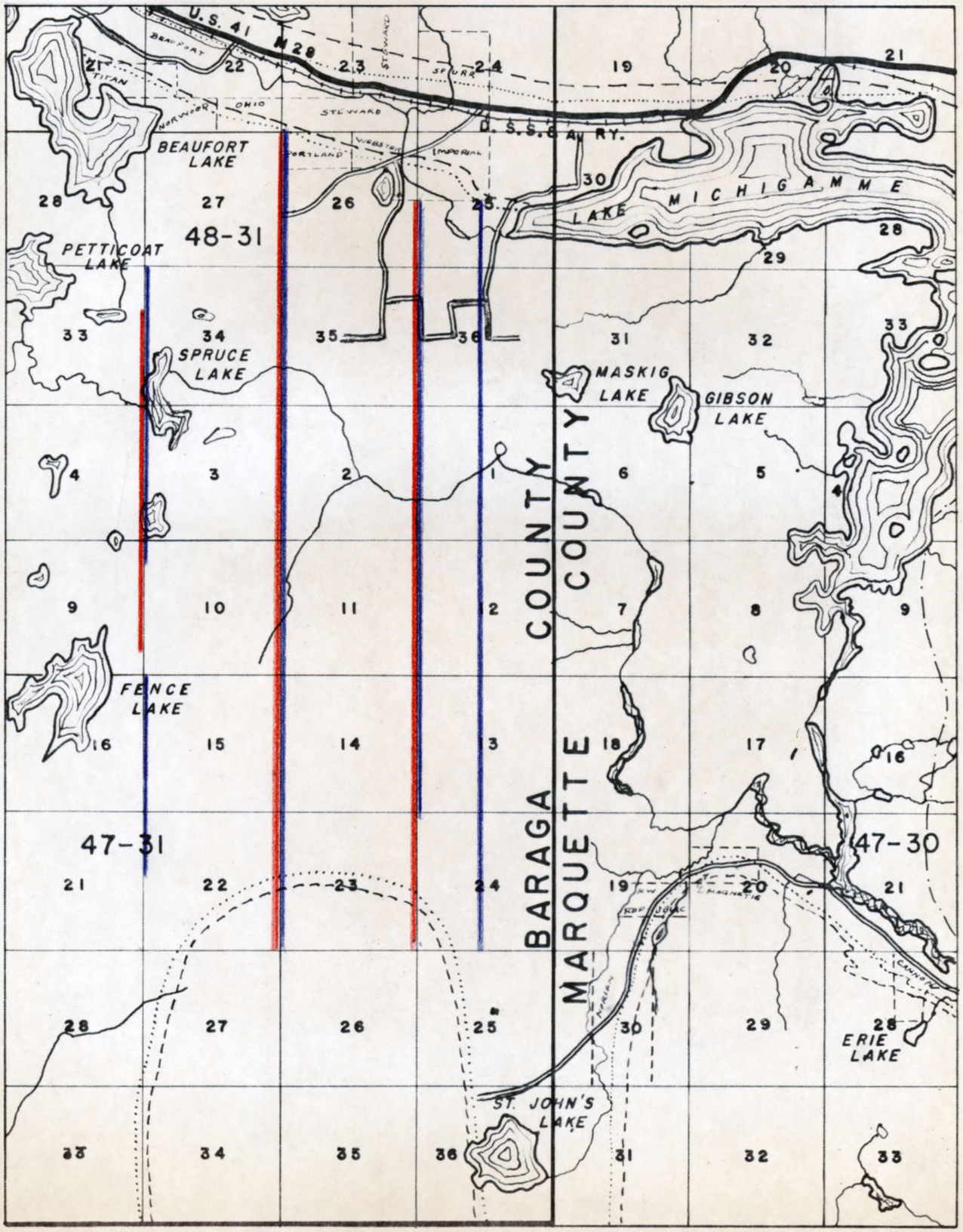
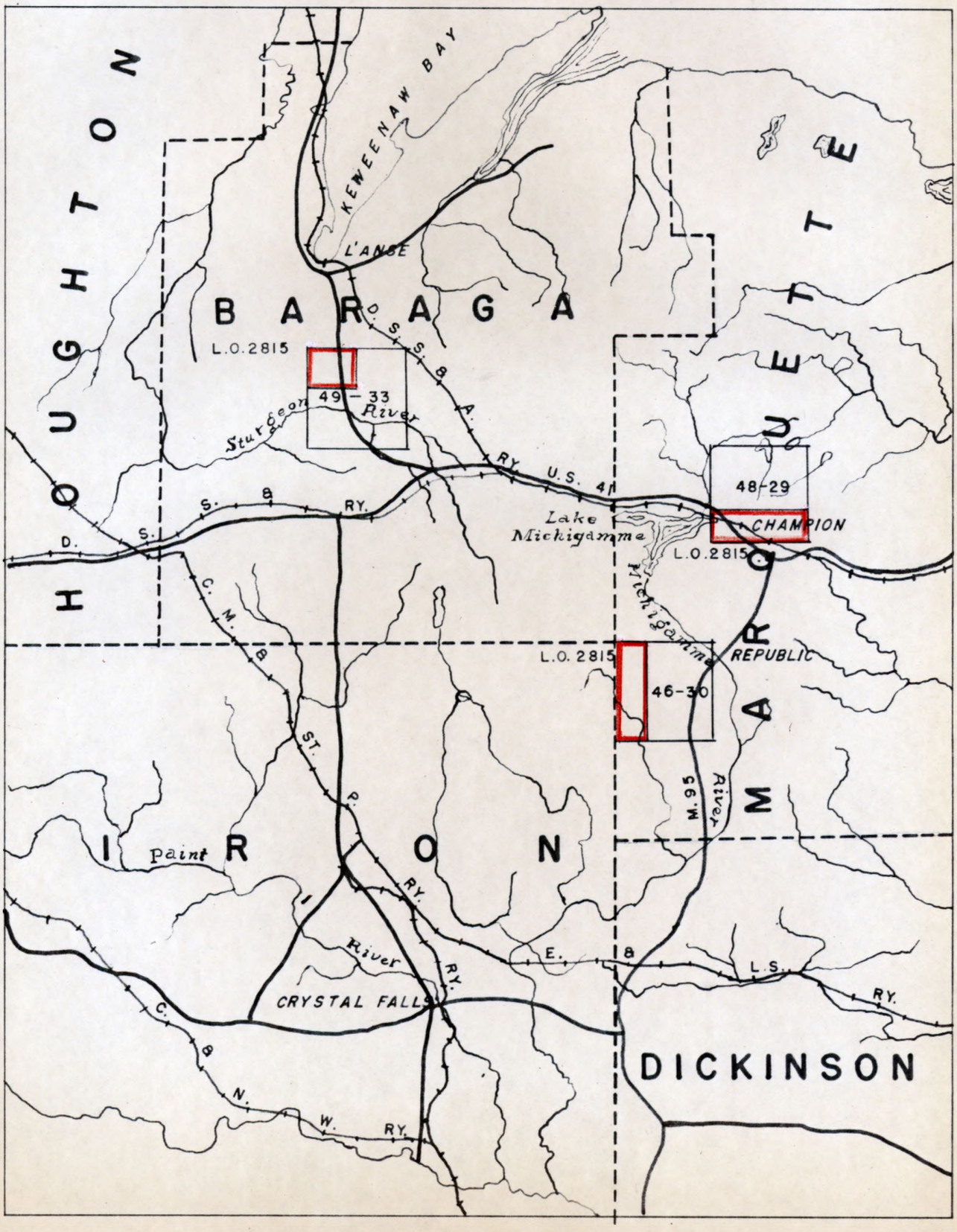


Figure 9

L.O. 2815 FORD MOTOR COMPANY



The Elbern Mine was selected as the hub of the operation as it is a typical cretaceous deposit. Magnetics were run both in and around the pit and continued out to the highway. Readings were taken every 50 feet on base lines, 50 feet apart. The magnetics were checked against drill logs and the results showed that the magnetic highs were located in the areas where the greatest depth of ore occurred, with the reading becoming lower in intensity on the flanks of the ore body.

Once the pattern had been established the roads were run from Biwabik to Bovey, with readings taken every tenth of a mile. In areas where there was no apparent change in the readings, the interval was increased to two-tenths of a mile or more. When a change was noted, the readings were again taken at one-tenth mile intervals.

Zones of magnetic highs were found in several areas along the contact of the Virginia Slate and Biwabik Formation. These zones appeared to be elongated to the southeast, with the greatest width to the Northwest. The areas containing the high magnetics are located in 3 regions, Elbern Mine and vicinity, Ely Lake and Twin Lakes.

2. Vermilion Range - Robert W. Riedel, Geologist

The 3 field crews engaged in geological and geophysical exploration, were based at 2 cabins on Armstrong Lake, midway between Tower and Ely. Figure 10 shows the field work. The survey lines are shown in red and the geophysical lines in blue.

The most important task of the 1952 summer field exploration was to delineate by ground magnetics and geological mapping, the area southeast of Tower, Minnesota. This area showed as a strong northwest-southeast trending anomaly on the 1949 aeromagnetic map published by the U.S.G.S. and the Minnesota Geological Survey. The idea was to accurately locate those lands with the best exploration possibilities, determine what State lands would be put up for bidding on an exploration permit, and decide which units to bid upon at the August 11th auction.

The area southeast of Tower was designated as Area I (O.E.1100) and Area II (O.E.1101) arbitrarily. (See Figure 10). In the process of exploring these areas, the field crews worked around or through lands contained in Land Offers 2611, 2676, 2903, 2904, and 2914.

A total of 45.1 miles of survey line were brushed. Geological mapping and sampling was done along 14.4 miles. Magnetic determinations were made along 42.2 miles of traverse line. Eleven metallurgical samples were collected from Area I and 4 from Area II.

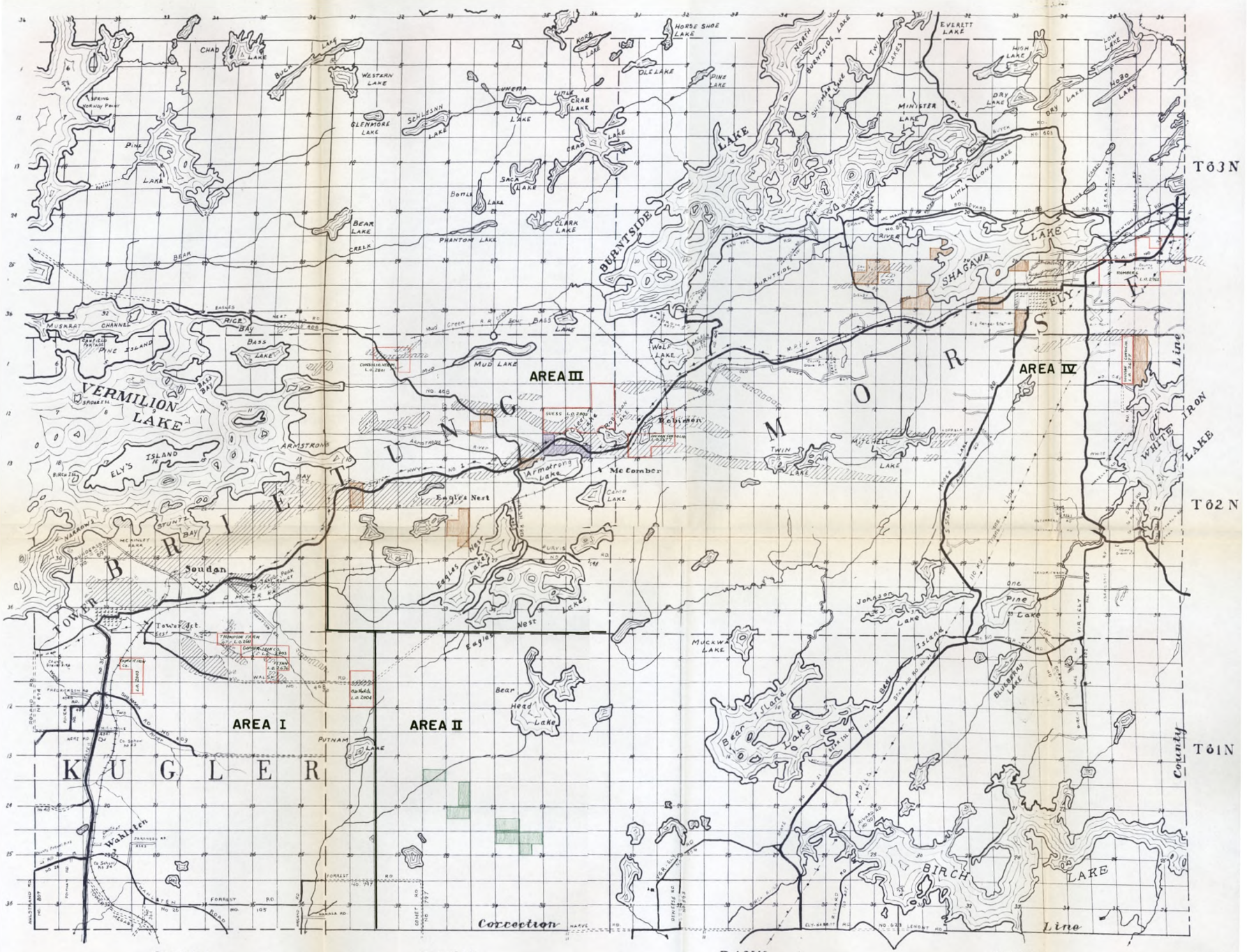
Field work was reduced in the late fall and preparations made for core drilling.

3. Minnesota General

a. Todd County - Sometime was spent during the year in a series of conferences with respect to Land Offer 2636, Todd County, offered by Mr. Robert Adams of Duluth. A review was made of existing information and an exploration program was outlined.

VERMILION RANGE – MINNESOTA

FIG. 10



MAP OF

FOURTH COMMISSIONER'S DIST.

ST. LOUIS COUNTY

1952 LAND OFFERS

- AS MARKED
- L.O. 2914 - STATE UNITS
- L.O. 2906 - MC COMBER MINE
- L.O. 2780 - CONAN-PATTISON & HIGGINS

KNOWN SOUDAN I.-FM. (FROM PLATE VI., MONO. 52)

SCALE – 1" = 1 MILE

FIG. 10

b. Lake of the Woods County - In April, a field examination was made of the air magnetic anomaly in Lake of the Woods County, Outside Exploration 1026. No significant exposures of iron-formation or associated rocks were seen, although the area has not been ruled out as having no possibility.

C. United States General

Section VI of this Annual Report covers the general subject of Land Offers and Outside Explorations. During 1952, a total of 15 mineral land offers throughout the United States, excepting Michigan and Minnesota were brought to the attention of the Department.

Eight of these land offers were examined in the field by members of the staff and were reported.

1. New Jersey - Land Offer 2790, the Mount Hope Mine of the Warren Foundry & Pipe Corporation, New Jersey was examined by Messrs. E. L. Derby, Jr., F. J. Haller and J. Trosvig, in June, 1952, and is covered by their report dated June 19th.

2. Wisconsin - Outside Exploration 1030, Pepin County, Wisconsin, was examined by Mr. R. M. Becker in May. This prospect consisted of a series of goethite deposits in limestone. This outside exploration was abandoned as the deposit was not of economic importance.

The balance of this section is devoted to examinations in the Western United States. Figure 11 is the location of these land offers.

3. Colorado - Land Offer 2799 consisted of manganese claims in Gunnison County, Colorado. The claims were found to contain insufficient potential reserves to justify exploration and were declined. The manganese mineralization was found to be in a vein deposit.

4. Wyoming

a. Land Offer 2822 was a hematite and goethite prospect near Sundance, Wyoming. The property was examined and found to contain insufficient potential reserves to warrant further consideration.

b. Land Offer 2836 was low grade hematite magnetite deposit near Lander, Wyoming. Twenty-one unpatented claims are included in this land offer. The deposit was found to be extensive. A strictly conservative estimate showed about 42,000,000 tons of metallurgical grade ore, analyzing in the neighborhood of 36% iron. Metallurgically, the material, a cherty hematite schist, responded fairly well to treatment. Previous financial commitments of the Company, made it necessary to decline the property at this time.

5. Arizona

Land Offer 2837 consisted of several groups of manganese claims in southwestern Arizona. Messrs. Boyum and Rex examined a number of manganese claims in the Artillery and Buckskin Mountains of Yuma and Mohave Counties, respectively. The establishment

Figure 11

MAP SHOWING LOCATION OF LAND OFFERS
EXAMINED IN WESTERN UNITED STATES

of a government purchase depot nearby make their location favorable. The claims cover manganese deposits which generally are low grade sediments with some of them secondarily enriched. One claim (Doyle) showed a relatively high grade deposit (18 to 20% Mn) of at least 100,000 tons which could be mined very cheaply. The greatest part of the manganiferous areas in the region are low grade.

This land offer was declined also because of the Company's financial commitments.

6. Montana

a. Land Offer 2831 was a magnetite pyrite deposit near Lewistown, Montana. Preliminary metallurgical tests appeared favorable, but there were no indications of a sufficient tonnage to justify further consideration of this property.

b. Land Offer 2851 consisted of magnetite and pyrite deposits near Stanford, Montana. The individual deposits are strung along a porphyry limestone contact for a distance of about 6 miles. The individual deposits are small. This land offer was declined.

c. Land Offer 2855 consisted of magnetite ilmenite deposits in Northwestern Montana and was also declined.

7. Outside Exploration in Western United States

Miscellaneous outside explorations in Western United States were also examined in the field during 1952. The following tabulation shows the outside explorations which were examined.

a. Outside Exploration - 1049 - Iron deposits in the Black Hills, South Dakota.

b. Outside Exploration 1050 - Iron deposits in Carbon County, Wyoming.

c. Outside Exploration 1062 - Climax, Molybedenum Mine, Colorado.

d. Outside Exploration 1063 - Manganese carbonate properties at Philipsburg, Montan.

D. Canada

In June, 1952, The Canadian-Cliffs, Ltd. was reorganized with the intent of being the Canadian subsidiary of The Cleveland-Cliffs Iron Company for exploration, development and production of iron ore in Canada. Dr. M. W. Bartley was made Resident Manager with headquarters at Port Arthur, Ontario. He was assisted by Dr's. J. M. Neilson and F. C. Kruger, Consultants.

Exploration was centered in the Provinces of Ontario, Quebec, New Brunswick and Nova Scotia. Offers of properties from Manitoba, British Columbia and the Yukon were also received.

During 1952, 70 land offers and 39 outside explorations were considered. Of this total, 13 land offers and 5 outside explorations were given some attention. Some were received too late

in the year to be given further examination and were deferred until 1953.

The projects that were given the greatest attention during the year are as follows:

1. Outside Exploration 978 - Matawin Range, Thunder Bay District, Ontario - Dr. F. C. Kruger. The iron-formation was found to be too low grade and unfavorable to concentration as well as narrow and irregular in width.

2. Outside Exploration 1025 - Land Offer 3002 - Pabineau-Little Rivers Reservation, New Brunswick - Dr. F. C. Kruger and R. M. Becker. The investigation of these anomalies showed either non-commercial deposits or deposits difficult to develop because of surface complications.

3. Outside Exploration 1031 - Mistassini-Albanel Area, Quebec - Dr. J. M. Neilson. Substantial tonnages of magnetic iron-formation averaging 31% iron and possessing good metallurgical properties have been staked for Canadian-Cliffs.

4. Outside Exploration 1035 - Bending Lake Area, Kenora District, Ontario - Dr. F. C. Kruger. The formation of this area does not have any economic possibility.

All except Outside Exploration 1031 have been abandoned. A recap of the 1952 expenditures may be shown as follows:

a.	Purchase of equipment	$ 1,173.31
b.	Investigation of land offers.	5,834.38
c.	Investigation of outside explorations . .	22,326.00
d.	General office expenses	4,800.53
	Grand Total	$34,134.22

E. South & Central America

1. Venezuela

a. Land Offer 2644 - El Trueno - The first half of the year was occupied with road building and details pertaining to the legalization of the claims. The second portion of the year was occupied with the continuing of the road building and construction of the base camp. The bulk of the drilling equipment had been transported to El Trueno by the end of the year. No field work was conducted on the deposit during the year in the way of geological or engineering studies.

Figure 12 shows the base camp under construction located on the Northeast flank of the main El Trueno deposit.

b. Land Offer 2748 - Perruolo Claims - These claims offered by Señor Nicolas Perruolo and associates, consisted of 6 separate groups of claims containing, presumably, iron and manganese mineralization. They were located south of the Orinoco River in the State of Bolivar. Of this total of 6, Messrs. Eric J. Rex

El Trueno, Venezuela

View of Base Camp Showing Construction Progress. Looking Northwest.

Figure 12

and Maxwell H. Madsen visited the following:

1. La Vigia
2. Monte Oscuro
3. Turapa

These examinations did not disclose significant tonnages of either manganese or iron. Conditions did not permit the examination of the remaining groups.

c. Land Offer 2777 - Real Corona - This land offer was investigated by Messrs. Eric J. Rex and Maxwell H. Madsen. It is located near the ferry on the Rio Aro on the way to El Trueno. The examination revealed considerable tonnage of low grade goethitic and hematitic canga. Locally are found small concentration of manganiferous material. The offer was declined.

2. Cuba

Land Offer 2834 - Cuban Manganese Ore - Messrs. S. W. Sundeen and R. E. Cannon examined a manganese deposit in Cuba in July. This deposit in North-Central Cuba was controlled by Mr. Arthur Macari. Samples did not show high manganese content, nor did the deposit contain significant reserves.

III. EXPLORATION DRILLING DEPARTMENT

The Exploration Drilling Department personnel moved into its new and centralized headquarters the early part of December, 1952.

The centralization of accounting and supervisory personnel will effect a more efficient operation. The proximity of diamond supplies and drilling equipment will expedite the overall operations too.

1. Diamond Cost

The following Table V represents an analysis of diamond bit costs at the various locations and the respective hole sizes.

TABLE V

PER FOOT COST OF DIAMOND BITS USED IN 1952

SURFACE

PROJECT		EX			AX			BX			NX			Total	Total
		Ft.	Amt.	Per. Ft.	Ft.	Amt.	Per. Ft.	Ft.	Amt.	Per. Ft.	Ft.	Amt.	Per. Ft.	Footage	Cost
Sec.	Hole														
3, 47-27	45				198	$ 294.87	1.49	12	$ 50.06	4.17					
3, "	46				316	371.08	1.17	3	22.47	7.49					
4, "	42							646	1,881.36	2.91					
4, "	43										2,766	$ 9,149.92	3.31		
4, "	45										792	805.79	1.02		
9, "	58							118	1,434.70	1.22					
9, "	66							467	1,040.43	2.23	16	50.82	3.18		
11, "	20							67	199.77	2.98	2,946	15,967.08	5.42		
29, 47-26	2							1,076	974.91	.91					
29, "	3				1,062	1,784.10	1.68	1,965	4,797.52	2.44					
29, "	4										809	1,518.42	1.88		
TOTAL FOR SURFACE HOLES					1,576	$2,450.05	1.55	4,354	$10,401.22	2.39	7,329	$27,492.03	3.75	13,259	$40,343.30

UNDERGROUND

MINE	EX			AX			BX			NX			Total	Total
	Ft.	Amt.	Per. Ft.	Ft.	Amt.	Per. Ft.	Ft.	Amt.	Per. Ft.	Ft.	Amt.	Per. Ft.	Footage	Cost
Athens-Bunker Hill	293	$ 397.08	1.36	513	$ 460.41	0.90	2,889	$10,255.84	3.55	1,407	$ 5,632.89	4.00		
Cambria-Jackson	110	130.30	1.18	2,254	3,985.43	1.77	1,026	2,894.89	2.82	10	62.81	6.28		
Cliffs-Shaft	8,978	6,820.69	0.76											
Lloyd				605	884.25	1.46	93	238.19	2.56	10	66.39	6.64		
Maas				743	785.10	1.06	169	156.08	0.92	11	52.62	0.48		
Mather "A"	431	733.75	1.70	6,849	11,487.21	1.68	3,494	7,157.02	2.05	115	705.81	6.14		
Mather "B"	139	528.45	3.80	9,743	12,945.50	1.33	4,555	7,611.15	1.67	152	162.46	1.07		
TOTAL FOR UNDER-GROUND HOLES	9,951	$8,610.27	0.87	20,707	$30,547.90	1.48	12,226	$28,313.17	2.32	1,705	$6,682.98	3.92	44,589	$74,154.32

2. Diamond Inventory - Hand Setting

The following Table VI shows the distribution of carbon and ballas bortz for the year 1952:

TABLE VI

DIAMOND INVENTORY (Hand Setting), December 31, 1952

	CARBON (Hand Setting)			BALLAS BORTZ (Hand Setting)		
	Kts.	Amount	Per Kt.	Kts.	Amount	Per Kt.
On Hand 1/1/52	808.24	$63,629.89	$78.72	40.89	$4,077.47	$99.72
Purchased 1952	--	--	--	--	--	--
TOTAL	808.24	$63,629.89	$78.72	40.89	$4,077.47	$99.72
Used 1952 (Loss)	--	--	--	--	--	--
On Hand 12/31/52	808.24	$63,629.89	$78.72	40.89	$4,077.47	$99.72

DISTRIBUTION OF INVENTORY: Loose Carbon, Carbon set in bits, loose Ballas (C. C. I. Co.)

3. Diamond Inventory - Mechanical Setting

The following tabulation shows the overall distribution of all types of diamonds used and on hand during the year 1952:

TABLE VII

DIAMOND INVENTORY (Mechanical Setting), December 31, 1952

	SCRAP CARBON		CONGO		LONGYEAR		"R" GRADE		"G" GRADE		TOTAL	
	Kts.	Amount	Kts.	Amount	Kts.	Amount	Kts.	Amount	Kts.	Amount	Kts.	Amount
On Hand 1/1/52	302.20	$4,490.37	346.66	$2,079.96	308.64	$ 3,395.04	29,506.36	$239,183.88	7,076.35	$68,136.75	37,540.21	$317,286.00
Purchased 1952	--	--	--	--	1,582.97	17,264.17	9,474.65	85,271.85	542.84	5,835.01	11,600.46	108,371.03
TOTAL	302.20	$4,490.37	346.66	$2,079.96	1,891.61	$20,659.21	38,981.01	$324,455.73	7,619.19	$73,971.76	49,140.67	$425,657.03
Used 1952 (loss)	5.68	113.60	19.50	117.00	1,432.49	15,608.89	9,484.35	85,359.15	816.67	8,983.37	11,758.69	110,182.01
Scrap Credit	--	--	--	19.72	--	--	--	1,875.18	--	138.74	--	2,033.64
On Hand 12/31/52	296.52	$4,376.77	327.16	$1,943.24	459.12	$ 5,050.32	29,496.66	$237,221.40	6,802.52	$64,849.65	37,381.98	$313,441.38

DISTRIBUTION OF INVENTORY IN CARATS

	SCRAP CARBON	CONGO	LONGYEAR	"R" NEW	"R" USED	TOTAL "R"	"G" NEW	"G" USED	TOTAL "G"	TOTAL INVENTORY
Loose Bortz (Mfg's)	128.10	206.87		8,142.69	3,187.01	11,329.70	2,244.39	1,236.51	3,480.90	15,145.57
Loose Bortz (C.C.I.Co.)	18.97			200.00	102.85	302.85	200.00	100.00	300.00	621.82
Salvage Reports Pending						2,043.89			111.61	2,155.50
Bits in Stock or Issued to Contracts	149.45	120.29	459.12			15,820.22			2,910.01	19,459.09
TOTAL	296.52	327.16	459.12			29,496.66			6,802.52	37,381.98

4. Plant Account

Table VIII is merely an excerpt from the 1952 Financial Statement.

TABLE VIII

	Account "A"	Account "B"	Account "C"	Total
End 1951	$23,338.39	$129,354.12	$159,906.60	$312,599.11
End 1952	19,775.26	150,861.88	180,089.59	350,726.73

Group "A" - Life not exceeding 2 years
Group "B" - Life not exceeding 10 years
Group "C" - Rods & Casing - Depreciated on footage basis

Rental charges (Per shift and per foot charges to cover depreciation and maintenance cost) amounted to $17,535.51.

IV. SURFACE EXPLORATION

The projects discussed in this section of the Annual Report are those involving drilling in addition to geological and geophysical field work. The details of the geological and geophysical field work have been covered in Section II of this report.

A. Michigan

1. The following Table IX is a summary of the surface drilling including the cost analysis:

TABLE IX

SUMMARY OF SURFACE DRILLING - COST ANALYSIS

LOCATION	HOLES	RIGS	OVER-BURDEN	DIAMOND DRILLING	TOTAL	1st CLASS ORE FOOTAGE	%	TOTAL COST "A"	C/FT "A"	TOTAL COST "B"	COST/FT "B"
Empire	1	C.C.I.	--	665	665	0	0	8,937.37	13.440	10,137.47	15.244
Cascade	2, 3, 4	C.C.I.	36	2,791	2,827	4	0.35	36,296.41	12.839	43,737.32	15.471
Sec. 3, 47-27	45, 46	C.C.I.	167	552	719	36	5.007	5,479.59	7.621	6,510.77	9.055
Sec. 4, 47-27 (Deep)	43, 45	C.C.I.	105	4,004	4,109	0	0	79,696.02	19.395	86,220.68	20.983
Sec. 4, 47-27 (Deep)	44	E.J.L.	55	1,091	1,146	0	0	24,010.04	20.951	25,125.50	21.925
Sec. 4, 47-27 (Total Deep)	43-45	C.C.I. & E.J.L.	160	5,095	5,255	0	0	103,706.06	19.735	111,346.18	21.189
Sec. 4, 47-27 (North Lake)	46-50	E.J.L.	108	3,252	3,360	0	0	43,974.15	13.088	47,327.96	14.086
Sec. 5, 47-27 (North Lake)	35	E.J.L.	64	492	556	30	5.4	6,231.84	11.208	6,513.19	11.714
Cliffs-Shaft Surface	36	E.J.L.	7	333	340	0	0	3,120.92	9.179	3,213.72	9.452

TABLE IX CON'T.

LOCATION	HOLES	RIGS	OVER-BURDEN	DIAMOND DRILLING	TOTAL	1st CLASS ORE FOOTAGE	%	TOTAL COST "A"	C/FT "A"	TOTAL COST "B"	COST/FT "B"
Sec. 4, 5, 47-27 (North Lake Total)	46-50, 35	E.J.L.	172	3,744	3,916	30	.766	50,205.99	12.821	53,841.15	13.749
Sec. 8, 47-27	1	E.J.L.	270	38	308	0	0	2,350.09	13.319	2,488.25	14.371
Sec. 9, 47-27	58, 66	C.C.I.	126	606	732	0	0	12,139.54	16,584	13,080.90	17.870
Sec. 9, 47-27	61-65, 67-71	E.J.L.	1,063	4,727	5,790	27	0.466	56,574.40	9,771	58,225.14	10.056
Sec. 9, 47-27 (Total)	58, 61-71	C.C.I& E.J.L.	1,189	5,333	6,522	27	0.414	68,713.94	10.536	71,306.04	10.933
Sec. 11, 47-27	20	C.C.I.	--	2,378	2,378	214	9.0	71,153.97	29.922	76,486.77	32.164
Sec. 11, 47-27	21, 22	E.J.L.	16	8,477	8,493	0	0	106,156.61	12.499	110,845.40	13.051
Sec. 11, 47-27 (Total)	20-22	C.C.I & E.J.L.	16	10,855	10,871	214	1.97	177,310.58	16.310	187,332.17	17.232
Sec. 2, 46-30 (Metropolis)	2, 3	E.J.L.	--								
Sec. 34, 47-30 (Standard)	4	E.J.L.									
Total Michigamme River			137	988	1,125	0	0	8,003.23	7.13	8,658.76	7.70
Sec. 19, 48-30 (Michigamme Mine)	6, 9-14	E.J.L.									
Sec. 20, 48-30 (Michigamme Mine)	3, 4	E.J.L.									
Total Michigamme Mine			86	3,912	4,098	0	0	22,736.61	5.50	23,893.21	5.69
Sec. 13, 43-35 (McGillis)	5-9	E.J.L.	765	4,656	5,421	0	0	49,388.25	9.11	51,951.07	9.58
Sec. 24, 43-35	80-82	E.J.L.	895	1,256	1,964	0	0	21,024.51	8.39	24,366.64	9.73
Sec. 26, 27, 43-35 (Hilltop)	5,14	E.J.L.	233	1,053	1,286	0	0	11,384.18	8.85	12,002.63	9.33

2. Recapitulation by Organization

Table X shows the distribution by the type of organization:

TABLE X

	NO. RIGS	FOOTAGE	% OF TOTAL
DEEP HOLE DIRECT SHIPPING			
* Department	5	9,479	20.925
Contract	2	9,639	21,279
TOTAL	7	19,118	42,204

* Empire Hole #1 is Metallurgical 0-500'. Deep Ore 500' and beyond.

TABLE X CON'T.

	NO. RIGS	FOOTAGE	% OF TOTAL
SHALLOW HOLE DIRECT SHIPPING			
Department	2	1,451	3.203
Contract	5	15,091	33.314
TOTAL	7	16,542	36.517
METALLURGICAL DRILLING			
*Department	1	500	1.104
Contract	4	9,139	20.175
TOTAL	5	9,639	21.279
TOTAL DEPARTMENT SURFACE		11,430	25.232
TOTAL CONTRACT SURFACE		33,869	74.768
GRAND TOTAL ALL SURFACE		45,299	100.000

* Empire Hole #1 is Metallurgical 0-500'. Deep Ore 500' and beyond.

3. Summary of Results - Marquette Range

a. Cascade - Kenneth H. Johnson, Geologist

Exploration drilling for direct shipping ore was continued during the year. Hole #3, an inclined hole, was drilled to explore the area to the south of and near the Volunteer fault. Hole #2, previously drilled, was re-entered to locate the footwall and explore for ore near the junction of the footwall and the Volunteer fault. The holes disclosed the presence of an hitherto undiscovered sill. Vertical Hole #4 was begun to test for direct shipping ore between the Volunteer and Palmer faults. At year's end, the current Cascade drilling has disclosed no merchantable ore body. Trouble with deviating drill holes is still a major problem here.

b. Empire - Kenneth H. Johnson, Geologist

Late in the year, Hole #1 was begun in the Empire Area. The hole is in essentially virgin ground for deep holes, and is located in a region of magnetic "highs". The first 500 feet is to be tested for its metallurgical characteristics and in depth for direct shipping ore. Considerable trouble with deviation from the vertical encountered.

c. Cliffs-Shaft Surface - Robert M. Becker, Geologist

Sections 3, 5, 8 & 9, 47-27 - The surface hard ore drilling in these sections is discussed in the Cliffs-Shaft Mine summary under Part V, Sub-division A, 1.

d. Section 4, 47-27 - Deep Exploration - Joseph L. Patrick, Geologist

Section 4 deep drilling continued along the established program with significant results. Hole #43 was stopped at a depth of 6365 feet. This is the deepest diamond drill hole in iron-formation, in the world. The entire hole was completed without any loss of equipment.

Hole #44 was started 400 feet to the north of Hole #43, and is intended to explore the area for which Hole #43 was originally located and could not drill because of excessive deviation from vertical. The retractable wedge was developed by The Cleveland-Cliffs Iron Company to such an extent in 1952, that it is now believed to be practical for keeping a hole within a few degrees of vertical. As of this years end, the correlation between holes #43 and #44 was very good.

Further to the east, Hole #45 was begun with a new large diesel rig purchased from the E. J. Longyear Company. Until broken ground forced the crew to case the hole, very excellent footage per shift, was recorded. This hole is exploring eastward from Holes #37, #37-A and #37-B, in which ore was found.

e. Section 11, 47-27 - Deep Exploration - Joseph L. Patrick, Geologist

Project Area II, Section 11, 47-27, this year, proved to be an area worthy of extensive exploration. Hole #20 in the northwest quarter of the section, cored 214 feet of high grade, low sulfur ore above the footwall at 4840 feet. The structure apparently has considerable extent, and a wedge hole (20-A) has begun to explore toward the south in an attempt to prove more ore.

Holes #21 and #22 in Project Area III were completed during the year. This drilling indicated a considerable displacement of the footwall to the South and also the lack of oxidation and enrichment in this area. Further exploration was discontinued and the rig moved to Project Area II, northwest of Hole #20.

f. North Lake Project - Sections 4, 5, 6, 47-27 - Joseph L. Patrick, Geologist

During the year, the drilling in Section 4, North Lake Project, was completed. Five holes were drilled along the three lines, each 1000 feet apart. The material was generally well enriched and oxidized with an iron content of approximately 35%. The first hole had been started in Section 5 by the year's end.

g. Tilden Mine - Kenneth H. Johnson, Geologist

No exploration activities were carried out at the Tilden Mine outside of routine studies.

h. Humboldt Mine - Charles R. Pace, Jr., Geologist

Geological work at the Humboldt property was restricted to plane table mapping in the mill site and pit area. Several metallugical samples were taken in conjunction with pit stripping in order to help ascertain the pit outline.

i. Michigamme Mine - Rolland L. Blake, Geologist

Additional drilling was done at the Michigamme Mine property from May to September. Eight new holes were drilled and one former hole deepened. The ore estimate was completed. In general, the

treatable iron-formation narrows to the west.

j. Ohio Mine - Rolland L. Blake, Geologist

No structure drilling was conducted on the Ohio Mine property in 1952, although the results of the churn drilling were correlated by the Department. Extensive mapping was conducted following the stripping and mining in both the East and West pits.

k. Republic Mine - Joseph L. Patrick, Geologist

No activity of geological interest was carried on at the property. However, an ore estimate was prepared from existing information. The indications are that more exploration is necessary, especially in the Park City Area.

l. Michigamme River Area - Robert W. Riedel

Early in 1952 diamond core drilling was completed on both the Metropolis and Standard Mine properties. In general, the iron-formation showed good metallurgical characteristics, but was not wide enough for economical mining. A comprehensive report was completed by Mr. Riedel dated April 7th.

4. Summary of Results - Menominee Range

a. McGillis Exploration - Section 13, 43-35 - Rolland L. Blake, Geologist

Five holes were drilled on North-South lines, cutting unoxidized iron-formation at near the same depth and crossing. This information indicates possible East-West parallel faulting successively displacing the unoxidized iron-formation. The area has been abandoned.

b. Spies Mine Survey - Section 24, 43-35 - Rolland L. Blake, Geologist

Three holes were drilled on the Spies Mine Survey in our continuing campaign to explore the South and Central portion of this section. This exploration is in addition to the underground exploration done from the Spies Mine. Two of the holes cut unoxidized iron-formation and the third was stopped in the hangingwall as it could not be continued owing to the proximity to the property line.

c. Hilltop Exploration - Sections 26 and 27, 43-35 - Rolland L. Blake, Geologist

Two holes were drilled in 1952, one in each section, to complete the Hilltop Exploration. The drilling demonstrated a considerable extent of oxidized iron-formation, but had insufficient high grade reserves to warrant additional expenditures.

B. Minnesota

1. Mesabi Range

Normal exploration conducted by the operating properties is not discussed in this report. Details of this type of work are obtained from the individual properties included in Mr. Holt's Annual Report.

2. Mesabi Range "Wild Cat Drilling"

Under II, B, 1, the field work done by Mr. Larson was discussed. The 3 areas are as follows:

a. The Elbern Area

This includes 2 properties, the Summerfield and the Section 36 Linco. The magnetics from the Summerfield property had been run previously by Professor W. A. Longacre.

Three holes were drilled, two of them in regions of magnetic highs and the third on a magnetic low. The sand in Holes #1 and #2 contained water washed magnetic pebbles. No economical material was found by this drilling.

The drilling in Section 36 consisted of 2 holes, both of which encountered the Virginia Slate. It is thought that the magnetics were caused by the underlying of the Biwabik iron-formation.

b. Ely Lake

Magnetics in this area are of the same relative base level as those discussed above. No interesting readings were found in the developed areas around the lake. Exploration was discouraged because of the high cost of obtaining the surface property.

c. Twin Lakes Area

This area was not drilled due to the unfavorable results obtained in Section 36 and at the Elbern Mine.

V. UNDERGROUND EXPLORATION

A. Michigan

1. Summary of Drilling

The following tabulation Table XI is the summary of underground drilling:

TABLE XI

LOCATION	HOLES	RIGS	DIAMOND DRILLING	1st CLASS ORE FOOTAGE	%	TOTAL COST "A"	C/FT. "A"	TOTAL COST "B"	C/FT "B"
Total Athens (Athens) &Bunker Hill (Bunker Hill)	47-49 7-19	C.C.I.	5,238	1,320	25.20	$45,503.10	8.687	$46,989.12	8.970
Cambria Jackson	197-208	C.C.I.	3,643	528	14.05	19,096.88	5.24	19,329.07	5.31
Cliffs-Shaft	781-832	C.C.I. (Mine)	8,978	1,423	15.08	32,911.54	3.666	35,622.43	3.968
Maas	65-67 68-74	C.C.I. Odgers	923 2,661	422 1,554	45.6 58.3	3,998.30 8,640.08	4.33 3.24	4,649.86 13,072.81	5.04 4.90
TOTAL	65-74	C.C.I. & Odgers	3,584	1,976	55.1	12,638.38	3.53	17,722.67	4.94
Mather "A"	86, 88-107, 110, 111, 117-119, 121, 125, 128, 129, 132-134, 140, 141, 145, 149	C.C.I. & (Mine)	10,762	2,558	23.77	60,888.73	5.66	72,317.16	6.72
Mather "B"	70-105, 108, 109, 112-116, 120, 122-124, 126, 127, 130, 131, 135-139, 142-144, 146-148, 150, 151	C.C.I. (Mine)	13,126	3,690	28.11	67,444.11	5.13	73,222.95	5.57
Spies (Above 8th)	56-58	E.J.L.	1,781	0	0	27,980.82	15.71	30,096.13	16.90
Spies (Below 8th)	59-63	Odgers	2,490	362	15.0	23,672.50	9.51	25,319.01	10.17
Spies Total			4,271	362	8.47	51,653.32	12.09	55,415.14	12.97

2. Recap by Organization

The following tabulation Table XII is the recap of organization:

TABLE XII

ORGANIZATION	NO. OF RIGS	FOOTAGE	PER CENT
a. C.C.I. Co. 1. Department	5	9,804	19.765
2. Mine	14	32,866	66.259
b. Contract	3	6,932	13.976
TOTAL	22	49,602	100.000

3. Summary by Properties - Marquette Range

a. Athens-Bunker Hill Mine - Kenneth H. Johnson, Geologist

1'. Athens Mine - The work of geological interest consisted of mapping and diamond drilling. Three holes were drilled to outline the ore and to locate the position of the footwall for lower level development. The anticipated outlines were confirmed.

2'. Bunker Hill Mine - This year an intensive campaign of exploration was initiated. The 10th level drift was extended to the 2400 W. co-ordinate and the north and south ore structures were explored. However, because of the complex nature of the structure, the exploration had not been completed at the year's end. The exploration proved that a greater amount of ore is available in the south ore body than had been anticipated.

3'. Negaunee Shaft - Work at the Negaunee Shaft consisted of mapping of the shaft and the connecting levels.

b. Cambria-Jackson Mine - Charles R. Pace, Geologist

During the year, a continuous exploration program was carried out. The main emphasis of the diamond drilling program was in the active mining area adjacent to the Cambria Fault above the 7th and 8th levels. This exploration was successful in maintaining the net reserves at approximately the same tonnage as 1951.

The other major activity was the drifting and drilling program on the 6th level in the east end of the Jackson Strip. One diamond drill hole was completed from this drift and encountered a short run of ore. This exploration will be continued in 1953.

c. Cliffs-Shaft Mine - Robert M. Becker, Geologist

Underground drilling during the year was largely guided by the New Shaft ore estimate and confined to "A" Shaft above 5th level, the Bancroft Lease, the "A" Shaft east area and "B" Shaft.

Drilling in the "A" Shaft east area, and "A" Shaft above 5th level, may be considered nearly complete at the present time. Significant tonnage additions were proven in the "A" Shaft east area, the Bancroft Lease and the upper levels of "B" Shaft North.

Surface drilling in Section 9, 47-27 proved the presence of a considerable body of second class and lean conglomerate ore in the vicinity of the Robbins Flooring Mill and an additional tonnage of second class ore in an anticlinal structure trending northwest of "B" Shaft far west workings. Hole #66, also in Section 9, showed no encouragement to the west of our present contracts in "B" Shaft.

Two holes in Section 3, 47-27 served to aid the planning of development now well under way in the "A" Shaft east area.

Drilling in Sections 5 and 8 was discontinued when the structure encountered was not as had been anticipated. The surface exploration for extensions of hard ore, which might be above present mine elevations, can be considered complete except for inlying areas. No significant tonnages of first class ore have been realized to date.

d. Lloyd Mine - Rolland L. Blake, Geologist

No geological activity was carried on for the year other than routine mapping and studies.

e. Maas Mine - Charles R. Pace, Geologist

Geological activity at the Maas Mine consisted of routine mapping of mining openings and the execution of a major exploration program.

The exploration program was carried out from the 6th level. The purpose was to outline the ore body for 6th and 7th level mining in both the Maas Mine and the Pioneer and Arctic properties. The results of this exploration were as follows: (1) the net reserves of the Maas Mine were increased by approximately one-half million tons, (2) approximately 1,200,000 tons of high sulfur ore were proved in the Pioneer and Arctic property, (3) the drilling indicated that the sulfur content of the ore is decreasing below the 6th level elevation.

f. Mather Mine

1'. "A" Shaft - David M. Bennett, Geologist - Exploratory drilling at the Mather Mine "A" Shaft for the year was conducted by drilling a total of 38 holes.

Third Level - Drilling from on or above the 3rd Level provided more detailed outlines to known ore bodies prior to further operations.

Fifth Level - Drilling from on or above the 5th Level provided further outlines and indications of the upward extension of the ore pipe previously outlined from the 6th Level.

Sixth Level - Drilling from the 6th Level outlined in more detail known ore bodies prior to operations.

Seventh Level - About half the total number of holes drilled were located on or above the 7th Level. This drilling proved anticipated ore bodies lying east of the Mather Fault. Scattered ore bodies to the west of the Mather Fault were confirmed to be larger than anticipated as 7100 Cross-cut drifting uncovered ore continuing westward from the 7200 Cross-cut. Indications of faulting in the 7100 Cross-cut have also been important in structure interpretation.

7100, 7500, 7600, 7700 Cross-cuts were important in establishing contacts which have facilitated working out the structure of the area south of the 7th Level.

The shaft has been sunk in silicious argillite to a depth of -1484 feet. Plans call for the removal of the pentice in the first quarter of 1953.

2'. "B" Shaft - Gerald J. Anderson, Geologist - The extensive diamond drilling program that was started in 1950-1951 was continued during 1952. The exploration was planned to cover four major objectives. These were (1) Outlining the 5th Level ore bodies, (2) Detailing the ore outlines for 6th Level mining, (3) Outlining and detailing the 7th Level ore bodies, and (4) Outlining the 8th Level ore structures.

Fifth Level - Five holes were drilled by Mather Mine "A" Shaft to explore the west end of 5th Level "B" Shaft. No mineable ore was encountered in the first stages of this drilling program.

Sixth Level - Eight holes were drilled from 6th Level and the sub-levels related to 6th Level to detail the outlines of the ore for 6th Level mining. This drilling proved to be very valuable for development purposes.

Seventh Level - The 7th Level exploration program included 9 down-holes from the 6th Level and 29 holes from the 7th Level workings. The results of this drilling indicates (1) an increase in the ore reserves available to 7th Level, (2) that a considerable amount of drilling is needed to detail the ore outlines for development, (3) that with the exception of small tonnages of high sulphur ore north of #22 dike, the ore will be standard grade.

Eighth Level - A total of 13 holes were drilled to outline the 8th Level ore bodies. These included 7 down-holes from the 7th Level and 6 holes from the 8th Level workings. This drilling indicated that large tonnages of standard ore will be available to the 8th Level.

4. Summary by Properties - Menominee Range

Spies Mine - Rolland L. Blake, Geologist

Exploration drilling proved the Spies east ore body continued on below 8th Level with the same thickness, but a steeper dip to the west. Mapping exploration drilling to the west of the Spies east deposit proved a major fault area and indicated the possibility of an associated ore body with this faulting.

VI. LAND OFFERS AND OUTSIDE EXPLORATIONS

A. Land Offers

During the year 1952 the Geological Department continued to process the various land offers submitted to the Company. The mineral land offers may be sub-divided into five general groups as follows:

Area	No.	Percent
1. Michigan	38	28.0
2. Minnesota	14	10.3
3. United States General	14	10.3
4. Canada	64	47.0
5. South and Central America	6	4.4
TOTAL	136	100.0%

A significant shift occurred in 1952 with a greater proportion of the land offers being in Canada. During the year, the 2900 series of numbers was reserved for Minnesota land offers and the 3000 series was reserved for Canada. During 1952, a total of $5,834.38 was spent on the investigation of Canadian land offers. A total of $37,692.82 was spent on Michigan, Minnesota and United States General land offers. Investigation expenses for South and Central America are not available at this writing. Figure 13 is a 5-year numerical analysis of the land offers.

Figure 13

GRAPH SHOWING RATE OF

MINERAL LAND OFFERS

1948—1952, inclusive

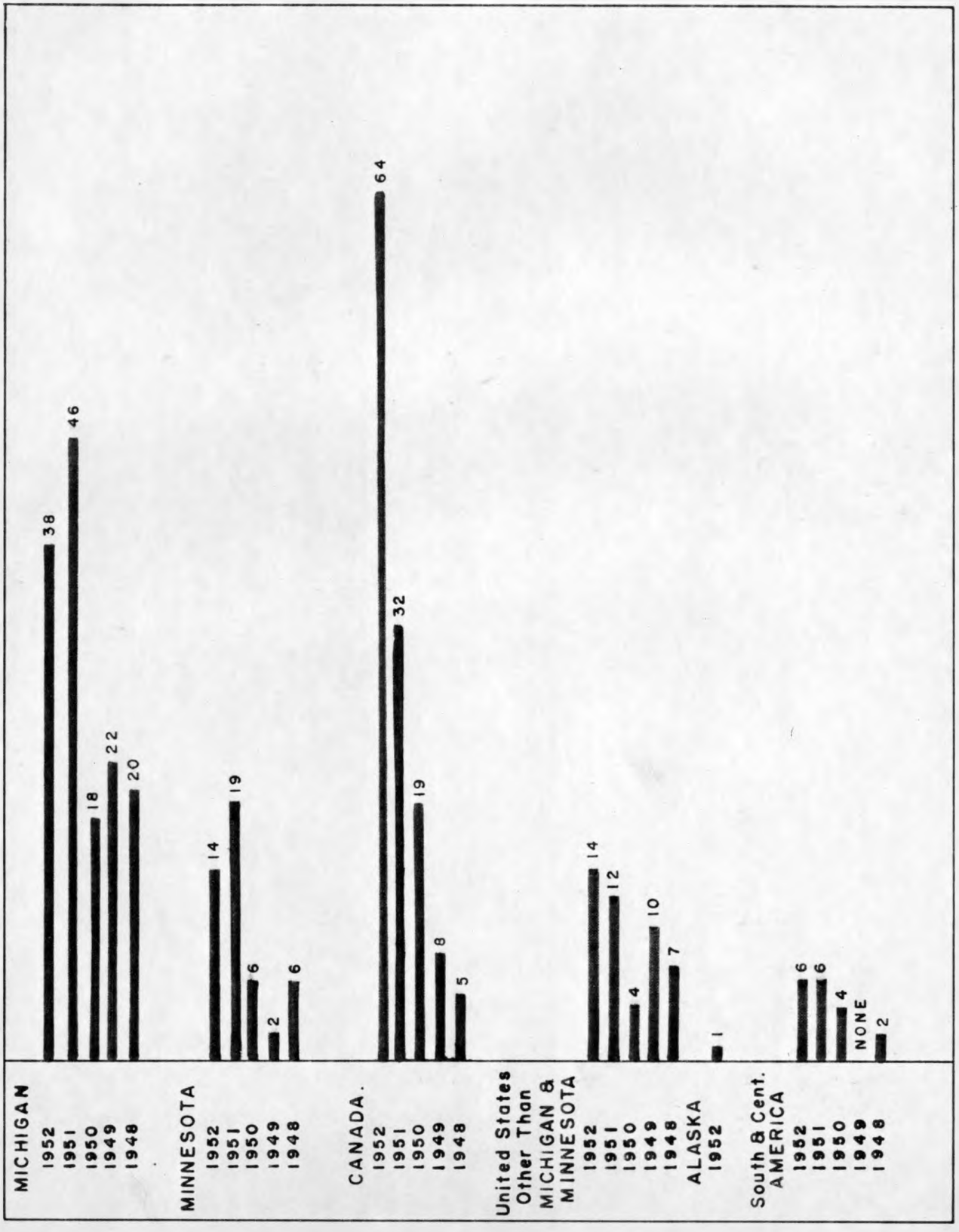
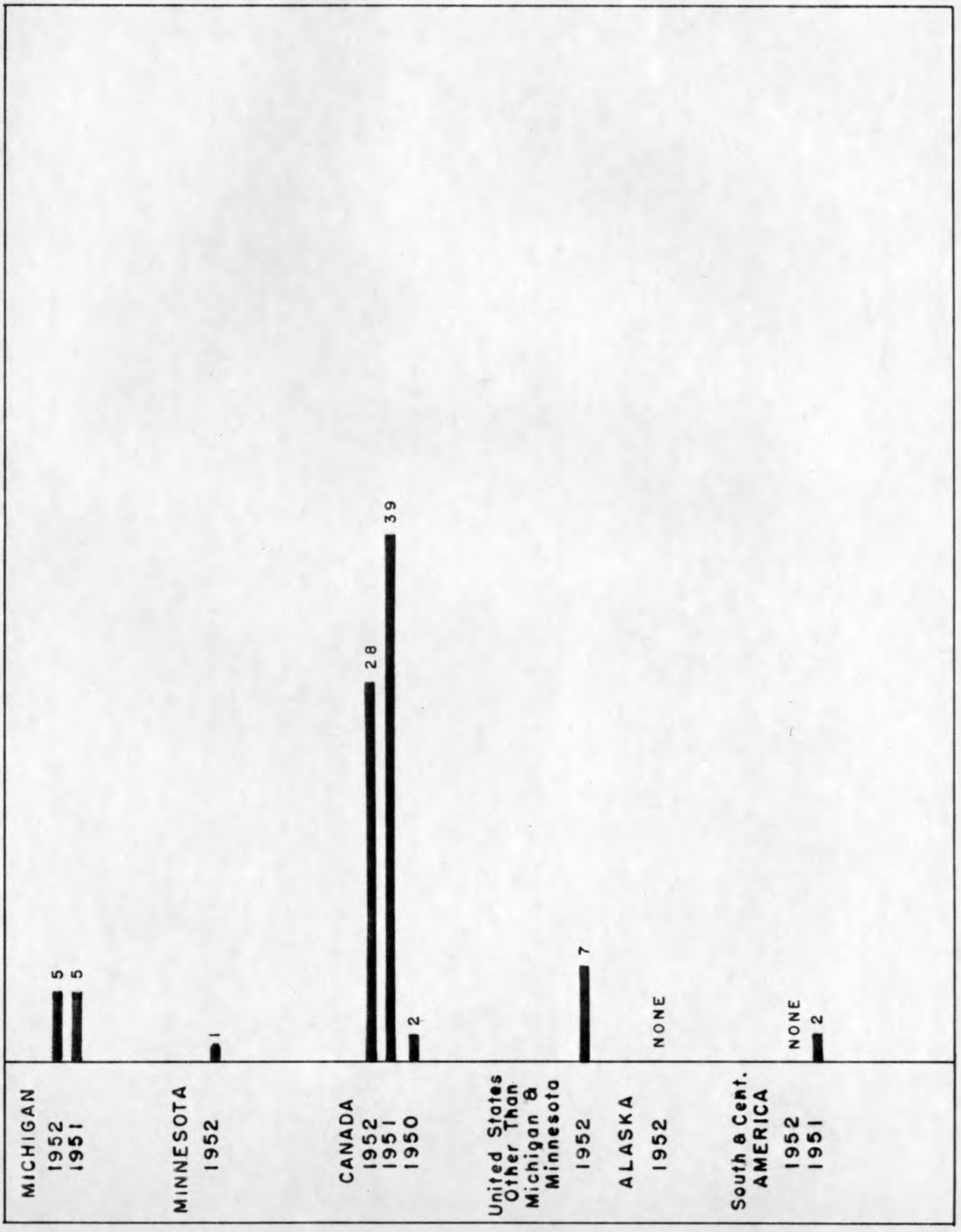


Figure 14

GRAPH SHOWING RATE OF
OUTSIDE EXPLORATIONS
1948—1952, inclusive



B. Outside Explorations

During 1952, increased attention was paid to the subject of outside explorations. Figure 14 shows the rate of outside explorations by years. The following table shows the distribution into the five general groups. A total of $15,038.09 was spent on these investigations in 1952.

Area	No.	Percent
1. Michigan	5	12.2
2. Minnesota	1	2.4
3. United States General	7	17.1
4. Canada	28	68.3
5. Alaska	0	0.0
TOTAL	41	100.0%

VII. OTHER DEPARTMENTAL HIGHLIGHTS

A. Ruska "Longacre" Superdip

Our Geophysical Consultant, Professor William A. Longacre, collaborated with the Ruska Instrument Corporation of Houston, Texas in a revision and improvement of the Hotchkiss Superdip. The Company purchased three of these Superdips and placed them in service in the field during the 1952 field season. In general, the instruments proved quite satisfactory and represent a considerable improvement over the older types.

Progress was made in the determination and adjustment of instrument constants, aimed at increasing the accuracy of the calibration in terms of vertical field intensity in gammas.

The superdip used in the Minnesota exploration on the Vermilion Range was calibrated in absolute vertical intensity expressed in gammas. This represents a supposedly new technique in magnetic work and is believed to have some advantage over the usual determination of relative values of magnetic intensity.

B. Mineralographic Research

During the summer of 1952, the Geological and Metallurgical Departments engaged Mr. Tsu-Ming Han for the mineralographic research. Emphasis was placed on the relation of microscopic studies and metallurgical characteristics. Mr. Han devoted the greater part of his time to the Humboldt and Republic Mines.

C. North Michigamme Geological Research

The Geological Department assisted Mr. Terence T. Quirke, Jr. with his thesis on the North Michigamme Area. This thesis was for partial credit for a Master of Science degree in Geology at the University of Minnesota. This project has been of considerable value to the Department, particularly with our current investigation of the Michigamme Mine.

D. Mine Subsidence

During the year 1952, the Geological Department continued its co-operative studies with the Mining Engineering Department on the subject of Mine Subsidence. During the year geophones were operated underground at the Athens Mine and in D.D.H. #65, Section 2, 47-27, Mather Mine "A" Shaft.

Regular meetings were started of the Subsidence Committee and work continued on the so-called subsidence sections. Conferences were also held with Dr. Leonard Obert and his staff from the Applied Physics Division of the U. S. Bureau of Mines.