23.

a. PENSION SYSTEM.

The pension system which went into effect on January 1, 1909 completed the thirty fourth year of its operation in 1942.

No changes in the rates of pensions were made during the year 1942. On January 1st, 1933 the pension payments were reduced 50%; those under $20.00 remaining the same, those over $20.00 having a minimum rate of $20.00. There has been no addition to the pension rolls since January 1, 1932.

The following Mining Department pensioners passed away during 1942:

No.	Name	Pension Began	Date of Death
122	Hans Selsback	6/1/1921	11/ 5/42
135	Ole Walline	8/1/1921	1/29/42
227	James Eddy	2/1/1928	4/26/42
254	Gust Carlson	1/1/1931	1/15/42

	1941	1942
Number of deaths	4	4
Number of Old Age pensions in force Dec. 31	44	40
Average annual pension	$ 283.56	290.80

There was no change in the Furnace Department pension payroll during the year 1942.

On December 31, 1942 there were three pensioners on the Furnace Department pension roll and the average annual pension was $282.24.

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23.

a. PENSION SYSTEM (Continued)

Pension payments for the years 1908 to 1942, inclusive, are as follows:

YEAR	Old Age	Widows and Orphans	Total
1908	69.10	48.00	117.10
1909	351.92	464.00	815.92
1910	896.44	1043.00	1939.44
1911	1690.57	2649.00	4339.37
1912	3865.95	3113.00	6978.95
1913	5133.62	3025.00	8158.62
1914	6179.57	3403.00	9582.57
1915	7910.35	2372.00	10282.35
1916	8787.02	1694.00	10481.02
1917	9327.22	1266.00	10593.22
1918	8889.14	944.00	9833.14
1919	9605.02	888.00	10493.02
1920	12613.29	814.00	13427.29
1921	21856.64	14.00	21870.64
1922	29063.85	168.00	29231.85
1923	29564.57	168.00	29732.57
1924	31987.64	168.00	32155.64
1925	34926.34	163.00	35089.34
1926	38924.88	143.00	39067.88
1927	45841.03	0.00	45841.03
1928	51869.03	0.00	51869.03
1929	52701.19	0.00	52701.19
1930	53779.24	0.00	53779.24
1931	56379.39	0.00	56379.39
1932	40615.13	0.00	40615.13
1933	30981.29	0.00	30981.29
1934	28205.25	0.00	28205.25
1935	24987.66	0.00	24987.66
1936	22736.32	0.00	22736.32
1937	20393.66	0.00	20393.66
1938	18360.44	0.00	18360.44
1939	16544.14	0.00	16544.14
1940	14237.87	0.00	14237.87
1941	12476.76	0.00	12476.76
1942	11632.15	0.00	11632.15
	$ 763383.48	22547.00	$ 785930.48
Payment made by Cleveland Office in 1930	2500.00		2500.00
	$ 765883.48		$ 788430.48

WELFARE DEPARTMENT.

23.

a. PENSION SYSTEM (Continued)

Republic Mine

There was no change in the pension roll during the year 1942.

On December 31, 1942 there were six pensioners on the roll and the average annual pension for the year was $248.00.

The payments made from October 1, 1920 to December 31, 1942, follow:

1920	$ 278.61
1921	3427.97
1922	5672.82
1923	6641.51
1924	8172.96
1925	8379.08
1926	9539.90
1927	12185.24
1928	12768.21
1929	14199.74
1930	13148.40
1931	11809.51
1932	7673.30
1933	4908.04
1934	4400.52
1935	4160.52
1936	4031.36
1937	2853.58
1938	2028.88
1939	1868.88
1940	1868.88
1941	1741.92
1942	1488.00
	$ 143247.85

23.

a. PENSION SYSTEM (Continued)

FURNACE DEPARTMENT.

Pension payments for the years 1910 to 1942, inclusive, are as follows:

Year	Old Age	Widows and Orphans	Total
1910	111.75	0.00	111.75
1911	268.20	120.00	388.20
1912	268.20	180.00	448.20
1913	268.20	180.00	448.20
1914	268.20	180.00	448.20
1915	268.20	180.00	448.20
1916	268.20	60.00	328.20
1917	268.20	0.00	268.20
1918	268.20	0.00	268.20
1919	130.55	0.00	130.55
1920	223.80	0.00	223.80
1921	781.63	0.00	781.63
1922	1118.04	0.00	1118.04
1923	1179.38	0.00	1179.38
1924	2085.32	0.00	2085.82
1925	2833.39	0.00	2833.39
1926	5351.35	0.00	5351.35
1927	4819.73	0.00	4819.73
1928	5481.50	0.00	5481.50
1929	6137.02	0.00	6137.02
1930	6191.42	0.00	6191.42
1931	5531.30	0.00	5531.30
1932	3327.09	0.00	3327.09
1933	2528.04	0.00	2528.04
1934	2309.43	0.00	2309.43
1935	1930.54	0.00	1930.54
1936	1902.72	0.00	1902.72
1937	1662.72	0.00	1662.72
1938	1446.90	0.00	1446.90
1939	1374.96	0.00	1374.96
1940	1158.78	0.00	1158.78
1941	926.72	0.00	926.72
1942	846.72	0.00	846.72
	$ 63536.40	900.00	$64436.40

23.

a. PENSION SYSTEM (Continued)

LAND DEPARTMENT.

Erick Johnson continued on the pension roll during the year 1942. His annual pension amounts to $240.00.

Total pension payments from January 1, 1927 to December 31, 1942 are as follows:

1927	333.36
1928	333.36
1929	333.36
1930	333.36
1931	333.36
1932	250.08
1933	240.00
1934	240.00
1935	240.00
1936	240.00
1937	240.00
1938	240.00
1939	240.00
1940	240.00
1941	240.00
1942	240.00
	$ 4316.88

WELFARE DEPT. ANNUAL REPORT YEAR 1942

23.

b. REPUBLIC MINE FUNDS

It is recorded in the annual report of this department that the 1930 annual report carries a full statement of the Sick Benefit Relief and the Fatal Accident Funds of the closed Republic Mine.

The unused balances which remained in these funds have now all been expended. For several years past there have been no claims against any of the remaining funds. For the past few years we have recommended that the remaining funds in these two accounts be closed out. This was done in April of 1942.

The original balances were all turned over to the Marquette County Chapter of the American Red Cross and were used exclusively in Republic Township for health and welfare purposes. The remaining balances, amounting to $274.12, were turned over to Republic Township in April of this year and they are being used for health and welfare purposes in the township. A recent report indicates that the last funds have been spent in providing necessary fuel, repairs and improvements of the old Republic Hospital, which we are now trying to transfer from the Republic Improvement Association to Republic Township. This is being done so that the old hospital may be maintained as a health center in the community. We believe it is necessary to maintain a health center at Republic because of the fact that this community is rather isolated, particularly in the winter months, and the maintenance of a health center assures not only medical attention, but emergency medical attention and it has been found from time to time that the maintenance of a health center has meant the availability of very necessary health services.

The funds which were reported last year on deposit in the Miners' First National Bank, as indicated above, have been closed out. There was a balance in deposit account #1672, known as Republic Mine Fatal Accident Fund, of $202.84. Deposit account #1673, known as Republic Mine Relief and Sick Benefit Fund, had a balance amounting to $71.28. These accounts have now been completely closed.

Dr. Van Riper, who headquarters at Champion, continues to make regular calls at Republic and to the surrounding area. He uses what was formerly the Republic Hospital, now known as the health center, for his headquarters in the district. Dr. Van Riper serves the medical needs not only of Champion Township, but of Humboldt Township, Ely Township, and a small portion of Michigamme Township. He takes care of our employees who live in the Champion-Republic district and he receives $1.25 per man per month, which the employees pay for medical attention. Dr. Van Riper is entirely alone in his district and he has not been able to get any help.

It is pointed out here that his services over a wide area brought him, during 1942, $83.75 for the lowest month and $111.25 for the highest month, which was November. For the services rendered the remuneration is not sufficient. It is pointed out that Dr. Van Riper covers rather a large area and since he has always been very loyal and faithful to our employees in his district it appears that he should be either placed on our payroll at a definite amount each month, or some allowance should be made for mileage, in addition to the $1.25 per employee which he now receives.

23.

b. REPUBLIC MINE FUNDS (Continued)

Some years ago the Republic Hospital had been deeded over to the Republic Improvement Association. The Republic Improvement Association never did function and in order to assure some type of health service and a health center in the district it was suggested that Republic Township, through its township officials, arrange to take the deed over from the Republic Improvement Association. This procedure is now being carried out and within a short time Republic Township will be responsible for the maintenance of the old Republic Hospital. This guarantees some type of health service program on a continuous basis in Republic Township.

c. SUSPENSE FUNDS

The annual report for the year 1918 carries a complete statement of the payments made from the Suspense Funds from February 1, 1912, at which time the Michigan Compensation Law went into effect. Reference to these funds is made in the annual report each year so that it may always be convenient to determine where to look for the final report on the Suspense Funds.

23.

d. VISITING NURSES

The services of the visiting nurses have been continued on the usual basis throughout 1942, and their services, particularly during war times, mean a great deal to all of our employees and their families. Our nurses are busy each day and the increase in our payrolls during the past year has given them added responsibilities and opportunities for service. The visiting nurses have carried on their work in a very commendable and satisfactory manner.

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 at Gwinn from September 1, 1910 until October 1, 1927 when the Gwinn mines were closed.

During the year 1942 the following nurses were employed:

Ishpeming - Miss Myrtle V. Welander
Negaunee - Miss Ina E. Atkin
Iron River - Miss Laura N. Fisk,
(Miss Fisk is employed jointly with other companies)

Miss Welander and Miss Atkin submit reports each week and we also have monthly summaries of their work. Each month the monthly summaries of the nurses' services are made a part of the monthly report of this department. Some idea of the extent of the work which the nurses carry on may be had by checking the monthly reports of this department. The service of our visiting nurses has long been a very important part of the follow-up work in case of illness amongst our employees and their families. It is felt that the work of the nurses has a great influence on the reduction of absenteeism among our employees.

23.

d. VISITING NURSES.

Following is the report of the Ishpeming visiting nurse for the year 1942:

Total number of patients cared for during year	602
Number of new cases cared for during year	342
Total number of visits to patients	4006
Number of families visited for the first time	66
Number died	8
Number of social calls	57

Classification of new cases for the year:

Number of adults	146	Male	11	Female	135
Number of children	196	Male	84	Female	112

Nationalities of new cases for the year:

American	245	Irish	3
Austrian	1	Italian	9
English	18	Norwegian	8
Finnish	45	Swedish	5
French	8		

Diseases and number of new cases:

Aenemia	2	Injury	7
Appendicitis	2	Nephritis	1
Asthma	3	Obstetrical	7
Baby Welfare	15	Otitis Media	3
Bowel Trouble	11	Paralysis	2
Bronchitis	16	Pleurisy	1
Burns	1	Pneumonia	8
Carcinoma	3	Post Operative	22
Chicken Pox	1	Postnatal	24
Cold	39	Prenatal	18
Cystitis	1	Rash	3
Dysentery	1	Rheumatism	3
Ear Trouble	1	Rupture	1
Erysipelas	1	Stomach Trouble	6
Fracture	5	Tonsilitis	15
Gall Bladder	1	Unclassified	3
Heart trouble	2	Undiagnosed	11
Infants, Newborn	50	Var. Ulcer	2
Infections	37	Whooping Cough	13

Visiting Nurse: Miss Myrtle Welander.

WELFARE DEPARTMENT.

23.

d. VISITING NURSES (Continued)

Following is the report of the Negaunee visiting nurse for the year 1942:

Total number of patients cared for during year	1304
Number of new cases cared for during year	800
Total number of visits to patients	5043
Number of families visited for the first time	41
Number of social calls	870
Number died	5

Classification of new cases for the year:

Number of adults	367	Male	109	Female	258
Number of children	433	Male	215	Female	218

Nationalities of new cases for the year:

American	415	Irish	2
Croatian	3	Italian	87
Finnish	260	Swedish	20
French	13		

Diseases and Number of new cases:

Aenemia	4	Mastoiditis	3
Appendicitis	12	Mumps	9
Arthritis	1	Nephritis	2
Asthma	6	Neuritis	3
Bowel trouble	44	Obstetrical	10
Bronchitis	20	Otitis Media	5
Burns	6	Peritonitis	2
Carcinoma	1	Pertussis	61
Cellulitis	1	Pleurisy	5
Chicken Pox	7	Pneumonia	8
Cholecystitis	19	Post Operative	71
Cold	58	Pregnancy	43
Croup	7	Pul. Tuberculosis	1
Cystitis	4	Pyletis	3
Dog Bite	1	Quinsy	1
Eczema	1	Renal Calculus	1
Gen. Debility	5	Rheumatism	9
Glycosuria	3	Rupture	6
Grippe	45	Scarlet Fever	22
Heart Trouble	12	Sore Eyes	4
Hives	2	Sprains	1
Hysteria	1	Stomach trouble	7
Infants, Newborn	18	Strep. Throat	28
Infections	37	Tonsilitis	32
Injury	71	Unclassified	11
Kidney Trouble	1	Var. Ulcer	3
Measles	5	Whooping Cough	13
Mal-Nutrition	44		

Visiting Nurse: Miss Ina E. Atkin.

WELFARE DEPARTMENT.

WELFARE DEPT. ANNUAL REPORT YEAR 1942.

23.

d. VISITING NURSES (Continued)

NUMBER OF PATIENTS ATTENDED AND CALLS MADE.

	No. of Patients	No. of New Cases	Male Adult	Female Adult	Male Children	Female Children.
Ishpeming	602	342	11	135	84	112
Negaunee	1304	800	109	258	215	218
	1906	1142	120	393	299	330

	Total No. Visits	Number Died	Social Calls	Families visited for first time.
Ishpeming	4006	8	57	66
Negaunee	5043	5	870	41
	9049	13	927	107

NATIONALITIES OF NEW CASES.

	American	Austrian	Croatian	English	Finnish
Ishpeming	245	1	-	18	45
Negaunee	415	-	3	-	260
	660	1	3	18	305

	French	Irish	Italian	Norwegian	Swedish
Ishpeming	8	3	9	8	5
Negaunee	13	2	87	-	20
	21	5	96	8	25

WELFARE DEPARTMENT.

23.

f. NORTH LAKE CLUB

The clubhouse at the North Lake location has carried on its usual functions of supervised recreation and community activity throughout the year. Mr. Dewey Urquhart continues as the director of the clubhouse. The Inland Steel Company has cooperated throughout the year in the operation of the club, and the building has been used not only as a community center, but as a gathering place for practically all types of activity in the North Lake district. Additional repairs were made to the building during the year and the building is in good condition. Employees in the district of both the Lloyd Mine and the Inland Steel Company mines use the clubhouse regularly for practically every type of community activity.

Following is a statement showing receipts and expenditures for 1942:

	TOTAL FOR YEAR
RECEIPTS:	
Membership Fees	$381.50
Bowling Alleys	334.54
Pool and Billiards	52.80
Telephone Tolls	32.18
TOTAL	801.02
EXPENDITURES:	
Building Maintenance	320.76
Equipment	192.72
Lighting	137.14
Heating	527.23
Water	60.00
Bowling Alley	246.98
Pool Room	5.39
Office Expense - Telephone	89.68
Salaries and Wages	2,585.92
Reading Room	15.55
Miscellaneous	85.29
Federal Special Excise Tax	40.00
Personal Injury Expense	6.00
Unemployment Insurance Tax	50.94
Old Age Benefit Tax	31.84
Fire and Boiler Insurance	70.29
Maintenance of Grounds	362.93
TOTAL	$4,828.66
Deficit	$4,027.64
Billed to Inland	960.00
Billed to Lloyd	3,067.64

23.

g. GWINN ASSOCIATION

The clubhouse, maintained and administered by the Gwinn Association at Gwinn, has had a busy year. Mr. E. L. Miller has continued as director in charge of all work, and the Company participates in the work at the clubhouse by matching the twenty-five cents monthly membership fee which is paid by our employees who are members of the club and who live in the Gwinn District. Each month a check is sent by the Company to match the membership fees of the members. This is the Company's donation towards the up-keep and the program of the Gwinn Association and the clubhouse.

The club building at Gwinn serves the community in practically every capacity. Activities, including not only community activities but governmental activities and school activities, are centered in the building. The school district of Forsyth Township has contracted to use the clubhouse as an athletic center and as a gymnasium and Mr. Miller acts as one of the athletic instructors. Practically all of the organizations in the district hold their meetings and gatherings at the clubhouse. Moreover, during the present year the building was used as a center for all civilian defense programs and for Red Cross activities.

A copy of the annual report is herewith submitted.

Membership

Number on roll, January 1, 1942.....267
Number on roll, January 1, 1943.....307
High membership for year: November.....320
Low membership for year: February.....259
Average monthly membership.....284

The membership showed a slight increase, due to the fact that more men are carried on the different mine lists.

Attendance

The attendance at the building showed a slight increase over last year and is due to the number of meetings held in the interest of civilian defense, Red Cross meetings, and other meetings in connection with the war effort.

Total estimated attendance at building during year.....78805
Average monthly attendance.....6567
High monthly attendance: December.....9350
Low monthly attendance: August.....3225

An effort was made to conduct the usual number of outdoor activities, but the hardball league was dropped as there was no organized league operating in this section; also adult inter-city softball games were omitted, owing to

23.

g. GWINN ASSOCIATION (Continued)

the travel curtailment. However, activities in softball, hardball, tennis and horse-shoe pitching were carried on among different local groups. Also activities at Bass Lake Camp were as usual. The following estimated attendance covers all activities conducted outdoors by the Club or where equipment is furnished for group leaders: 8,200.

Financial Information

(Taken from December Financial Statement)

Total receipts including 1941 balance	$ 5,782.23
Total expenditures for year	4,866.40
Balance on hand, January 1, 1943	$ 915.83

Buffet, Billiards and Bowling

Receipts for year	$ 1,019.00
Expenditures for year	694.18
Profit	$ 324.82

Receipts from membership and rental $ 3,097.50

General Activities and Organizations using Building

20 - committee meetings
18 - nights play Men's Cribbage League - 1 annual banquet
12 - sessions Women's Card Groups - bridge and cribbage - banquet
15 - meetings Women's Study Club - annual dinner
28 - meetings Federal agencies
56 - meetings by Red Cross workers
15 - classes Home Nursing
16 - meetings Junior Study Club - annual dinner
20 - meetings Daughters of Isabelle
6 - meetings by Town Club
3 - meetings by Sportsmen's Association
17 - rehearsals for different plays
6 - registrations for Selective Service and civilian defense
7 - meetings Civilian Defense and Observation Post
2 - meetings C.C.I. Company employees
6 - wedding showers
1 - annual Tea Party--Senior High Girls
1 - annual card party to raise funds for Girl Scouts
5 - miscellaneous parties by different groups
16 - dances held, including social dances by high school, dances by Catholic Church to raise funds, and other organizations
168 - sessions in kindergarten
106 - lunches or dinners held by different organizations
31 - times - chairs, tables or dishes loaned for family parties

23.

g. GWINN ASSOCIATION (Continued)

Annual Events of Special Interest

Annual Banquet	by	Men's Cribbage League
Annual Junior Prom	by	High School
Annual Banquet	by	Women's Card Groups
Annual Banquet	by	Women's Bowling League
Annual Hallow'een Party	by	Senior High School
Annual Christmas Treat for Children	by	Entire Community
Annual New Year's Party	by	Town Club

Church Organizations Using Building

18 meetings - 1 rummage sale - 32 choir rehearsals - Methodist Church
17 meetings - 2 parties - 1 dinner - Women's Guild
10 meetings - 2 church services- 1 Mother's Day program - 1farewell party - 1 Sunday used equipment to serve meals for district meet.
3 meetings - Dorcas Society
8 meetings - 3 card parties - 3 dances to raise funds - Catholic Church

Library and Reading Room

There were not as many books withdrawn from the library this year as in other years and no doubt it is due to the fact that members are reading the better magazines, containing articles regarding the war and situations that will develop in the future.

Weekly magazines received.....5	Daily newspapers.....3
Monthly magazines received.....20	Weekly newspapers.....2

Members are permitted to check out magazines for home reading.

Recreation Room

This room is being used at present to capacity. The older members are spending more time here than before, no doubt on account of the effort being made to save tires. The pool and billiard tables are in good condition, new cues being added and new ivory balls for billiards. The table tennis table is very popular and should the interest continue, it will be necessary to add another table.

Card Playing Facilities

The playing of cards in the building is still under supervision. There is some miscellaneous playing done in the afternoons by night-shift men, but most of the playing is in organized groups. The men have their regular night weekly for cribbage and the women have a scheduled night for bridge and cribbage.

23.

g. GWINN ASSOCIATION (Continued)

Town Club

This is a newly organized club, composed mostly of business men to promote civic programs and work for the best interests of the entire community. Meetings are held twice monthly and the club will be an asset to the Association. It sponsored the Annual New Year's Party, used local talent entirely, dancing, a program of singing, community singing, a short talk at midnight by a local minister, and a feature of everyone bringing their own food, including coffee and sugar. A total of 200 attended.

Bowling

The past year the men completed an 8-team league. Starting in December this year, they will have a 6-team league. The women have a four-team league. The league games take up five nights every week, leaving Saturday night and Sunday afternoon for open bowling. The alleys were closed during the summer and were put in the best shape possible during that period.

Civilian Defense

The building is the center of all civilian defense and Red Cross activities. All registrations for Selective Service and defense were held in the building. Association employees are active in all branches and it is estimated they spent 400 hours in different kinds of activity to further the war effort. The secretary of association is acting as Commander of Civilian Defense.

Supervised Gymnasium Activities

	Periods	Attendance
High school classes (girls)	126	3305
High school classes (boys)	138	3959
High school basketball practice	68	683
High school mixed dancing classes	28	822
Grade and kindergarten	31	1790
Boys' basketball league	22	1280
Girls' basketball league	8	255
Senior basketball practice	19	208
High school demonstration	1	160
	441	12462

Basketball Games under High School or Club Supervision

The high school played five games at home and seven away, entering Class "C" tournament at Escanaba. The club team played three games at home and two away.

Boys high school league and tournament played.....84 games
Girls high school league played.....18 games

23.

g. GWINN ASSOCIATION (Continued)

Attendance at all home games.....6050

A feature of the high school physical training program was the demonstration held for parents. 160 participated, and 200 spectators attended.

Outdoor Activities

Owing to the fact that there were no adult organized leagues in softball and hardball, all activity in these lines was of a miscellaneous nature.

Softball games played by adults, boys and girls.....107
Attendance at all games.....5900

The tennis court was in condition for play in early June, but owing to the great amount of rain during the summer, it was in condition for play but 34 days. Attendance.....88

Attendance at small playground near club.....1500

Bass Lake Camp

The cottage opened May 23 and closed October 31.

One new outhouse was erected as per specifications of the State Board of Health. Drinking water was tested twice during the year and found to be O.K.

Club members were permitted the use of boats and cottage free of charge. The amount of $26.00 was collected from non-members. The Cleveland-Cliffs Iron Company paid the caretaker for use of car.

Total attendance at grounds, including basket picnics, those using cottage, bathers, fishermen, and visitors.....1800

Scout Activities

Only one girl scout troop was sponsored during the year, however, they were very active under fine leadership. The troop observed scout week. They were helpful to the local Red Cross Chapter, delivering articles to be sewed. Made Christmas presents for an orphanage and with older girls made presents for Good Will Farm at Houghton. Sang carols at Community program. Twelve scouts spent six days camping at Bass Lake under leadership.

Building

The clubhouse is operated under the same financial arrangements as in previous years. The Cleveland-Cliffs Iron Company gives financial assistance, the Cliffs Power and Light allows free service and the local Board of Education

23.

g. GWINN ASSOCIATION (Continued)

pays rental for use of building and equipment for their physical education program and space for kindergarten.

During the year all floors were given varnish treatment where needed, roofs were repaired, some rooms redecorated, bowling alleys put in condition, new cues added in recreation room, necessary equipment purchased for outdoor recreational activities, lockers and locker room for girls repainted, front porches repainted and fuel for heating building and gas for the club kitchen purchased.

The Cleveland-Cliffs Iron Company had a stoker installed during November and the building has been more comfortable, and is much appreciated.

h. ISHPEMING Y.M.C.A. BUILDING

There is practically nothing new to report on the Ishpeming Y.M.C.A. building. During the last year there has been some agitation with respect to the re-opening of the building, but since there seems to be no great need for this type of building at the present time in the community, nothing has transpired. The difficulty lies in the fact that there are no funds immediately available for remodeling the building and for providing for the necessary direction of any program which might be instituted. It has been roughly estimated that it would cost about $6,000 or $8,000 to put the building in proper condition.

Some time ago there was some thought of remodeling the building and using a portion of it for offices for various departments of the city government. Up to this date no definite plan has been formulated and nothing has been done.

During the year, the Y.M.C.A. bulb electric sign, which hung on the outer front of the building for many years, was taken down. The sign was becoming a hazard since the supports were loose. Since there was no need for the sign in the community, a letter was directed to the City Council, requesting that it be sold or donated to the Y.M.C.A. at Ann Arbor, Michigan. The Y.M.C.A. at Ann Arbor is in connection with the University of Michigan and is a very active organization. The sign was cleaned up and sent to them some few weeks ago.

The Y.M.C.A. building in Ishpeming presents rather an unpleasant scene since all the windows are boarded up and the building occupies rather a prominent position in the downtown district. In the past, however, it has been difficult to maintain the building and eventually it had to be closed. Presently the need for the building is not great and if it is to be opened again some definite program should be first planned so that ample finances may be had to promote or establish an effective program.

23.

i. SAFETY WORK

The Central Safety Committee held meetings during the year when they were called by Mr. A. J. Stromquist. At each of these meetings a general discussion was had of the accidents which had occurred and a study was made of the possibility of preventing like accidents in the future. During 1942 meetings were held on the following dates:

July 10
July 17
September 4
September 21

These meets generally cover a two or three-hour discussion period and are often attended by the captains of the various mines. The material presented is well prepared and considerable detail is gone into with respect to the various accidents, and the suggestions relating to improved safety practices are carefully considered. These meetings are very practical and helpful. In these days when production is increased and we have a great many new men on our payrolls, it is very necessary to be constantly carrying on the safety program. Great stress is placed on the saving of life and the preventing of accidents which are costly and which cause a loss of time.

The following are the members of the committee:

Mr. G. R. Jackson, Chairman
Mr. S. R. Elliott
Mr. C. J. Stakel
Mr. A. J. Stromquist
Mr. J. D. Preston
Mr. L. C. Moore
Mr. W. W. Graff
Mr. H. O. Moulton
Mr. C. W. Allen
Mr. Carl Brewer
Mr. Walter F. Gries
Mr. W. E. Johnson
Mr. H. F. Rogers
Mr. F. J. Haller
Mr. S. W. Sundeen
Mr. Onni Marjamaa
Mr. F. C. Stanford
Mr. Ernest Keast

The regular report of the Safety Department will be found in Mr. Stromquist's annual report.

23.

j. HOSPITALS AND MEDICAL SERVICE

Regular contacts are maintained by the Welfare Department with the Ishpeming Hospital and the Negaunee Dispensary. Practically daily a discussion or a conference is held with the Superintendent of the hospital or with some of the doctors on our staff. Visits are made throughout the year regularly to the doctor's office and to the dispensary at Gwinn. Three or four times during the year contacts are made in the Iron River District, not only with the Stambaugh Hospital, but with the county health department and with the industrial hygiene work under the supervision of Dr. Irvine in the Iron River District.

In October, 1942 a general notice was posted at the various drys and departments, stating that the medical plan, as maintained and supervised by the Company, although in existence for many years, was entirely an optional plan. Employees were informed that they could withdraw from the plan if they so desired. It was interesting to note that out of approximately 3450 employees at the time of the posting of the notice, thirty-five have withdrawn. At least half of the thirty-five are employees who live at distances so remote from our hospital and doctors' offices that they could not be served by the plan.

There has been some discussion during the year about the raising of medical plan rates from $1.25 to $1.75. Also, we have considered the advisability of increasing our hospital room and ward rates. The matter of ambulance rates has also been discussed. These matters are in the hands of Mr. Elliott for final decision.

ISHPEMING HOSPITAL

The Ishpeming Hospital continues to render adequate service, not only to the immediate community, but to many persons who live outside of the district and who choose to come to the Ishpeming Hospital when hospitalization is necessary. Throughout the year the Ishpeming Hospital has continued to maintain its high rating with the American Hospital Association and the American College of Surgeons. Miss Georgia Holmes, R.N. has continued throughout the year as the Superintendent and her work in this capacity is rated very highly. She is rather a strict disciplinarian, but evidence of her supervision is noticeable throughout the institution.

The medical staff, the nursing staff, including the follow-up work, has been carried on in an efficient manner throughout the whole year. 1942, although a very busy year, was also a very satisfactory one. We have continued to replace old and worn out equipment. The program of redecorating and repairing of walls where plaster has fallen has been continued and, of course, these things will reflect in the cost of administration. During the year we have had the largest group of employees that we have had in recent years and with the staff of doctors which we now have and the work they are required to do means that they are very busy. It is practically impossible to get additional physicians due to the need of doctors in the war effort.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

The community at large undoubtedly does not recognize the real value of the Ishpeming Hospital. The Company has always maintained and operated the hospital at no expense whatsoever to the community. It is often noted that people have no realization of the costs of maintaining and supporting a hospital. The Ishpeming Hospital is looked upon in the community as a sort of a gift of the Cleveland-Cliffs Iron Company. We have many reactions regarding the services in the hospital and they are practically all complimentary. The Cleveland-Cliffs Iron Company certainly is making a very splendid contribution to the general welfare and health of the community through its maintenance and through the service rendered by the Ishpeming Hospital. It is recognized that the health of the community, which includes all of our own employees, is one of the greatest assets the Company can have. The preservation of that asset is one in which management has great opportunities and responsibilities and these are being fully realized at the Ishpeming Hospital.

Throughout 1942 Mr. G. R. Jackson, General Superintendent, and Mr. E. E. Riedinger, Chief Clerk, have served with the Superintendent of the Welfare Department, who acts as Business Manager of the Ishpeming Hospital, as an Administrative Advisory Committee. Our committee meets each month to go over the problems that naturally arise in the administration of a hospital. The assistance of this committee is highly appreciated by the Welfare Department and it is desired to express this appreciation for the cooperation which has been given. This committee has not only become very interested in the problems of hospital administration, but they are becoming more familiar with the needs of the hospital and the possibilities of economies which from time to time can be made.

The staff of the Ishpeming Hospital during the year 1942 was made up of the following:

Dr. A. W. Erickson, Chief of Staff
Dr. P. P. Hartt
Dr. W. A. Corcoran

The vacancies caused by the leaving of Dr. Stevenson and Dr. Wescott have not been filled. This is due partly to the difficulty which comes with the scarcity of doctors.

The staff at the Negaunee Dispensary is made up of the following:

Dr. W. A. Mudge
Dr. J. D. Sarven

Dr. Raymond L. Paine left our service during the year to join the Navy. Dr. MacIntyre is still confined to his home and we do not anticipate that he will return to his practice.

In the Gwinn District Dr. J. E. Witters continues to serve.

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

Special information covering the operations of the Ishpeming Hospital for 1942 are herewith submitted. This special annual report is made up mostly from the regular monthly reports and from additional material which is of interest and should be placed on record.

The Ishpeming Hospital was opened in 1918. It is owned and operated by the Cleveland-Cliffs Iron Company. It has been the purpose of the Ishpeming Hospital to render to the employees of the Cleveland-Cliffs Iron Company and their families and to the participating companies in the district the best possible medical and hospital service. The administration of the hospital is carried on as a separate institution of the Cleveland-Cliffs Iron Company, and the Administrative Committee, which was organized a few years ago, meets monthly to discuss various hospital problems and to keep in touch with hospital management and procedure. This committee is made up of Mr. G. R. Jackson, General Superintendent, Mr. E. E. Riedinger, Chief Clerk, and Mr. Walter F. Gries, Superintendent of the Welfare Department. The regular monthly meetings of the Administrative Advisory Committee are attended also by Dr. A. W. Erickson, Chief of Staff, and by Miss Georgia Holmes, R.N., the Superintendent of the hospital.

In 1918, when the hospital was opened, it was considered to be of ample size to take care of future needs for a great many years to come. We have found, however, in recent years that many times the hospital does not have ample facilities to take care of all medical cases. It is our purpose to make sure that our own people are taken care of first, and two beds are always reserved for possible mine injuries. At the present time we are listing the hospital as having a capacity of 53 beds and 12 bassinets.

During the year it was found necessary to use one of the rooms adjacent to the old obstetrical room for a new and additional obstetrical room. This room has been equipped with the newest type obstetrical delivery table, and the doctors report that this equipment, which was badly needed, has helped to solve a rather perplexing problem. Arrangements are now being made to redecorate the new obstetrical room and to make it as sanitary and attractive as possible.

The Ishpeming Hospital is a member of the American Hospital Association and it is approved by the American College of Surgeons. There is a closed medical staff and a complete nursing staff made up of graduate registered nurses. A training school is not conducted in connection with the hospital and the hospital does not employ anyone who is not fully qualified and registered.

Throughout 1942 the program of improvement of the building and grounds has been continued. Several new pieces of equipment were added during the year and the ceiling in the lobby has now been covered with acoustic Celotex and the old problem of constant chipping and peeling of plaster has now been overcome. The hospital is well equipped with x-ray apparatus, as well as the proper type of equipment for diathermy. While the Ishpeming Hospital is not the largest hospital in the Northern Peninsula of Michigan, it is as well equipped as any hospital in the peninsula .

j. HOSPITALS AND MEDICAL SERVICE (Continued)

Daily admissions and enrollment statistics indicate that the hospital is known and ample use is made of its facilities. As pointed out in annual reports of the past few years, indications are that the Ishpeming Hospital will soon be unable to take care of the medical needs and hospitalization of the people in the district which it now serves. There have been times when it was necessary to take care of as many as 62 people at one time. We have not refused admittance at any time to any case referred to the hospital by our medical staff. However, with the advent of new schemes of hospitalization and plans for medical care now so popular a gradual increase in hospital admissions is noted and most likely in the near future we shall experience difficulty in taking care of all cases referred.

The Ishpeming Hospital is a three-story fire-proof building of brick and of modern design. The hospital is well built and within the last year all the windows and doors were weatherstripped. This is resulting in a saving of fuel and we no longer need to put up our storm windows each fall and take them down in the spring. The saving in the putting up and taking down alone amounts to about $500.00 a year. We have had exceptionally cold weather this winter and checks have been made from time to time to determine whether or not the weatherstripping has improved the heating. We are pleased to report that the weatherstripping of the building has definitely meant a saving, not only in fuel, but it now appears that we shall no longer need the storm windows.

Much credit is due the Cleveland-Cliffs Iron Company and the participating companies in the district for the fine interest and support given the Ishpeming Hospital. It is sometimes felt that the people in the district do not really appreciate the fine service that has been rendered. There are not many communities the size of Ishpeming which can boast a fully equipped hospital such as we have in the Ishpeming Hospital.

A check was recently made, covering a period of five years, in connection with the Hospital Accounts Receivable:

1938	$35,546.11
1939	31,526.77
1940	28,155.43
1941	24,589.41
1942	19,918.93

The operating revenue for the twelve months of 1942 amounted to $59,420.73. The uncollectible accounts for 1942 amounted to $949.46. During the year the hospital collected 98.4 cents out of every $1.00 of work done.

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

GOVERNING BOARD

E. B. Greene, President
S. R. Elliott, Manager
G. R. Jackson, General Superintendent

ADVISORY COMMITTEE

G. R. Jackson
E. E. Riedinger
Walter F. Gries, Secretary and Chairman

Walter F. Gries, Director

ACTIVE MEDICAL STAFF

A. W. Erickson, M.D., Chief of Staff
P. P. Hartt, M.D.
W. A. Corcoran, M.D.
W. A. Mudge, M.D.
J. D. Sarven, M.D.
George McL. Waldie, M.D.
J. E. Witters, M.D.

COURTESY STAFF

V. H. Vandeventer, M.D.
Paul Van Riper, M.D.
I. Sicotte, M.D.

CONSULTING STAFF

A. W. Erickson, M. D.

DEPARTMENT

Laboratory and Roentgenology
A. W. Erickson, M.D.

Gwinn Dispensary
J. E. Witters, M.D.

Negaunee Dispensary
W. A. Mudge, M.D.
J. D. Sarven, M.D.

Anaesthesia
P. P. Hartt, M.D.

Histories
A. W. Erickson, M.D.

Industrial Hygiene Department
George McL. Waldie, M.D.

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

ISHPEMING HOSPITAL
STATISTICAL REPORT FOR THE YEAR 1942

Number of patients remaining in the hospital at beginning of year		51
Number of adult patients admitted	1048	
Number of child patients admitted	123	
Number of births	369	
Total new patients for the year 1942		1540
Total of all patients during the year 1942		1591
Number of deaths	65	
Number discharged during the year	1489	
Total number leaving hospital		1554
Number of patients remaining at the end of the year 1942		38
Classification of new cases:		
Newborn	369	
Surgical	243	
Medical	300	
Obstetrical	399	
Total		1311
Number of operations:		
Major	167	
Minor	206	
Infant Circumcisions	139	
Emergency Room	150	
Total		662
Number of patient days		16,606
Average number of patients per day		45.3
Average stay per patient (days)		14.9

NUMBER OF FRACTURE CASES DURING 1942

Cleveland-Cliffs Iron Company	67
Inland Steel Company	13
Oliver Iron Mining Company	1
Outside Parties	120
Total	201

WELFARE DEPARTMENT

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

DEATHS FOR 1942 CLASSIFIED BY DISEASE

Atelectasis	1
Carcinoma	3
Cardiac	10
Cerebral Embolism	1
Cerebral Hemorrhage	8
Cerebro-spinal meningitis	1
Congenital Heart	1
Coronary Thrombosis	1
Diabetes Mellitus	2
Enteritis	1
Gunshot Wound	1
Hydrocephalus	1
Internal Injuries	1
Intestinal Obstruction	2
Intracranial Hemorrhage	1
No Diagnosis	1
Patent Foramen Ovule	1
Peritonitis	2
Poisoning - accidental	1
Poisoning - suicide	1
Pneumoconiosis	1
Pneumonia	6
Premature Birth	3
Skull Fracture	2
Spina Bifida	1
Stillborn	11
Total	65

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

DEATHS DURING THE YEAR 1942

Surgical	0
Medical	36
Traumatic Injuries	6
Newborn	12
Stillborn	11
Total	65

Deaths within 12 hours	20
Deaths under 48 hours	14
Deaths over 48 hours	31
Total	65

TRAUMATIC DEATHS

Case No.	Patient	Age	Diagnosis
21160	Mrs. Byradette Johnson	33	Cerebral injury. Possible subdural hemorrhage.
21571	Anton Lund	51	Gunshot wound in chest. Hemorrhage in left pleural cavity.
21511	Mrs. Rose Cowling	72	Cerebral hemorrhage. Fracture right femur. Fracture right arm.
21638	Leslie Wertanen	30	Basal skull fracture.
21684	Ernest LaValley	40	Severe shock, result of internal injuries.
22062	Napoleon Amel	38	Fractured skull, vault and base. Fracture (?) 8th or 9th dorsal vertebra.

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

EMERGENCY ROOM REPORT FOR 1942

	Co.Cases	Outside Cases	Total Visits	Operations
January	300	90	390	6
February	397	91	488	6
March	343	74	417	6
April	414	109	523	9
May	397	71	468	4
June	370	123	493	6
July	360	95	455	6
August	394	140	534	7
September	320	148	468	11
October	316	129	445	30
November	264	101	365	26
December	401	113	514	30
Totals	4276	1284	5560	147

LABORATORY REPORT FOR 1942

Urinalysis	4066
Hemoglobin	879
Red Cell Counts	840
White Cell Counts	1727
Differential	157
Sedimentation Rate	27
Blood Sugar	36
Coagulation Time	114
Feces	31
Gastric Contents	3
Smears	96
Sputum	23
Blood Typing	57
Blood Matching	18
Phenolsulphonephthalein Test	10
Pregnancy Test	22
E.K.G.'s	84
Kahns (vena puncture)	679
Friedman Test	10
Glucose Tolerance Test	9
Blood Chemistry	76
Culture	6
	8977
Pathological Specimens to Ann Arbor	261
	9238

WELFARE DEPARTMENT

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

PHYSIO-THERAPY REPORT FOR 1942

Diathermy	1831
Infra Red	53
Ultra Violet	239
Metabolism	70
Electrocardiograph	111
	2304

DEPARTMENT OF INDUSTRIAL HYGIENE

January 1942 - December 1942

Urinalysis	3214
Hemoglobin	2752
Red Cell Count	108
White Cell Count	2744
Differential	68
Sedimentation Rate	2725
Blood Sugar	4
Vena Puncture for Kahns	3023
Blood Chemistry	3
E.K.G.'s	22
Glucose Tolerance	18
	14681

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

X-RAY REPORT FOR 1942

Extremities	862
Shoulder	48
Spine	98
Skull	45
Ribs	10
Kidney	20
Pelvis	68
Stomach	37
Fluoroscopy	4
Barium Enema	6
Chest	227
Fetus	30
Gall Bladder	60
	1515
No. of Out Patients	1098
No. of In Patients	379
	1477

SARANAC INVESTIGATION

Chests	2991
Miscellaneous	22
	3013

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

DIETARY REPORT--ISHPEMING HOSPITAL--YEAR 1942

Patients' Meals.....49389
Doctors, Nurses, Employees, and Visitors.....33161
Total Meals for the Year.....82550
Formulas.....369

Special Diet--Patient Days:

Nephritic.....34
Salt Free.....11
Fat Free.....7
Diabetic.....352
High Protein.....237
Dry.....66
High Carbohydrate, High Protein...6
Milk.....4
Allergy.....5
Special Soft.....681
Low Fat.....7
High Protein, High Vitamin.....3
Ulcer.....18
Bland.....26
Anemia.....21
Low Fat, High Carbohydrate.....7
Reducing.....29
Selective.....215
Low Protein.....5
Post Operative Gastric Ulcer.....57
Corbus Peptic Ulcer.....3
High Vitamin.....16

Total Special Diet Patient Days.....1897
Total Special Diet Meals.....5691

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

The following improvements have been made and new equipment purchased at the Ishpeming Hospital:

Delivery Table (for the obstetrical cases)			$ 607.50
Waste basket $10.00 Kelly pad $10.00			20.00
Dryer and Presser and 2 Laundry Baskets (American Laundry Company)			760.00
Grounds - Cement walk outside curbing in front of Hospital			198.00
12 Bedside Lamps			129.00
12 Bedside Tables			355.00
1 Rolling Chair			48.00
1 Rolling Table			53.20
1 Microscope for Laboratory			293.76
1 Ultra Violet Lamp - Physio-Therapy			213.00
1 Audiometer			351.75
1 Steel Filing Cabinet			70.00
Boiler Tubes - Boiler Room and Repair			220.57
Removal of Storm Windows - Replacing of Screens			403.97
Painting Outside of Hospital Window Frames			407.06
Weather Stripping and Corking Windows			1700.00
New Splints and Fracture Equipment:			
3 sets	Buckle Straps	9.75	
2	Thomas Leg Splints	16.00	
1	Thomas Pressure Pad	7.50	
1	Adjustable Hodgen Splint	8.00	
1	Pearson Attachment	3.25	
2	Foot Supports	2.00	
1	Batchelor Extension Apparatus	22.50	
1	Kirschner Wire Tractor	18.88	
4	Tibia & Fibia Splints	20.00	
2	Banjo Splints	7.13	
1	Shipment of Vitallim and Venable Screws and Plates	60.00	
4	Counter Traction Splints	10.00	
12	Kirschner Wires, Triangle Shank and Spear Point	3.00	
1	Emergency Transportation Set for Ambulance	11.02	
15	Miscellaneous Splints	10.00	209.03
Purchases Anticipating Shortage			1306.30
Films for X-ray			454.75
Linen			357.08

WELFARE DEPARTMENT

j. HOSPITALS AND MEDICAL SERVICE (Continued)

Herewith are submitted the comments of Miss Georgia Holmes, R.N., Superintendent of the Ishpeming Hospital:

Considerable painting has been done this year - the four main corridors, two stairways, a number of the patients' rooms, all rooms and offices on the main floor, the front entrance and the waiting room. The new ceiling, just completed in the waiting room, will prevent the falling of plaster and has improved the general appearance of the room as well as the acoustical advantage.

The usual Christmas programs were carried out with decorated trees, one on each floor. Several choruses sang carols at Christmas and the singing was enjoyed by the patients as well as visiting relatives and friends.

The Nursing Department: Three of our nurses have gone into the service--Bernice Brandt, Anna Mattson, and Frances Trevarrow. We have been most fortunate in our supply of nurses. We have not had to resort to floor clerks, nurses aids, ward helpers or volunteer workers as most hospitals are doing now.

We have had the unusual experience of planning for a blackout of the hospital building and preparations for casualties should there be sabotage or bombing. With the cooperation of all concerned, medical and nursing staff and personnel, the hospital is now organized and ready to meet the emergencies.

I wish to thank the members of the advising committees for their patience, and their ever-ready support and advice in working out the various problems which have arisen.

To the medical staff, heads of departments, and personnel, my sincere thanks and appreciation for their loyalty and assistance. We all have first in mind the care of the sick and injured and only with the cooperation of all concerned can the hospital do its best in bringing back to health those entrusted to our care.

Respectfully submitted,

(Sgd.) Georgia Holmes, R.N.

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

DOCTORS' CALLS FOR YEAR 1942

HOME CALLS

	C. C. I. Co.			O. I. M. Co.			H. P. Co.			I. S. Co.			Private		
	Med.	Obs.	Sur.	Med.	Obs.	Sur.	Med.	Obs.	Sur.	Med.	Obs.	Sur.	Med.	Obs.	Sur.
Jan.	485		10	88		9	65		1	114	1	1	48		
Feb.	489		18	90		7	53		5	101	1	5	22		
Mar.	475	1	15	78		1	48			102		2	12		
April	496	1	13	81		1	44		1	133		17	26		
May	333		8	46			17			124		4	20		
June	475	1	10	72			48		1	133			19		
July	262	1		54			33			56		1	12		
Aug.	325		12	52		1	51			58			19		
Sept.	384			63			35			76			17		
Oct.	381			73			37			79			27		
Nov.	376			59			40			93			29		
Dec.	433			60			46			95			37		
Totals	4914	4	86	816		19	517		8	1164	2	30	288		

OFFICE CALLS

	C. C. I. Co.		O. I. M. Co.		H. P. Co.		I. S. Co.		Private	
	Med.	Sur.	Med.	Sur.	Med.	Sur.	Med.	Sur.	Med.	Sur.
Jan.	1036	55	107	14	68	17	145	52	9	90
Feb.	1022	289	104	9	55	28	154	71	26	91
Mar.	1192	261	94	21	47	11	170	56	16	74
Apr.	1155	283	89	32	65	16	132	81	8	109
May	947	314	44	12	28	15	137	56	7	71
June	1011	339	73	16	59	14	98	47	18	110
July	698	242	71	3	53	6	85	67	16	99
Aug.	826	298	79	31	59	6	120	59	35	140
Sept.	917	253	91	11	52	14	117	69	18	147
Oct.	775	204	87	10	49	20	113	57	26	116
Nov.	842	204	118	5	42	3	125	35	34	89
Dec.	877	217	82	9	54	1	138	28	27	88
Totals	11298	2959	1039	173	631	151	1534	678	240	1224

Total Home Calls.....7,848
Total Office Calls.....19,927

Grand Total.....27,775

WELFARE DEPARTMENT

j. HOSPITALS AND MEDICAL SERVICE (Continued)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Patients Admitted	104	108	127	121	160	109	124	182	149	126	113	117
Pts. Discharged	103	94	120	132	140	124	103	171	140	140	102	120
Deaths	10	1	7	7	6	8	5	4	6	3	0	8
Number of Men	22	32	21	31	71	28	31	31	37	19	24	14
Number of Women	56	50	63	53	41	48	57	81	64	58	58	58
Number of Children	4	4	11	7	6	7	16	31	11	16	5	5
Number of Newborn	22	22	32	30	42	26	20	39	37	32	26	40
Classified as:												
Newborn	22	22	32	30	42	26	20	39	37	32	26	40
Maternity	22	24	33	33	46	26	24	44	40	32	32	43
Medical	27	24	25	22	25	27	37	30	30	19	20	14
Surgical	23	24	27	21	27	14	13	28	15	21	19	11
Orthopedics	2	3	1			2	1				2	
Tr. Surgery	7	10	9	14	15	8	14	4	13	6	8	7
E. E. N. T.	1	1		1	5	6	15	37	14	15	6	2
Pediatrics												
Highest Daily Count	54	58	61	55	57	50	44	64	54	54	48	64
Lowest Daily Count	41	38	33	34	33	26	28	37	40	37	28	22
Daily Average	47.13	49.9	49.17	38.20	48.24	39.7	37.24	52.5	49.19	48.10	39.7	45.13
Patient Days	1232	1211	1250	907	1171	950	979	1265	1164	1166	965	305
Newborn Days	238	170	286	253	341	227	192	352	325	332	212	1113
Total Days	1470	1381	1536	1160	1512	1177	1171	1617	1489	1498	1177	1418
Operations:												
Emergency	6	6	6	9	4	9	6	7	11	30	26	30
Major	12	19	17	15	20	9	7	19	15	11	14	9
Minor	11	10	12	6	17	10	24	51	19	20	15	11
Circumcisions (infant)	6	11	9	15	11	9	11	16	14	13	7	17
General Anesthetic	19	23	24	16	23	13	12	63	28	25	18	14
Local Anesthetic	4	6		5	12	6	8	6	8	7	7	3

j. HOSPITALS AND MEDICAL SERVICE (Continued)

NEGAUNEE DISPENSARY

The Negaunee Dispensary, which was formerly known as the Negaunee Hospital, is used by our doctors and nurses in the Negaunee District for offices, emergency first aid, and as a drug dispensary. At the present time there are approximately 1450 employees in the Negaunee District and the medical needs of this group and their families are served through the Negaunee Dispensary. This is a convenient arrangement for the people in the Negaunee district since they have at their disposal medical service right in their own city. Regular visits are made to the Negaunee Dispensary two or three times a week. We now have only two doctors in the area since Dr. MacIntyre has retired. Dr. Sarven joined our staff in the middle of December. He is a graduate of the University of Illinois, age 49, and comes to us well recommended. He has had approximately twenty years of general practice. No hospital cases are taken care of at the Negaunee Dispensary. All hospitalization is undertaken at the Ishpeming Hospital.

The Negaunee Dispensary building is in good condition. Repairs have been made during the year and the building and equipment is fully adequate to carry on the work of our doctors and nurses in the Negaunee district.

Dr. Paine, who formerly was a member of the staff at the Negaunee Dispensary, joined the Navy in September of 1942.

GWINN HOSPITAL

Dr. J. E. Witters continues as our medical representative in the Gwinn district. His office is in his home, which is directly across from the Gwinn Clubhouse and adjacent to the old Gwinn Hospital. Dr. Witters maintains a small dispensary and he takes care of the medical needs of all of our employees who live in Gwinn and vicinity. Dr. Witters is also the health officer for the township of Forsyth and for two or three other townships in the district. He also serves as the local doctor for the Marquette County Department of Social Welfare. Dr. Witters is the only doctor in Gwinn and the surrounding area and he takes care of the health and the medical needs of practically all the people.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

REPUBLIC HOSPITAL

The building formerly known as the Republic Hospital at Republic, Michigan is still being used by Dr. Van Riper as an office and a health center for the Republic district. Dr. Van Riper takes care of the medical needs of our employees who live in Champion, Ely, Humboldt, and Republic Townships. He goes to Republic daily and holds a regular office hour in the building which was formerly used as a hospital.

Some years ago the Republic Hospital was deeded to the Republic Improvement Association. The Improvement Association, however, did not function very long and an effort is now being made to transfer the building to the Republic Township so that ample arrangements can be made for the upkeep of the building and for the furnishing of fuel. I feel that the old Republic Hospital should be maintained as a health center and as an office for Dr. Van Riper. He is the only doctor in the area and it is essential that he have some place which he may use as an office.

The Republic Township Board engages a married person who is a nurse to live in the residence part of the building. This trained nurse is on duty for emergency cases. She is granted her rent, and we feel that the arrangement is a fortunate one for Republic Township.

IRON RIVER HOSPITAL

Three visits were made during 1942 to the hospital at Stambaugh. This hospital cares for the medical and hospital needs of our employees at the Spies-Virgil. It is a well equipped hospital and doing a fine service in the community. Each year Mr. Haller, Superintendent of the Spies-Virgil, and Mr. Walter F. Gries, Superintendent of the Welfare Department, attend the annual meeting of the Iron River General Hospital at the hospital in Stambaugh.

Dr. L. E. Irvine continues to provide medical attention for our employees in the Iron River District.

PAYMENTS TO PHYSICIANS

For reference purposes the following statement is made in each annual report:

On August 1, 1927, a new rate of payment for the Cleveland-Cliffs Iron Company went into effect. The employees pay $1.25 for the medical service for themselves and immediate members of their families and the Company pays 50¢ per man per month to cover medical and hospital services for cases coming under the Compensation Law.

The above paragraph is carried in each annual report to show the date on which the new rate of payments became effective.

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

PHYSICAL EXAMINATION OF EMPLOYEES

The contract with the Trudeau Foundation of Saranac, New York was continued throughout 1942 with satisfactory results. Our contract runs from November 1 to October 31. Regular schedules are made for physical examinations for each day and efforts are being made to schedule twelve men each working day.

During the year, Mr. Hugo Luostari left the employ of the Trudeau Foundation at the Ishpeming Hospital and he was replaced by Mr. Sidney Hodson.

Mr. Don Cummings visited us during the year and his demise deprives us of the advice and counsel of an outstanding man in the field of industrial hygiene.

INDUSTRIAL HYGIENE DEPARTMENT

The Industrial Hygiene Department came into being on April 1, 1939. As previously reported, we secured the services of Dr. George McL. Waldie. Reference has been made in previous reports to his background of training and experience. Dr. Waldie does a particularly fine type of work and he succeeds in getting along very well with our employees. Seldom do we have any complaints in connection with our physical examination program. Dr. Waldie makes a thorough examination of our men but they seem to be pleased with the manner and the method employed by the doctor.

The making of daily schedules, which was formerly made by the Welfare Department, is now being made by our Employment Agent, Mr. H. W. Sundberg. Each individual employee is given a definite time to report to Dr. Waldie's office for examination. These schedules are always made a week in advance and this program makes it possible for Dr. Waldie and his secretary to review the previous examinations and to prepare for the checking of previously listed deficiencies. We try to arrange the program so that no employee will lose any time.

Dr. Waldie continues to do considerable follow-up work with employees who have shown some evidence of physical defects or illnesses. This part of the program has become well established and the follow-up is quite complete. The response of the men and the efforts of the Industrial Hygiene Department to be of assistance in correcting defects has been gratifying.

23.

j. HOSPITALS AND MEDICAL SERVICE (Continued)

The following number of examinations have been made to December 31, 1942:

Cleveland-Cliffs Iron Company	13,592
Inland Steel Company	2,382
Republic Steel Corporation	1,589
Pickands Mather Company	143
M. A. Hanna Company	188
North Range Mining Company	999
Oliver Iron Mining Company	478
Marquette County Road Commission	10
Hercules Powder Company	120
Calumet & Hecla Consolidated Company	29
	19,530

Special emphasis is given to pre-employment examinations. Every new applicant who is being considered for employment is given a thorough examination. The findings are reported to this department. Within recent months there have been more rejections than usual because of the fact that we have now reached a point in the employment of men where it is necessary to consider what labor there is available in the district. Up to this point physical standards have not been relaxed.

It is felt that the establishment of the Industrial Hygiene Department was an important step and we have been very fortunate in the type of work done by the department. The attitude of the employees towards the program of the Industrial Hygiene Department has been excellent. We have gradually built within the minds of our employees a concern regarding their health and physical fitness.

23.

k. COMMUNITY HEALTH

Health conditions in Marquette County during the past year have been above the average. There have been no epidemics or great loss of time because of prolonged illnesses of any kind. A check of the records indicates that more time is lost because of common colds than for any other reason. It should be noted, however, that since the advent of higher wages that we note there is loss of time due to the after pay-day influence.

Each city in the county has a health officer and a full-time school nurse. The city health officers in Marquette County are:

Marquette	-	Dr. C. P. Drury
Ishpeming	-	Dr. N. J. McCann
Negaunee	-	Dr. N. J. Robbins

The Michigan Children's Fund, commonly known as the Couzen's Fund, carried on its dental clinic again and free dental attention was given to many children throughout the county.

Each year a number of children from all counties in Northern Michigan are selected to attend a seven-weeks' camp period at Bay Cliff Health Camp at Big Bay in Marquette County. I have continued to serve as Chairman of the Board of Directors of Bay Cliff Health Camp during the past year. Mr. Moulton formerly served in this capacity. This camp completed its eighth year with funds provided by the Michigan Children's Fund and during the past year we have had some assistance from Community Chests. During the past summer we cared for approximately 160 children, including about 30 poliomyelitis convalescent cases. During the past three years, following the regular camp period, a special period for diabetic children was provided. Diabetic children are brought in for special training and for control of diet. The results of the camp in general have been very gratifying.

23.

1. RED CROSS (Continued)

Report of Nurse
Marquette County Chapter
American Red Cross.

I.	Service to or in Behalf of Individuals:	
	A. Maternity Service:	
	1. Antepartum	28
	2. Postpartum	8
	B. Morbidity Service:	
	1. Noncommunicable	1
	2. Acute Communicable	4
	3. Other Communicable	51
	C. Crippled Children's Service	43
	D. Health Service:	
	1. Newborn	8
	2. Imfant	106
	3. Preschool	117
	4. School	213
	5. Adult	6
	E. Social Service	14
	F. Unclassified	8
II.	Children given inspection by Nurse	679
III.	Number of children excluded because of communicable diseases	41
IV.	Children Completely Imminized:	
	1. Diphtheria	1059
	2. Smallpox	1013
	3. Whooping Cough	218
V.	Nurse conference at school with:	
	1. Parents.	111
	2. Teachers	294
	3. Pupils	150
VI.	Demonstration to Instruct Teachers in	
	1. Classroom Inspection	114
	2. Vision Tests	111
VII.	Teachers assisted in planning School Health Program for year	5
VIII.	Children given special attention	19

WELFARE DEPARTMENT ANNUAL REPORT YEAR 1942.

23.

1. RED CROSS (Continued)

IX. Clinics and Conferences:

1. Eye- 13 1/2 days session - 218 children examined.
2. Immunization - 21 sessions
   a. Diphtheria
      1st toxoid 539
      2nd toxoid 520
   b. Smallpox 1013
   c. Whooping Cough 218
3. Mental Clinic: 3 in attendance.
4. Hearing Clinic: 2094 children examined with group audiometer;
   20 found defective in both ears;
   19 found defective in right ear;
   13 found defective in left ear.
5. Orthopedic Clinic: Sponsored by Michigan Crippled Children's Commission- 68 children attended- 9 lay people and 6 nurses attended.
6. Dental Clinic: Complete report attached.

X. Meetings Attended:

Nutrition Regional	1
Red Cross Regional	1
County Red Cross	1
Michigan State Public Health - Grand Rapids	1
Marquette County Health Nurses	1
Marquette Co. District Nurses Association	5
Health Education Classes	2
County Nutrition Defense Commitee	4
Joint Meeting of Social Agencies	3
Annual Red Cross Chapter	1
Home Nursing Conference	3
Marq. Co. Council on Community Nursing	5
County Dental Committee	1
Marquette Co. Board of Supervisors	1
U.P. Health Conference	1

XI. Interviews:

County Physicians	35
County Dentists	4
Officials from Michigan Department of Health and Children's Fund of Michigan	20
County Nurses	11
Township Supervisors	2
School Board Members	41
Others	43

XII. Special Projects:

Two sound pictures "Life Begins Again" on use of group audiometer, and "More Life in Living" on Nutrition, shown in 17 schools.

WELFARE DEPARTMENT.

23.

1. RED CROSS (CONTINUED)

Plans for organizing a central kitchen for preparing hot lunches for county schools.

XIII. Group Education:
First Aid classes: 2 in Gwinn; 1 at Marquette.
Advanced First Aid: in Gwinn 1.

IX. Talks:
1. Dorcas Society - Messiah Lutheran Church.
2. Senior Class - St. Luke's Hospital.
3. Nutrition Luncheon - Nothern Michigan College.

X. Miscellaneous:
1.child entered the Orthopedic Room - Marquette City.
2 Red Cross calls.
8 patients examined at Children's Clinic.
Drove two representatives of DAR to 16 schools where they started Junior American Citizen Clubs.
4 patients sent to Dr. Hornbogen.
Accompanied Miss Olive Sewell, Exec. Sec. Michigan State Nurses Association, to National Mine, Champion, and Gwinn schools where she talked to 64 school girls who are interested in nurses training.
Accompanied Miss Thelma Scratch to four schools where she talked wo High School girls on preparing for nurses training.
10 children had tonsils and adenoids removed.
Brought dental assistant to and from the dental clinics at National Mine, Champion and Gwinn.
The Red Cross car was used by Mrs. George Soear in conducting First Aid classes at Republic.
5 undernourished and 3 crippled children were sent to the Bay Cliff Health Camp for 7 weeks.
Brought 2 diabetic children to the Bay Cliff Health Camp.
Arranged to have 2 feebleminded children sent to Newberry.
1 child had a chest X-ray at the Children's Clinic.
2 adults had chest X-rays at the Sanatorium.

Materials needed for immunization clinics were furnished by the following:

Smallpox vaccine, toxoid, and pertussin from the Michigan Department of Health through the City Health Department;
Sterile towels, needles, syringes, sterilizer, and gauze from the Children's clinic;
Cotton, alcohol, and aciton fron the County Red Cross Chapter.

23.

1. RED CROSS (Continued)

FINAL REPORT OF
MARQUETTE COUNTY DENTAL CLINIC, 1942.

Center 1: Northern Michigan Children's Clinic.

School	Days	No. of Children
Orphanage, Marquette City	3 plus	47
Michigan Children's Aid	part	4
Eagle Mills, Negaunee tnsp.	1 1/2	25
Big Bay, Powell tnsp.	2 1/2	38
Harvey, Chocolay Tnsp.	2	29
Beaver Grove, " "	1 1/2	15
Mangum, " "	1 1/2	26
Heidtman, West Branch Tnsp	1	13
June, " " "	1	16
Pioneer, Skandia Tnsp	1	15
Skandia Station " "	1	13
Carlshend, " "	1	15
Lawson, " "	1	19
VNA	1/2	4
Sands, Sands Tnsp	2	33
Chocolay Tnsp	1	11
Bay Cliff Health Camp	part	4
Bancroft, Marquette tnsp	1 1/2	21
	22 1/2	348

Center II: National Mine School.

West Ishpeming, Ishpeming Tnsp	3	40
Ishpeming City	2	37
North Lake, Ishpeming Tnsp	3	38
Palmer, Richmond Tnsp	3 1/2	41
Social Welfare	1/2	3
National Mine, Tilden Tnsp	3 1/2	45
	15 1/2	204

Center III: Champion School.

Republic, Republic Tnsp	3 1/2	52
Diorite, Ely Tnsp	2	24
Michigamme, Michigamme Tnsp	1 1/2	15
Champion, Champion Tnsp	3	40
	10	131

WELFARE DEPARTMENT.

1. RED CROSS (Continued)

Center IV: Gwinn School.

Turin	3	41
Northland, Wells Tnsp.	1	10
Watson, " "	1	8
Gwinn, Forsyth Tnsp.	5	69
	10	128

Dr. Albert Long from the Children's Fund of Michigan was the dentist.

Miss Barbara Dolf, Marquette, was the dental assistant.

Respectfully submitted

Emma C. Anderson, R.N.

County Health Nurse.

WELFARE DEPARTMENT ANNUAL REPORT YEAR 1942.

23.

m. RELIEF WORK.

The usual policy was followed in the extension of assistance to certain families who have shown special need through illness, death, or some type of disability. During the year 1942 29 families were assisted compared with 36 families in 1941.

The following is a statement of the assistance rendered:

	Ishpeming	Negaunee	Republic	Gwinn	Marquette	Total
January	154.77	50.75	41.93	2.79	10.00	260.24
February	224.20	41.35	38.90	123.79	-	428.24
March	215.75	16.99	28.43	42.52	10.00	313.69
April	143.94	56.55	27.43	42.79	10.00	280.71
May	135.50	-	15.45	80.00	10.00	240.95
June	187.64	33.25	37.35	65.49	10.00	333.73
July	184.20	33.86	27.24	22.70	10.00	278.00
August	150.44	55.51	23.45	77.79	20.00	327.19
September	263.44	14.14	29.15	67.79	-	374.52
October	266.47	18.56	54.35	108.45	20.60	468.43
November	165.59	10.73	8.00	60.75	10.30	255.37
December	131.70	40.83	54.35	45.75	10.30	282.93
	$ 2223.64	372.52	386.03	740.61	121.20	3844.00
Number of families assisted	18	4	2	4	1	29

Average amount of relief per family $ 132.55

n. EMPLOYMENT.

Daily contact is made with the Employment Office, in charge of Mr. H. W. Sundberg. The registration records of all the men who are employed at the various mines have been sent to this office and a separate record is kept so that we may have full knowledge of all persons employed.

23.

o. INCAPACITATED EMPLOYEES.

During the year payments have continued to certain men and certain families who originally did not have sufficient service to bring them within the provisions of the pension system. To these people donations were granted. These men are those who have suffered some disability through accidents or through injuries at the mines and some with large families who have become incapacitated.

Following is the list of families and the amount of the donations paid to them during the year:

	Monthly Rate for 1942	Total Amount Paid during 1942	
Fred Fredette	20.00	240.00	
Sam Metherell	14.40	172.80	
John Aho	14.40	172.80	
Andrew Niemi	16.60	199.20	
Edmond Durant	20.00	240.00	
Axel Erickson	20.00	140.00	Died 7/10/42
Edward Van Langenhoven	20.00	240.00	
Donato Valenzio	20.00	240.00	
Fred Carlson	16.00	192.00	
Joseph Thomas	75.00	900.00	
A. J. Yungbluth	100.00	1000.00	Died 10/ 8/42
William Ryan	25.00	300.00	
R. J. Chenneour	50.00	600.00	
W. H. Moulton	150.00	1800.00	
Gust A. Peterson	20.00	40.00	Died 2/26/42
John Maki	25.00	300.00	
William Nault	82.00	493.00	See foot-note.
John Salo	20.00	60.00	Off 4/ 1/42
Charles Vincent	30.00	360.00	
Jacob Bietila	25.00	175.00	Began 6/ 1/42
Hilmer Lerlie	25.00	175.00	" " " "
John Scoble	30.00	180.00	" 7/1/42
John Iskola	30.00	60.00	" 11/1/42

Beginning July 1st, 1942 the payment to William Nault was made from the Cleveland office.

HOLMES MINE DONATIONS.

Peter Lesage	20.00	240.00
Carl Jarvinen	16.99	203.88
Bernt Wiggen	20.00	240.00
Martin Trondson	20.00	240.00
		$ 923.88

WELFARE DEPARTMENT.

o. INCAPACITATED EMPLOYEES (CONTINUED)

Donations to Widows

	Monthly Rate for 1942	Total Amount Paid during 1942	
Mrs. J. H. Tregonning	25.00	300.00	
Mrs. Anna C. Nordeen	25.00	200.00	Off 9/1/42
Mrs. Fiina Kampinen	25.00	300.00	
Mrs. Andrew Larson	12.50	75.00	Off 7/1/42
		$ 875.00	

FURNACE DEPARTMENT DONATIONS

The donations, after being granted, were paid by the Furnace Department itself and later by the Cliffs Dow Chemical Company. By directions from Cleveland on September 1, 1937, the donations have been paid from this office, and the following payments have been made during the year:

John Schrandt	25.00	300.00
Mrs. George Cameron	20.00	240.00
Jacob Hill	20.00	240.00
Julius Olson	25.00	300.00
		$ 1080.00

Amount of Donations paid to Incapacitated Employees	$ 8278.80
Amount of Donations paid to Incapacitated Holmes Mine Employees	923.88
Amount of Donations paid to Widows	875.00
Amount of Donations paid to Furnace Department cases	1080.00
Total Donations	$ 11157.68

WELFARE DEPARTMENT.

o. INCAPACITATED EMPLOYEES (Continued)

Retirement Roll

Several new names were added to the Retirement Roll during 1942. Each case is carefully studied with the superintendent of the mine and is finally referred to Mr. Elliott and if the case is approved the name is added to the Retirement Roll. It has been the Company policy for a long time to give consideration to old and faithful employees. From time to time conferences are held with the employees and they are always encouraged to come in with their problems.

During 1942 several older employees, because of some physical ailment or because of old age, have been added to the rolls. In many of these cases the Social Security benefits are still quite low. The Company supplements the Social Security benefits and also permits the employee to carry a portion of his group insurance. The privilege of carrying group insurance on the part of older and retired employees means a good deal. Practically every individual who accepted retirement has also continued to carry the life insurance feature of his group insurance. This privilege is very highly appreciated.

At the present time the following men are on our Retirement Roll:

	Present Monthly Rate	Total Amount Paid During 1942	
John Mattson	21.32	255.84	
Mrs. Anna Simo	40.00	480.00	
John Chiri	31.00	372.00	
James Christian	39.00	468.00	
Silvio DeGabriele	10.00	50.00	Died 5/21/42
Matt Hemmila	27.00	324.00	
Esten Peterson	33.50	402.00	
William J. Phillips	49.50	594.00	
Alfred Anderson	27.00	108.00	Died 4/23/42
Swen Lahti	12.31	147.72	
Anthony Mengorie	32.50	390.00	
August Reiklot	33.50	335.00	Died 10/27/42
David Reed	30.00	360.00	
Sam Roberts, Sr.	33.00	396.00	
Sam Sims	39.00	468.00	
Charles Abramson	46.50	558.00	
Thomas Berryman	35.00	420.00	
Victor Carlson	39.00	468.00	
William J. Curtis	35.50	35.50	Died 1/27/42
Arvid Jernquist	45.00	225.00	Died 5/29/42
Andrew Larson	10.00	10.00	Died 1/30/42
Charles Larson	32.00	384.00	
Albin Lyman	47.50	570.00	

23.

o. INCAPACITATED EMPLOYEES. (Continued)

John H. Maki	$ 39.00	468.00	
Lars Olson	36.20	434.40	
Hemming Silas	35.00	420.00	
Dave Spencer	32.00	384.00	
Joseph Villeneuve	31.00	372.00	
Henry Beale	50.00	600.00	
George Bredeson	24.70	160.58	Died 7/11/42
John Hennessey	35.00	420.00	
August Olson	17.65	114.73	Died 7/ 2/42
Erick Soyrinki	13.81	165.72	
William T. Waters	20.00	240.00	
Fred L. Prudom	50.00	600.00	
Charles Stevens	40.00	480.00	
Matt Mattson	10.00	120.00	
Henry Hendrickson	10.00	120.00	
William Kennaugh	10.00	120.00	
Anton Seagren	10.00	120.00	
John Bjorne, Sr.	10.00	120.00	
John Bergeson	10.00	120.00	
Herman Johnson	10.00	120.00	
John Johnson	10.00	120.00	
Rasmus Christenson	10.00	120.00	
August Wigg	10.00	120.00	
Otto Lindstrom	10.00	120.00	
John Chirio	10.00	120.00	
Simon Maki	10.00	120.00	
Abram Lahtinen	10.00	120.00	
Frank Martin	10.00	120.00	
Gust Palomaki	10.00	120.00	
C. A. Steede	10.00	120.00	
Charles Anderson	10.00	80.00	Died 8/22/42
John Walimaa, Sr.	10.00	120.00	
Herman Aho	10.00	120.00	
Alex Boz	10.00	120.00	
Peter E. Nelson	10.00	120.00	
John Cox	10.00	120.00	
Joseph Grevious	10.00	120.00	
Gust Holmgren	10.00	120.00	
Chris Stone	10.00	120.00	
Otto Franson	10.00	120.00	
Michael McNamara	10.00	120.00	
Otto Schadt	10.00	120.00	
Arsene Tousignant	10.00	120.00	
John K. Johnson	10.00	60.00	See*Died 12/20/42
Edwin Harper	10.00	120.00	
William F. Worth	10.00	120.00	

23.

o. INCAPACITATED EMPLOYEES (Continued)

William C. Mitchell	$ 10.00	$ 120.00	
Peter Coron	10.00	120.00	
George Young	10.00	120.00	
Thomas Atwell	10.00	110.00	Begun 2/1/42
Joseph Bollero, Sr.	10.00	110.00	" "
Swan Anderson	10.00	80.00	Begun 5/1/42
Henry Hyvonen	10.00	80.00	" 5/1/42
Henry Knudsen	10.00	80.00	" 5/1/42
Anthony Lavelle	10.00	80.00	" 5/1/42
Noah Morin	10.00	80.00	" 5/1/42
Godfrey Larson	10.00	60.00	" 7/1/42
Antti Pasonen	10.00	60.00	" 7/1/42
Helmer Solem	10.00	60.00	" 7/1/42
Frank Velin	10.00	60.00	" 7/1/42
Herman Alanko	10.00	60.00	" 7/1/42
Thomas Graham	10.00	60.00	" 7/1/42
Charles Roseveare	10.00	60.00	" 7/1/42
Thomas Welsh	10.00	50.00	" 8/1/42
Emanuel Stephens	10.00	40.00	" 9/1/42
Archie Blair	10.00	10.00	Sept. Mo. only.
Henry Heiser	10.00	30.00	Begun 10/1/42
Joseph Menzer	10.00	20.00	" 11/1/42
Noah Hares	10.00	10.00	" 12/1/42
William J. Pascoe	10.00	10.00	" 12/1/42
Fred Holm	10.00	10.00	" 12/1/42
Total		$ 18120.49	

* John K. Johnson worked six months of the year on the grounds of the Ishpeming Hospital.

23.

p. COST OF LIVING

There has been a general increase in the cost of living during 1942. Occasionally prices are checked locally and comparisons are made with other parts of the state and other communities in other states. It is estimated that during 1942 food prices advanced approximately 20%, rent 5%, clothing 14%, house furnishings 10%, and fuel 3%.

From time to time inquiries are made among the local merchants regarding general business conditions. This past year they report that business conditions are good. Many of the stores in the community, over the Christmas holidays, practically sold out certain lines of materials. Previous to this year, merchants reported that business conditions were not in keeping with increased wages. During the past year, however, it appears that many people have used their buying power for food, clothing, and house furnishings and since automobiles can no longer be purchased the local merchants report better business conditions.

Bank Deposits

During the year bank deposits increased somewhat, but many people are buying war bonds with their money. There is ample evidence that there is more money in circulation due to the fact that payrolls are larger and that wages are higher.

Housing

There is very little change in the housing situation in Ishpeming and Negaunee. Good average homes are scarce and rents have increased somewhat. There has been less building during the year than during previous years. In spite of a slight housing shortage rents in the district are still lower and more reasonable than they are in Marquette and other cities in the Northern Peninsula.

Relief Situation

The relief problem in Marquette County still is on the decline. The case load is about as low as it has been at any time in recent years. In fact, during 1942 we have had the lowest case load in many years. This is due to the fact that there has been more employment available and income has been greater. The W.P.A. load in the county is approximately 110. Most men employed on W.P.A. are either unemployable or semi-unemployable and their average age is approximately sixty years. With the closing down of W.P.A. some of the former W.P.A. employees will probably seek Old Age Assistance; a few will seek work; and others who are unemployable will have to be taken care of by the direct relief agencies or by some new type of work relief program. The State Social Welfare Commission is considering the possibility of some type of a work relief program with state assistance.

The great majority of the employees of the Cleveland-Cliffs Iron Company seem to realize that living conditions in the community, and working conditions as well, are well above the average. For the most part they are eager to work regularly and to take advantage of the wages now paid. Regular visits are made at various types of meetings in the district and there is practically no evidence at all of under-

23.

p. COST OF LIVING (Continued)

nourishment or lack of proper clothing. In some of the schools milk is provided at a small price and in cases where children are not able to purchase milk it is provided by the boards of education. Some schools also provide vitamin capsules free of charge.

It is believed that living conditions in this district are considerably above the average for areas where mining is the chief occupation. People who come into this district for the first time are surprised to find our clean, healthy towns and happy workmen. Of course, the influences of organized labor have had some effect upon the thinking of the individual employee. It is anticipated that some employees will have a different attitude towards their work in the future than they have had in the past.

During the year I have continued my services as a member of the State Social Welfare Commission. This commission meets monthly, generally in Lansing, and has charge of all the direct relief, the Old Age Assistance, Aid to Dependent Children, Aid to the Blind, the Child Welfare Services, and all other matters dealing with general public relief. The general relief program in Michigan last year, including the various categories, totaled approximately $42,000,000.

q. IMPROVEMENT WORK

Mr. Julien Payen has had charge throughout the year of the improvement work around all the grounds and properties and the usual program of gardening was carried on at the Ishpeming Hospital.

The buildings and grounds surrounding our properties, including the mines, the offices, and the hospital, present a neat and pleasing appearance.

r. WELL KEPT PREMISES

The Best Kept Premises and Vegetable Garden contest, established by Mr. Mather, was carried on in 1942. About 120 entries were listed and during the first two weeks in August the judges, consisting of Mr. Julien Payen, Mrs. E. E. Bjork of Gwinn, and myself, visited the premises of all the entrants. Cash prizes amounting to about $500.00 were later distributed.

There are many fine gardens and well kept premises in all the districts. Gwinn always has had the best gardens because some of our Italian miners who live there are excellent gardeners and they get splendid results.

Plans are being made to conduct this contest next year and we wish to express appreciation for Mr. Mather's continued interest in this particular phase of the work of the Welfare Department.

WELFARE DEPARTMENT

23.

s. COMMUNITY SERVICE WORK

The American Legion building in Ishpeming, which was formerly the old hospital, continues to serve as the center for all Legion activities and for many other community activities. The Legion maintains the building and keeps it in good condition.

The American Legion Club in Negaunee has been continued for the usual purposes. The Negaunee Legionnaires have had some difficulty in trying to make both ends meet. The building has not had the same care as the building in Ishpeming and during the year 1942 the building had reached the point where extensive repairs were necessary. The roof needed new supports and this has been taken care of. The building was also painted and new porches and steps were provided. This building now presents a very fine appearance.

Previously in this report, the Ishpeming Y.M.C.A. building was mentioned. The building is boarded up and presents a problem. Attempts have been made at various times to open the building, but at the present time it appears that there are no plans for doing anything with it. The fact that a recreation area is being undertaken in the City of Ishpeming makes it seem unnecessary to proceed at this time with the re-opening of the Y.M.C.A. as a community service building. The building could be re-opened and remodeled and used partly for some of the city offices. A portion of the building probably could be used by the American Legion and the building which they are now using, closed. A number of the fraternal organizations in the city maintain club rooms and there seems to be no particular need for a community center for the re-opening of the Y.M.C.A. building as a community center.

t. CLUBS

The Saturday Noon Luncheon Club, made up of superintendents and heads of departments, meets occasionally on Saturday noons at the call of Mr. Elliott. A number of meetings were held during the year, but regular meetings on Saturday during the winter months have been abolished. Mr. Elliott now calls the group together on Saturday noon when he has some particular matters to discuss with the group.

u. OUTDOOR ACTIVITIES

The usual winter activities, particularly winter sports such as skiing and skating, were carried on through the winter of 1942. The Ishpeming Winter Sports Club is a sort of center for the sports enthusiasts for the entire district, including Marquette. Special programs are arranged for the entertainment of the public and the winter sports area is very popular.

23.

u. OUTDOOR ACTIVITIES (Continued)

The annual Ski Tournament, which is held on February 22, is the outstanding winter sports event in the district. This program has been carried on for over fifty years, and every year on Washington's Birthday thousands of people are attracted to Ishpeming for the ski jumping event. For several years the practice of selecting an outdoor winter queen has been followed in several of the larger cities in the Northern Peninsula. During the year both Ishpeming and Negaunee selected winter queens.

Three years ago the City Council of the City of Ishpeming selected a Recreation Commission. This commission continues to study the recreation problems of the community. A program and plan has been outlined for the community from the standpoint of future recreation needs. Considerable thought and attention are given to the extension of the recreation program and to the needs for future years. An effort is being made to make the Ishpeming recreation area a complete unit, providing all types of recreation, both summer and winter. The Commission has met with Mr. Elliott at various times and he is familiar with the work that is being done.

The Mather Inn

The Mather Inn is without question the most popular hotel in the Northern Peninsula of Michigan. Many people are surprised to find a hotel like the Mather Inn in this part of Michigan. The hotel continues to serve a very great need in the community. Each year it is used for many meetings which formerly were held in other parts of the district.

w. VARIOUS DEPARTMENTS AND ACTIVITIES

During the past year I have continued to assist in various types of activities which are of public and civic nature. These include the Marquette County Chapter of the American Red Cross, of which I am a director and now Chairman of the Preparedness Relief and Disaster Committee. Presently I am also serving as a member of the Child Guidance Institute, a director of the Michigan Welfare League, member of the Marquette County branch of the Michigan Tuberculosis Association, the Michigan Delinquency Prevention Council, the Michigan Society for Crippled Children, Inc., the Upper Peninsula Law Enforcement Association, and the Bay Cliff Health Camp. From time to time we are called upon to assist in many activities which normally are a part of the work of the Welfare Department.

23.

x. POLICE DEPARTMENT

The Police Department, in direct charge of Robert J. Veale, comes under the supervision of the Welfare Department. Almost daily conferences are held with Mr. Veale, whose office is adjacent to mine. Mr. Veale makes a monthly report and gives regular attention to the functioning of the various patrols at the various mines and properties.

The Police Department is now uniformed and we have given special emphasis to the selection of the men who serve as officers and patrolmen. It is felt that we have a very good industrial police force.

23.

w. VARIOUS DEPARTMENTS.

LAND DEPARTMENT

COMPARATIVE STATEMENT OF GENERAL WELFARE EXPENSES

FOR YEARS 1939 TO 11942, INCLUSIVE.

General Welfare Acct. No. 11.	1939	1940	1941	1942
A-2 Prop. charged by Treas.,	300.00	300.00	300.00	300.00
11-F Miscellaneous Expenses	240.00	240.00	230.00	150.00
	$ 540.00	540.00	530.00	450.00
Donations				
Munising Fire Department	10.00	10.00	10.00	
U. P. Development Bureau	500.00	500.00	500.00	500.00
Munising Hospital Benefit Dance		2.00		
	$ 510.00	512.00	510.00	500.00
Compensation:				
a. Funeral Expense				
d. Legal Expense				
g. Medical Expense				
i. Monthly payments to doctors	399.14	406.62	465.52	421.35
h. Compensation.				
Compensation - Logging Operations.				
Medical & Hospital	324.84	1185.29	16.50	17.02
Compensation Payments	2547.07	3759.29	5680.12	3836.56
Percentage of payroll	4.1	5.2	5.5	3.3

23.

w. VARIOUS DEPARTMENTS (Continued)

LAKE SUPERIOR & ISHPEMING RAILROAD COMPANY

COMPARATIVE STATEMENT OF GENERAL WELFARE EXPENSE

YEARS 1939 to 1942, INCLUSIVE.

Donations:	1939	1940	1941	1942
Fire Department	15.00	25.00	19.90	- -
Visiting Nurse-Marquette	250.00			
Community Chest Fund-Marquette Negaunee, and Ishpeming		287.50	400.00	300.00
	$ 265.00	312.50	419.90	300.00
Pensions	12130.89	2889.69	2420.00	5255.00
	$ 12395.89	3202.19	2839.90	5555.00
Compensation:				
Compensation Paid	2450.00	493.20	2402.41	3590.26
Medical Expense	735.35	857.02	2240.76	931.86
Percentage of payrolls acct. compensation payments	.0036	.0007	.0029	.0039

ELECTRICAL DEPARTMENT
ANNUAL REPORT
YEAR 1942

CLIFFS SHAFT MINE:

Due to the increased production and opening of new contracts in this mine during the year 1942 trouble was experienced from over loading of cables and feeder lines with subsequent low voltage conditions at certain parts of the mine. To remedy this condition the following was done: The 2300 volt line was extended to "B" shaft, an oil circuit breaker installed and a 1/0 2300 volt cable extended from surface to the 10th level. From this cable was taken a line at the 2nd level and a new 150 Kva substation with the necessary protective equipment installed, together with larger cables on the 2nd level feeding from that substation. At the same time a temporary cable which had been installed from the 2300 volt overhead feeder line to "A" shaft, following a previous cable failure, was replaced by a new 2/0 3-conductor 2300 volt line.

A burn out experienced with the 100 H.P. motor operating the top tram necessitated the removal of that motor and substitution of a 125 H.P. motor. Fortunately this burn out occured on Saturday afternoon and it was possible to make the replacement during the night and the following Sunday so that the tram cars were in condition to operate when production was started Monday morning. The 100 H.P. motor which failed has been rewound and is now stored, complete with coupling, and ready for use should a second failure of this equipment occur.

Considerable difficulty has been experienced in the past due to failure of the band wires on the 750 H.P. motors operating the hoists. These band wires were replaced during the year and at the same time the hoist controls were so adjusted to limit the speed of the motors during the lowering cycle as much as was practical. It is hoped that the combination of new band wires and reduced lowering speed will eliminate some of the difficulty which has been experienced in the past.

It was possible to remove from this mine a complete motor generator set consisting of a 220 H.P. alternating current motor and a 100 K.W. direct current generator, with complete starting and protective equipment, and install this unit at the Princeton Mine, which then necessitated a unit of this character to operate its underground haulage system. The removal of this unit was made possible by a larger set having been installed at the Cliffs Shaft and the fact that the unit removed was no longer necessary for active operation.

The increase of the use of welding to repair minor breaks and build up worn parts around the mines has caused a considerable demand from the mine superintendents for arc welding to be done at the mine. Most of the operations were conducted by using a resistance type machine which is extremely ineconomical and does not do good work and also constitutes a considerable drain on the capacity of the haulage generator unit. Accordingly a demand for a new arc welding set for this mine was made and in December a 220 volt A.C. welder with a 300 ampere secondary capacity was purchased. This unit was placed in the mine welding room and if it proves as satisfactory as expected we feel that other mines will require similar units in the future.

ATHENS MINE:

On July 2nd there was a break in the winding on the rotor of the 850 H.P. induction motor which drives the flywheel set operating the skip hoist at this mine. This break necessitated the shipping of the rotor to the General Electric Service Shop at Milwaukee for complete rewind of the rotor and exciter and the machine was not back in service until July 13th.

The 60 H.P. motor driving the #1 blower at the 10th level burned out during the year and was replaced by a 50 H.P. motor which we had on hand. The 60 H.P. motor was immediately rewound and is now on hand for a spare for this equipment. This burn out did not cause any delay in the production schedule of the mine.

ELECTRICAL DEPARTMENT
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ATHENS MINE:

During September a new 150 K.W. motor generator set, complete with switch panels, was installed in the 10th level pump station to be connected with the underground haulage system in order to serve as a spare and furnish additional haulage capacity to the two 100 K.W. rotary converters installed at that place. This was necessitated by the destruction of a unit similar to the 100 K.W. converters which burned out early in the year.

NEGAUNEE MINE:

This mine had several minor delays during the summer on account of coil breaks on the armature of the 500 H.P. direct current skip hoist motor. Fortunately we had on hand a spare armature for this motor and were able to install this armature in the motor on Saturday and Sunday preceding Labor Day. After several days of operation it was observed that because of drying and lack of use since this armature had been repaired the windings were loose and moving between the armature laminations and the commutator rings. These coils were wedged and tied in place on the succeeding Sunday so no delay would be caused to the hoisting equipment and the motor is now operating satisfactorily. We immediately ordered a new winding for the armature which had been removed and it is anticipated that the new windings will be installed in the armature early in the year 1943 and at that time these coils will be wedged and tied so that if this armature is needed the trouble that occured in the old unit will be avoided.

After perhaps 20 years of operation it was noticed that the coils in the 440 H.P. 2200 volt A.C. motor for the Ingersoll-Rand air compressor were becoming loose and moving in their slots. It was thought advisable to place non-conducting rings on both sides of the armature laminations and tie all of the stator coils to these rings. This prevents the stator coils from moving and should prevent further trouble with the motor.

During the year a new blower plant was installed which necessitated purchase and installation of a 125 H.P. motor with panel to be used for the purpose of driving the blower. This blower plant is equipped with thermostatic controlled individual heating units which are cut in in proper numbers to supply the warm air necessary for the blower plant operation. Steam for the individual heating units is supplied by a boiler adjacent to the blower plant and the stoker is driven by a 5 H.P. motor.

MAAS MINE:

After approximately 20 years operation it was noticed that the coils in the 438 H.P. synchronous motors driving both the Ingersoll-Rand air compressors were moving in their slots. In order to avoid further trouble a non-conducting ring was placed on each side of the motor laminations and each of the coils was tied to these rings.

We had additional trouble with the compressor motors when the bearings on the exciter of the synchronous motor driving the #1 compressor failed. A temporary arrangement was made for exciting this synchronous motor from another source. No serious delay was occasioned by this failure.

It was noticed in routine inspection that the bearings on the cage hoist motor had worn to the point that they gave an unequal air gap clearance on this motor. Accordingly new bearings were purchased and installed to avoid a shutdown of this equipment during operating time and the old bearings have been removed and rebabbitted so that they will be available should they be needed in the future.

ELECTRICAL DEPARTMENT
ANNUAL REPORT
YEAR 1942

MAAS MINE:

The 75 H.P. motor driving the Prescott pump on the 5th level of the mine was removed and completely overhauled by the installation of new internal resistance, new coupling, rebabbitted bearings, etc. The equipment was subsequently installed and is working satisfactorily.

The liquid rheostat forming the resistance for the motor of the skip hoist has given considerable trouble in the past due to its having become worn after years of operation. This rheostat was completely rebuilt and again installed the latter part of this year. In addition it is anticipated that in the early part of 1943 additional pumping capacity will be installed which will make this control apparatus more reliable.

LLOYD MINE:

Our records show no serious electrical difficulties and no new electrical equipment installed during 1942.

SPIES-VIRGIL MINE:

Considerable trouble was experienced with the Westinghouse rotary converter which is in service as a spare source of power for the haulage system of this mine. The first trouble was experienced early in the year and was a break down of the insulation in the rotor, at which time the rotor was sent to the Westinghouse shops in Milwaukee for repair. This rotor was returned in the spring and later in the year a field coil on the same machine failed. This coil was repaired and the machine put back in service but for several weeks recurring difficulties were had which caused the commutator of the rotor to flash over. Several different tests were made on the machine as a means of revealing the new source of difficulty and the trouble was finally located as a loose connection in the lines feeding the set. After these were repaired no further difficulty was experienced. Although these delays were troublesome they resulted in no delay in mine production.

In the fall the 50 H.P. motor driving the 3rd level pump burned out in such a manner that complete rewinding of the stator was necessary. We were fortaunate in locating another stator of the same size which could be installed. Accordingly this was borrowed from the Maas Mine and placed in service on the pump and rewind materials were ordered for the stator which was removed. It is expected that this rewind job will be completed early in 1943 and either the rewound stator will be placed on the pump or will be returned to the Maas Mine in place of the one borrowed, whichever seems best at the time.

PRINCETON MINE:

The electrical equipment for the Princeton Mine has been installed during the year after completion of the dewatering. Considerable trouble was experienced from time to time with this equipment since much of it was not in the best of condition when installed and much of it had been in operation for some time before installation. However, these difficulties were no more than could be expected with the type of equipment and the difficulties under which they were operating. It is expected that most of the trouble had been eliminated by the end of the year.

22. REPORT OF GEOLOGIST FOR THE YEAR ENDING DECEMBER 31, 1942

A. STAFF

The staff of the Geological Department for the year 1942 is shown in Table I below. The personnel has remained unchanged throughout the year.

TABLE I.

Name	Occupation	Hours Lost Sickness	Hours Lost Absence	Hours Overtime	Net % Hours Worked
E. L. Derby, Jr.	Chief Geologist	61½	98	108¾	97.5
Burton H. Boyum	Asst. Geologist	36	18	-	97.4
Archie Minnear	Draftsman	-	79¾	-	96.1
E. A. Allen	Assistant	-	50	-	97.5

Mr. Grover J. Holt, formerly a Mining Engineer with the Oliver Iron Mining Company in Minnesota and, for the past fourteen years with Butler Brothers in Minnesota, recently Assistant to the Vice President of the latter,-joined the Company on April 1st, 1942. He had his headquarters at the Company's Hibbing office until November 1st, but at that time established his headquarters in the Ishpeming office. While strictly not of the personnel of the Geological Department, he will, in addition to his other activities in the Operating department, assist me in many ways. In particular, he will have charge of all metallurgical problems and processes, including the experimental work involved, and will act as Project Engineer on all initial engineering problems.

The year 1942 was divided into the factors shown in Table II, below:-

TABLE II.

Total Working Days	282 days (2038 hours)
Sundays	52 "
Full days resulting from Saturday afternoons	26 "
Holidays	5 "
	365 days

Table III, below, shows the average number of men regularly employed on a full time basis on the staff of the Geological Department during the past five years:-

TABLE III.

Year	Average Number of Men
1938	4.0
1939	4.0
1940	3.9
1941	4.5
1942	4.0

B. GENERAL DESCRIPTION OF THE WORK OF THE DEPARTMENT

The work of the Geological Department was divided between the various mines, explorations and miscellaneous items shown in Table IV, below:-

TABLE IV.

ITEMS	HOURS WORKED	PERCENT
MINES		
Athens	116	1.5
Barnes-Hecker	32½	.4
Book (Ford-Neely)	16¼	.2
Canisteo	48½	.6
Cliffs-Shaft	568½	7.3
Hill-Trumbull	86	1.1
Holman-Cliffs	93¼	1.2
Jackson Lease	166	2.1
Lloyd	351	4.5
Maas	200	2.6
Mather	568¼	7.3
Missouri-Cliffs	57¼	.7
Morris Lease	223¾	2.8
Negaunee	273	3.5
Pontiac	129	1.6
Princeton	192	2.5
Ravenna-Prickett Lease	1	-
Reserve Mining Co	46¼	.6
Tilden	15¾	.2
Virgil	168½	2.2
Total Mines	3,352¾	42.9
EXPLORATIONS		
Cliffs-Shaft Surface (Section 9)	120¾	1.6
Cliffs-Shaft Surface (Section 11)	44¼	.6
Cliffs-Shaft Mine	283¾	3.6
Lloyd Mine	385¾	4.9
Maas Mine	60½	.8
Mather Mine Surface	484¾	6.2
Negaunee Mine Surface (Section 5)	58¼	.7
Negaunee Mine	19¼	.2
Princeton Mine	22	.3
Section 3, 47-27	13¼	.2
Section 5, 47-27	509¼	6.5
Section 24, 43-35	161½	2.1
Virgil Mine	65	.8
Total Explorations	2,228¼	28.5
MISCELLANEOUS ITEMS		
Annual Report	53¼	.7
Beneficiation of Iron Ores (General)	5	.1
Carbon Selection	7	.1
Engineering Department	243¼	3.1
Geological Surveys on Company's Mineral Estate	411½	5.3
Gold Leases on Company's Mineral Estate	3	-
Investigating Mineral Land Offers	696¾	8.9
Investigating Outside Explorations	59¼	.8
Michigan Mineral Land Company	16¾	.2
Miscellaneous Geological Expense	733¼	9.4
Total Miscellaneous	2,229	28.6
GRAND TOTAL	7,810	100.0

B-1. DESCRIPTION OF WORK BY THE STAFF MEMBERS

E. L. DERBY, JR. Approximately 49% of my time during the year was spent in connection with the geological work in the Company's active mines. About 5% of my time was spent in planning and supervising diamond drill explorations in the Cliffs-Shaft, Lloyd, Maas, Negaunee, Princeton and Virgil Mines; on the surface of the Cliffs-Shaft, Mather, Negaunee and Spies Mines; and on Section 3, 47-27, in the Ishpeming District and Section 5, 47-27, in the North Lake District. The balance of my time, or approximately 46%, was taken up with the routine work of the office and the numerous miscellaneous duties peculiar to the Geological Department. The geological surveys and explorations are treated separately and in more or less detail later in the report. My activities, in addition to the strictly routine work of the office, may be summarized as follows:

In JANUARY, I attended the annual meeting of the Minnesota Section of the American Institute of Mining and Metallurgical Engineers held at the University of Minnesota, Minneapolis, Minnesota, on Monday, January 12th. From there, I went directly to Poplar Bluff, Missouri, and spent 2½ days going over the activities of the Mesaba-Cliffs Mining Company in both field and office, in company with Messrs. Barber, Raymond and Wivell, representing the Company and with Messrs. Archibald, Nicolson, Doan, Frank Book and Herbert Book, representing the North Range Mining Company. Messrs. V. D. Perry of the Anaconda Copper Mining Company and W. R. Brown of Washington, D. C., both representing the Reconstruction Finance Corporation, came to my office on January 28th. I went over with them all of the drill reports, cross-sections and reserve estimate figures of the Pontiac Mine. At that time it was agreed that the Pontiac Ore, together with all of the black manganiferous ore reserves of Butler Brothers, would form a sufficient backlog for a Government concentrating plant to be erected on the Cuyuna Range for the extraction of manganese and the production of a ferro manganese ore for the war effort.

In FEBRUARY, I spent two days at the Cleveland Office in conference on matters pertaining to negotiations for a lease on the Steep Rock Mine, near Atikokan, Ontario, as well as matters relating to the proposed heavy density cone plant at the Hill-Trumbull Mine.

In MARCH, I made two trips to the Mesaba Range in connection with our negotiations for a lease on the Steep Rock Mine mentioned previously. This culminated in a trip to the Mine with Messrs. Van Slyke and Roberts. We spent four days inspecting the drilling from the ice of Steep Rock Lake and in going over all of the records of this work to date. While there, I prepared a composite sample of the cuttings from all of the churn drill holes which had been put down in both the "A" and "B" ore bodies, extending from 1940 to date. I accompanied Messrs. Barber and McClure to Sault Ste. Marie, Ontario for conferences with Sir James Dunn, President, T. F. Rahilly, Vice President and General Manager and other officials of the Algoma Steel Corporation, in connection with their potential interest in a lease on the Steep Rock Mine Property. I went to St. Paul and Minneapolis. In St. Paul, Grover Holt and I conferred with Messrs. Pat and Hazen Butler of Butler Brothers, on data in connection with the Pontiac Mine and more especially as this property affects the proposed leaching plant which was to have been constructed by the Government on the Cuyuna Range for the preparation of a ferro manganese grade of ore. At the Mines Experiment Station in Minneapolis, I witnessed tests being made on crushed Cliffs-Shaft ore by the so-called double classification method.

In APRIL, I conferred in our Cleveland Office with Mr. Barber and other officials of the Company on the Pontiac Mine and the negotiations for a lease on the Steep Rock Mine in Ontario. I spent one day in New York, conferring with Mr. Frederick Laist, executive Metallurgist of the Anaconda Copper Mining Company relative to the proposed leaching plant which was to have been constructed by the Government on the Cuyuna Range previously mentioned. I then

spent one day in Washington, D. C. with Messrs. Geffine and Barber, representing the Company and Messrs. Francis Butler, Pat Butler and Richard Whitney, representing Butler Brothers, in a conference with Mr. H. DeWitt Smith of the Metals Reserve Company, representing the Government, on the Cuyuna Manganese situation and the proposed leaching plant. I made two trips to the Mesaba Range. Much of the time while there, was spent in connection with working up data with Messrs. Walter Sterling, Bolthouse, McClure and Holt for our joint report on the Steep Rock Mine Property. I conferred in St. Paul with Messrs. Downing and O'Connell, engineers of the Minnesota State Tax Commission, on the question of the proposed review by the Commission of the Holman-Cliffs Mine reserves and valuations. As a result of this conference, I was able to have this review deferred for a year. I joined Messrs. Geffine, Barber and Jackson in a conference in Lansing with Messrs. Pardee & Eddy, State Appraisers of Mines, going over their valuations on all of the Company's Michigan properties. I joined with Mr. Archibald in the usual annual report to Mr. Bush on the lands of the Michigan Mineral Land Company, and adjoining lands, that have been advertised for the sale of taxes.

In MAY, I made two trips to the Mesaba Range in working on and completing, with Messrs. Walter Sterling, Bolthouse, McClure and Holt, our final report on the Steep Rock Mine property, Land Offer #2176. I joined Messrs. Barber, Walter Sterling, Bolthouse and Holt in an examination of the Mesaba Mountain Pit, Land Offer #2204. In connection with the latter, I attended a conference in Chicago for the purpose of submitting a bid to the Minnesota State Department of Mines and Minerals for a lease on this property. Other representatives of the Company at this conference were Messrs. Barber, Raymond, Walter Sterling and Holt. Also at the conference were Messrs. Frank Book, Archibald, Cohoe, MacDonell and Ives. Messrs. Barber, Walter Sterling, Holt and I prepared a preliminary agreement which was filed with the Government for the proposed opening of the Pontiac Mine in connection with the leaching plant, the erection of which was being considered by the Government at that time. I joined Messrs. Walter Sterling, Donovan and Bolthouse at the annual Occupational Tax hearing at the State Office Building, St. Paul, Minn.

In JUNE, I had two conferences at the Cleveland office. At the first conference, I went over all of the data in connection with the Steep Rock iron deposit, covered by a joint report, in which I joined. Between these conferences, I accompanied Messrs. Greene, S. L. Mather, Barber, Geffine and McClure, representing the Company, at a conference held in the Royal York Hotel in Toronto, Ontario, at which time we went over all phases of the Steep Rock Property and proposed lease of same with Mr. Jacobs representing the Bethlehem Steel Company, and with Messrs. MacMaster and Hilton, representing Steel Company of Canada; Sir James Dunn and Messrs. Rahilly, MacPhail, Franz and George MacLeod representing Algoma; Acers, an independent hydraulic engineer and Van Slyke, an independent mining engineer. At my second conference in Cleveland, I assisted in the preparation of a proposed sales contract for the sale of Pontiac ore to a possible Government leaching plant to be located on the Cuyuna Range

I made two trips during the month to the Mesaba Range. During this time, Dr. Andrew Leith, Washington, D. C., in charge of the manganese supply for the Steel Industries, as a member of the War Production Board, met me in Duluth, in connection with the proposed Government leaching plant, to investigate the reserves of black manganiferous ores on the Cuyuna Range. I went over with Dr. Leith, all of the Pontiac maps, cross-sections and reserve estimates and arranged for a conference between him and Mr. Whitney, manager of Butler Brothers. I took Dr. Leith to the Cuyuna Range where we went underground in the Merritt Mine of Butler Brothers, and where we had an opportunity to see the actual mining of black manganiferous ore and to learn something of the reserves of this product on the Cuyuna Range. I spent a short time in St.

Paul and Minneapolis during the month. In St. Paul, I conferred with Messrs. Francis and Pat Butler of Butler Brothers, in connection with our proposed sales Contract of Pontiac ore to the Government for the anticipated leaching plant. In Minneapolis, I visited the Mine Experiment Station and conferred with Messrs. Davis and Wade on a report recently made by Mr. Davis on the Reserve Mining Company property at Babbitt and also on matters pertaining both to the Pontiac Mine and to the Cliffs-Shaft Mine.

In JULY, I addressed directors W. G. Mather, Greene, Newberry, Williamson, Brainerd and Wade at the time of their annual inspection trip to the Company's properties, on the ore possibilities of the Company's mineral estate on the Marquette Range. I also assisted in showing these gentlemen both the active and many of the inactive properties on the Range. I joined Messrs. Barber and Raymond in a conference with Messrs. Salsich and Diehl of the Oliver Iron Mining Company in discussing with them the question of leasing from the Oliver the $S\frac{1}{2}$ of the $NW\frac{1}{4}$ of Section 10, 47-27 adjoining the Cliffs-Shaft Mine on the South and also a lease on the Champion Mine. I accompanied Messrs. Barber and Raymond to the Mesaba Range and went over the Company's operations, explorations and milling activities with them and Mr. Walter Sterling. Messrs. Sterling, Holt and I visited the two Fillmore County limonitic iron ore deposits near Spring Valley, Minnesota, being operated by Winston Bros., contractors of Minneapolis. One of these properties, the Fillmore, is leased by Winston Brothers and the other, the Weebing, is leased by the Evergreen Mines Company, but operated by Winston Brothers under contract.

In AUGUST, I conducted Mr. W. L. Cummings, Jr. of the engineering department of the Bethlehem Steel Company around the Marquette range and on an inspection at the bottom of the Mather Shaft, which, at that time, had reached a depth of 1875'. I spent three days at the Cleveland office during which time I joined Messrs. Brown and Barber in a conference with officials of the Republic Steel Corporation discussing in considerable detail the Steep Rock Iron Mine property near Atikokan, Ontario. I conferred with Mr. S. L. Mather and Attorney Young in preparing a proposed lease of the $S\frac{1}{2}$ of the $NW\frac{1}{4}$ of Section 10, 47-27 from the Oliver. I joined Messrs. Brown and Barber in a trip to Bethlehem, Pa. We conferred with Mr. Jacobs on Mather Mine matters and then attended an annual outing of the mining and raw materials men of the Bethlehem Steel Company.

In SEPTEMBER, I spent several days on the Mesaba Range in connection with the near completion of the new Cone plant at the Hill-Trumbull Mine, the structure drilling at all of our Mesaba Range properties and conferences with Mr. Holt on his report covering the Reserve Mining Company property at Babbitt, Minnesota. Mr. Stakel went to the Range with me. I went to St. Paul and held conferences with Messrs. Downing and O'Connell, engineers for the State Tax Commission, on the review to be made of the Holman-Cliffs Mine. While, there, Mr. Holt and I conferred with Mr. Davis of the Mines Experiment Station, Minneapolis, on Mr. Holt's report of the Reserve Mining Company property. Mr. M. L. Jacobs, Vice President of Bethlehem Steel Company and Messrs. Greene and Barber spent two days inspecting the Mather and Negaunee Mine properties. While they were here, I addressed them informally on the various phases of the Marquette range and particularly in reference to the properties of the Negaunee Mine Company. Messrs. Bush, Brotherton and I examined the test pitting and other work done in Section 36, 42-33, in the Stager District of Iron County. This land, owned by the Michigan Mineral Land Company, was optioned for the exploration for manganese to Mr. Ray Turner of Iron Mountain and others.

In OCTOBER, I conferred with Mr. Davis, Director of the Mines Experiment Station in Minneapolis, and his staff, relative to the results they had obtained on the small scale experiments to aglomerate Princeton Mine plastic ore

and made arrangements for a large scale test on a carload lot of this material, during the winter. I then went to the Mesaba Range and visited all of the Company's operations, including the initial run of the new heavy density cone plant at the Hill-Trumbull Mine, and went over the drilling problems at all our properties. With Mr. Holt, I inspected the new experimental laboratories recently equipped in the Hibbing district by Pickands Mather Company and by the Minerals Separation North American Corporation. At the latter laboratory, an intensive study will be made on the possibility of separating iron from waste material in fine sizes by flotation.

In NOVEMBER, I examined and reported on the old Davidson and Commonwealth Pits near Florence, Wisconsin and old Indiana Pit near Iron Mountain, Michigan, with Messrs. Haller and Holt. We were joined by Messrs. George Anderson and J. T. Spencer, Jr. representing the latter's father, in connection with Land Offers on these properties,- Offers No. 2235 and No. 2239. I joined Messrs. Geffine, Walter Sterling, Donovan and MacPherran, in attending the public hearing on ad valorem valuations in the State Office Building, St. Paul. I conferred with Messrs. Davis, Craig and Wade at the Mines Experiment Station, relative to the proposed sintering test to be made on a carload sample of Princeton Mine plastic ore. I visited the Mesaba Range and went over the current exploration problems. While there, I prepared a letter of protest to the State Tax Commission on the Hill-Trumbull ad valorem valuation. Also, Walter Sterling and I conferred with Messrs. Calvin, Van Slyke and MacKillican, all of whom represent various fee interests in properties on the Mesaba Range, in connection with the possible acquisition of additional ore reserves on the Range by the Company. On my return, I contacted Mr. W. G. Pearsall in Duluth, representative of the Mesaba Mineral Association in the same connection. I attended a meeting of mining representatives and geologists at the Michigan College of Mining and Technology, Houghton, to discuss ways and means for an increase in activity to develop mineral reserves in the Upper Peninsula that will aid in the war effort. With Mr. Stephen Royce of Crystal Falls, I was appointed as Co-chairman of the Committee on Iron Ore. Messrs. Stakel and Holt accompanied me to this meeting. I conferred with Mr. Archibald on an appraisal of the Barnes-Hecker Mine in anticipation of possible negotiations with the Inland Steel Company to trade this property for a tonnage of ore in the Dean Mine, Mesaba Range, owned by the Inland Company.

In DECEMBER, Mr. Holt and I examined a wild cat iron ore property in South-Central Wisconsin, Land Offer No. 2240, located about 10 miles South of Mauston. The exposures consist entirely of residue fragments of a high grade limonitic iron ore. There are probably several hundred tons exposed in pieces from small grains to large chunks weighing several tons each.

BURTON H. BOYUM. Mr. Boyum continued as Assistant Geologist throughout the year. He spent 60% of his time on the geological surveys and maps of our operating mines; 12% on the drilling explorations; and 28% on miscellaneous duties included in the rountine work of the Department. Although he made periodic underground geological surveys, and posted this information on the geological maps, of the development work in all the operating mines, the Cliffs-Shaft Mine continued to take the largest share of his time on such work,- a total of more than 19%. With the rapid underground development on the two upper main levels of the Mather Mine,- namely, the 1600' and the 1750' levels, this property accounted for 15% of his time. In addition to the geological surveys, Mr. Boyum has classified all of the drill core from current explorations and had direct charge of the drilling under my supervision. He made specific gravity tests on all of the diamond drill carbon submitted to the Department during the year, as an aid in our final selection. He has direct charge of all mechanically set Bortz bits. These are dispensed to the various explorations, where this type of bit is used, from this office and a complete record of performance kept. We are making a special study in the comparison of Bortz bits with carbon bits. We believe each type of bit has its preferred place in our drilling program and are making this study to determine where each type should be used.

GROVER J. HOLT. Mr. Holt, as mentioned previously, joined the Company's personnel on April 1st and spent the first seven months of his employment on the Mesaba Range with headquarters at the Hibbing office. On November 1st, he transferred his headquarters to this office. He has assumed direct charge of all our metallurgical problems and has assisted me in the consideration of numerous mineral properties coming to our attention in the form of land offers. It will be recalled that, while in the employ of Butler Brothers, with headquarters in St. Paul, he served us in a consulting capacity in the planning, the design, and the erection of the Cone Plant for treating so-called jig material at the Hill-Trumbull Mine. Since joining the Company, he has kept in close touch with this development and operation. It has also been noted above that he did important work in connection with a joint study and report on the Steep Rock Mine. He will play a prominent part in the preliminary studies and plans for the opening and equipping of any mine to be operated by the Company.

ARCHIE MINNEAR. Mr. Minnear continued as a Draftsman and Office Assistant with the Department throughout the year. During the year, however, he spent about 9% of his time assisting in the Engineering Department due to the shortage of help and emergencies that arose. Approximately 60% of his time was spent in drafting work associated with the geological surveys and maps of our operating mines; 7% on similar work for the drilling explorations; and 24% on miscellaneous duties included in the routine work of the Department. He spent considerable time on the reclassification and refiling of old maps, cross-sections and other data in our vaults which was necessary to make room for current maps and other data. This work was started in 1941. Mr. Minnear also took over the work in the core room, filing diamond drill and such sludge samples, whenever Mr. Allen found it necessary to be at the drills for any length of time.

E. A. ALLEN. Mr. Allen spent 93% of his time during the year collecting, labelling, sampling and filing diamond drill core and sludge samples from the current explorations and in making tests for the dip and bearing of all current drill holes with the Maas Compass wherever this data was required. He made thin sections of rock samples and drill cores whenever necessary for microscopic study by Mr. Boyum and me. About 4% of his time was charged to the Engineering Department for the weekly observations of water levels in the various deep well holes on the surface of the Maas and Negaunee Mines which he made during the year. These wells were drilled for the purpose of observing and platting the activities and drainage of surface water over the ore bodies at these Mines. The rest of his time was spent on routine office duties.

C. SURFACE GEOLOGICAL SURVEYS

No important surface geological surveys were made during the year. Mr. Holt and I, accompanied by Mr. Haller, examined the old Davidson and Commonwealth pits near Florence, Wisconsin and the old Indiana pit near Iron Mountain, Michigan, in connection with Land Offers No. 2235 and 2239, made by Mr. John T. Spencer of Iron Mountain. The offer was declined and, therefore, this examination was not followed up by any detailed geological mapping.

Perhaps, under this heading, reference should be made to a large amount of time spent by Mr. Holt and me with Mr. McClure, as consultants, and Messrs. Walter A. Sterling and H. C. Bolthouse of our Mesaba Range operating organization, in several examinations of the geological surveys and explorations at the Steep Rock Mine property near Atikokan, Ontario, Canada. A detailed joint report was prepared for large and steady production.

D. MINE GEOLOGICAL SURVEYS AND OPERATIONS

Underground geological surveys of the current mine extensions and development work were made during the year in all of our operating mines. This included periodic inspections of the Mather Mine Shaft in mapping the geology of the formations passed through, and also occasional underground surveys of the current extensions in the Jackson lease being operated by the Republic Steel Corp. in connection with its Cambria Mine.

From January 1, 1942, all underground mines, excepting the Cliffs-Shaft and Virgil, were operated on a six day per week basis, working three - 8 hour shifts for five days and two - 8 hour shifts on Saturdays. The Cliffs-Shaft Mine operated six days per week, two - 8 hour shifts per day. The Virgil Mine operated two - 8 hour shifts, five days per week until October 17th, after which one 8 hour shift on Saturdays was added.

The Tilden Mine open pit operations began on March 28th and continued quite steadily to and including November 23rd. Operations, as in the past, were geared to the schedule of boat shipments.

It has been customary in my annual reports for a good many years, to discuss under this heading the more important features of the development work and geology which has come to our notice during the year at each of the operating mines. Without doubt, many of these features are discussed by each superintendent in his annual report of the particular property. My object, however, has been to combine all of this data in this Annual Report. Due to an excessive and accelerated demand on my time for the entire year to date, this report already has been delayed much too long. Because the material I might assemble is contained largely in the reports of the separate mines, I shall not further delay this report to assemble this information for the year 1942. We have been able to keep up the geological mapping of the current development work in all of the operating mines so that our files contain a complete geological record of these extensions.

E. OPTIONS AND LEASES

No new options to explore, nor mining leases, were taken by the Company during the year.

Notice of intention to surrender the lease on the Mackinaw Mine in the Gwinn district was sent to fee owners on December 5th, 1941. The actual surrender took effect on February 5th, 1942. This lease comprised the:

$S\frac{1}{2}$ of $SW\frac{1}{4}$	Sec. 35, 45-25
$N\frac{1}{2}$ of $SE\frac{1}{4}$	" " "
$SW\frac{1}{4}$ of $SE\frac{1}{4}$	" " "

F. EXPLORATIONS AND COSTS

Drilling explorations were carried on in 1942 in the following districts and mines:

F-1. - FROM SURFACE

DISTRICT	RANGE	PROPERTY
Coleraine	Mesaba	Canisteo Mine
Marble	"	Hill-Trumbull Mine
Taconite	"	Holman-Cliffs Mine
Ishpeming	Marquette	Cliffs-Shaft Mine
Ishpeming	"	Mather Mine

F-1. - FROM SURFACE

DISTRICT	RANGE	PROPERTY
Ishpeming	Marquette	Section 3 Exploration
Negaunee	"	Negaunee Mine
North Lake	"	Section 5 Exploration
Iron River	Menominee	Spies Exploration

F-2. - FROM UNDERGROUND

DISTRICT	RANGE	PROPERTY
Ishpeming	Marquette	Cliffs-Shaft Mine
North Lake	"	Lloyd Mine
Negaunee	"	Maas Mine
Negaunee	"	Negaunee Mine
Gwinn	Swanzy	Princeton Mine
Iron River	Menominee	Virgil Mine

Table V, which follows, gives the footage drilled, the ore encountered, and the cost per foot of drilling for both surface and underground explorations. It will be noted that the average cost of surface drilling was $4.98, excluding certain items not actual drilling expenses which customarily are charged to the explorations. By including these items, the average cost of surface drilling was $5.71 per foot. The cost of underground drilling, in the same way, was $3.91 per foot and $4.37 per foot, respectively. By comparison with 1941, the cost of drilling from surface increased by $0.46. This increase was due chiefly to two conditions: in the first place, on account of the great demand for drill runners, there has been a shortage which has forced us to use much less efficient men and advance younger and inexperienced men from helpers to runners. They do not reach their maximum efficiency for some time after becoming runners. Secondly, in order to carry out our exploring program, we had to employ no less than three contract drills. This always adds to our expense materially because the contract price necessarily includes a material profit to the contractor. In comparison with 1941, the cost of drilling underground showed an increase of $1.00 per foot. Here again, reduced efficiency of drilling personnel played a large part and some of our drilling required unusually frequent moves which increased the dead work in proportion to the footage drilled. At one property, the Virgil Mine, we were forced to do the work under contract which, as mentioned above, increases the cost over Company operated drilling.

Drilling costs, as a whole, in 1942 showed an increase of $.56 per foot.

Table VI, also shown below, gives a comparative cost of total drilling for the past five years.

TABLE V.

SUMMARY OF DRILLING FOR 1942.

PROPERTY	SEC.	T.	R.	STAND-PIPING FT.	CHURN DRILLING FT.	DIAMOND DRILLING FT.	TOTAL DRILLING FT.	FIRST CLASS ORE FT.	SECOND CLASS ORE FT.	LEAN ORE FT.	TOTAL COST "A"	COST PER FT. "A"	TOTAL COST "B"	COST PER FT. "B"
SURFACE DRILLING														
Canisteo Mine	29,30,31 & 32	56	24, Minn.	1,966	3,438	-	5,404	-	-	1,635	$ 22,900.98	$ 4.24	$ 18,588,90	$ 3.44
Hill-Trumbull Mine	17	56	23, "	1,235	6,639	-	7,874	-	-	2,640	39,998.71	5.08	32,652.33	4.15
Holman-Cliffs Mine	21 & 22	56	24, "	845	6,716	-	7,561	-	-	3,845	38,539.17	5.10	30,166.66	3.99
Cliffs-Shaft Surface	9 & 11	47	27, Mich.	206	-	2,644	2,850	9	-	-	15,593.28	5.47	14,791.14	5.19
Mather Mine Surface	2	47	27, "	148	-	3,599	3,747	26	10	25	32,873.41	8.80	31,185.65	8.32
Negaunee Mine Surface	5	47	26, "	68	-	681	749	-	-	-	4,137.10	5.52	3,730.68	4.98
Section 3 Exploration	3	47	27, "	68	-	363	431	-	-	-	3,821.11	8.87	3,499.10	8.12
Section 5 Exploration	5	47	27, "	178	-	5,591	5,769	153	22	111	41,053.02	7.12	37,701.49	6.54
Spies Mine Surface	24	43	35, "	305	-	2,389	2,694	-	-	-	12,809.29	4.75	12,491.94	4.64
TOTAL SURFACE DRILLING				5,019	16,793	15,267	37,079	188	32	8,256	$211,826,07	$ 5.71	$184,807.89	$ 4.98
UNDERGROUND DRILLING														
Cliffs-Shaft Mine	3,9 & 10	47	27, Mich.	-	-	3,696	3,696	237	144	169	$ 17,292,48	$ 4.68	$ 16,036.73	$ 4.34
Lloyd Mine	6	47	27, "	-	-	5,439	5,439	137	156	320	24,541.12	4.51	21,294.04	3.92
Maas Mine	6	47	26, "	-	-	1,000	1,000	330	82	70	2,818.38	2.82	2,354.22	2.35
Negaunee Mine	6	47	26, "	-	-	298	298	20	15	-	831.72	2.79	639.45	2.15
Princeton Mine	18	45	25, "	-	-	154	154	12	10	16	1,114.32	7.15	1,021.86	6.64
Virgil Mine	24	43	35, "	-	-	1,014	1,014	-	-	-	4,124.43	4.07	3,998.39	3.94
TOTAL UNDERGROUND DRILLING				-	-	11,601	11,601	736	407	575	$ 50,722,45	$ 4.37	$ 45,344.69	$ 3.91
GRAND TOTAL DRILLING				5,019	16,793	26,868	48,680	924	439	8,831	$ 262,548.52	$ 5.39	$ 230,152.58	$ 4.73

Note:- Cost "A" includes office expense, engineering, analysis, legal, personal injury, etc.
Cost "B" excludes " " " " " " " " (To compare with contract prices)

At the Canisteo Mine, 4123' were drilled on contract for $3.494 per foot by J. S. Schultze & Sons of Grand Rapids, Minnesota
At the Hill-Trumbull Mine, 5278' were drilled on contract for $3.601 per foot by J. S. Schultze & Sons of Grand Rapids, Minnesota.
At the Holman-Cliffs " , 2046' " " " " " 3.965 " " " " " " " " " " " "
At the Section 3, Expl., 431' " " " " " 6.251 " " " E. J. Longyear Company, of Minneapolis "
At the Spies Mine Surface, 2694' " " " " " 4.485 " " " " " " " " " "
At the Virgil Mine, 596' " " " " " 4.154 " " " " " " " " " "

TABLE VI.

SUMMARY OF FOOTAGE DRILLED AND COST PER FOOT OF DRILLING FOR THE PAST FIVE YEARS

YEAR	TOTAL FEET DRILLED	COST PER FOOT "A"	COST PER FOOT "B"
1938	15,774	$ 6.16	$ 5.38
1939	19,926	4.70	3.96
1940	19,514	4.66	3.89
1941	42,223	5.00	4.17
1942	48,680	5.39	4.73

F-3. - DIAMOND DRILL CARBON

We had on hand, January 1, 1942, a total of 1157.18 carats of diamond drill carbon which inventoried at $97,173.35. We purchased, during the year, a total of 67 stones, having a weight of 289.09 carats, at a cost of $22,640.45. We consumed during the year a total of 241.60 carats, having a value of $30,171.57. This left on hand, Dec. 31, 1942, a total of 1204.67 carats which inventoried at $89,642.23. In addition to this carbon, we used 9 carats of Bortz at a cost of $29.25. This exactly depleted the balance of Bortz which we had on hand January 1, 1942. During the year, however, we purchased 50.40 carats of additional Bortz, at a cost of $138.60, all of which was on hand on December 31, 1942. Bortz is used in the place of carbon fragments or chips when we encounter soft ore, or any real soft ground, to save the larger stones and reduce the hazard of loss in case the bit becomes permanently stuck in a hole. In addition to our carbon and Bortz, we are now using a large number of mechanically set Bortz bits which we buy ready for use. We receive credit, after they have ceased to cut, for the Bortz remaining in the bits that can be used again.

F-4. - DRILL SECTIONS

Cross-section tracings of all drilling showing analyses and classification of material encountered during the year have been made up. Photographic copies of these, showing the work done during the year on the Marquette and Menominee Ranges, in colors, will be found in the Annual Report books which are submitted as a part of the Annual Report of the Engineering and Geological Departments.

G. SURFACE EXPLORATIONS

G-1. - EXPLORATIONS ON CLIFFS-SHAFT SURFACE, SECTION 9, 47-27, MICHIGAN

Sometime ago, while making a reconnaissance study of the surface geology of the Ishpeming district, and more particularly the area that might be tributary to the Cliffs-Shaft Mine, we studied areas on the Company's mine estate where there was a possibility of discovering and developing hard ore of Cliffs-Shaft grade. This ore is confined to the uppermost portion of the Negaunee Iron Formation and lies in contact with and just below the Goodrich quartzite hangingwall. On April 4th we started a vertical hole, #56, from the surface in the NW¼ of the SW¼ of Section 9 to test this possibility. It was located at S.8800 and 25000 W. which places it about 1/2 mile due South of the Section 9 Deposit which is being developed from the 10th level "B" Shaft. Hangingwall quartzite was encountered at ledge at a depth of 42'. With the exception of an occasional bedded layer of graywacke, the hole continued in typical quartzite to a depth of 1336'. From this point on, more slate than quartzite was encountered with slate and graywacke from 1336' to 1338'. After cutting 10' of quartzite from 1338' to 1398', the drill again encountered slate and graywacke. Unfortunately this hole deviated from the vertical to a considerable extent and in the direction of the dip of the formation. Finally, it was found the hole had flattened to approximately 58° at 1380' and was exactly parallel to the dip of the formation. It was realized, with such a deviation, that there was only a slim chance of the hole changing its course to again cut across the bedding and reach the objective contact between the quartzite and the hard ore horizon below. For this reason, the hole finally was bottomed on August 4th at a depth of 1410'.

A second attempt was made to drill to the quartzite-hard ore jasper contact and hole #57 was located approximately 800' due North of hole #56. This hole also was drilled vertically and work commenced on August 27th. Quartzite was encountered at ledge at a depth of 163'. The hole had reached a depth of 865' on the last of the year and was still in typical Goodrich quartzite hanging material.

G-2. - EXPLORATIONS ON CLIFFS-SHAFT MINE SURFACE, SECTION 11, 47-27.

Early in the summer an examination of old #9 pit in the NW¼ of the NW¼ of Section 11, 47-27, revealed a limited amount of broken hard ore which had been left at the conclusion of mining operations many years ago. Also, along the walls of this pit there were evidences of hard ore which had been left in place. Even though all of this material since has proven to be leaner than the average run-of-mine from the Cliffs-Shaft Mine proper, the broken ore was removed and mixed with richer ore and disposed of.

In order to determine a possible downward extension of the lense of ore mined in old #9 pit, it was thought advisable to drill two or three shallow incline holes to intersect the ground below it. Three such holes were drilled, #6, 7 and 8, dipping to the Northeast with dips varying from 36° to 45°. The first hole #6, encountered 9' of high grade hard ore from 78' to 87' and then broke into old mine workings. The other two holes encountered no ore and were in footwall material their entire footage. Hole #7 was drilled to a depth of 241' and #8 to a depth of 247'. These holes proved quite conclusively that there was no material downward continuation of the hard ore that was mined from old #9 pit and the exploration was discontinued on November 5th.

G-3. - MATHER MINE SURFACE, SECTION 2, 47-27, MICHIGAN

At the beginning of the year, two drill rigs were operating from the Mather Mine surface, Sec. 2, 47-27. Hole #49 was being drilled vertically from the top of the diorite bluff north of the Golf Club on the 12000 W. meridian to further cross-section the geologic structures crossing this area. The hole was 1778' deep on the first of the year. A run of high grade ore had been encountered in December, 1941 extending from 1565' to 1605' and averaging 63.23% iron and .059% phos. This was only a short distance above the interbedded slate. The latter was encountered at 1628' and extended to 1755' below which jasper again was encountered. A 4' seam of high grade ore was cut from 1781' to 1785', averaging 60.58% iron and .270% phos. The main body of footwall slate was encountered at 1793' and the hole finally bottomed in it without further change at 1872' on January 20th.

Hole #50, also vertical hole, and drilled from the Golf Club area on the 12700 meridian, was drilling in soft ore jasper at a depth of 1810' on the first of the year. No ore was encountered above the interbedded slate, in contrast with hole #49, but 26' of high grade ore was encountered from 2031' to 2057' between the interbedded slate and the main body of footwall slate. This ore averaged 62.16% iron and .115 phos. Ore at this horizon has been very persistent over quite a large area of the Mather Mine in the drilling completed to date. This hole was completed on February 13th at a depth of 2117' and in footwall slate.

In order to follow the Northerly continuation of the ore encountered in hole #50 up the dip, hole #51 was drilled vertically on the same meridian from a point on top of the diorite bluff approximately 750' North of hole #50. This hole was carried all the way to and into the Siamo slate footwall and bottomed at 1810' on June 17th. No enrichment was encountered in the zone above the interbedded slate. Enrichment was cut between this slate and the main footwall between 1694' and 1718', but it was not high grade ore. It averaged from 47.25% to 51.60% iron. It is problematical whether this hole limits the extension of enrichment up the dip on this meridian or whether the hole passed through a lean area with ore again coming in to the North. This hole is about 400' South of the Lillie Mine, which was not under lease to us at the time this drilling was done; consequently, it was decided not to follow this possibility further. Now that the Lillie property is under lease to us, it may be advisable to drill at least one more hole to the North of #51 on this meridian.

It was decided to drill one additional hole to the West of the meridian through Holes 38, 41, 50 and 51. Hole No. 52, consequently, was drilled vertically on the 13600 W. meridian, in the Golf Club area, approximately 950' due West of Hole No. 38. This location, however, is only 800' West of the point in Hole 38 where the ore was encountered because the latter had deviated some 240' to the Southwest by the time it reached the ore horizon. Hole No. 52 was started on July 6th, and was still drilling at the end of the year. It had reached a depth of 1635' at that time and was drilling in a hard blue phase of soft ore jasper some considerable distance above the anticipated ore horizon.

G-4. - NEGAUNEE MINE SURFACE, SECTION 5, 47-26, MICHIGAN

Hole No. 29, the 4th and last in a series of holes started during 1941 to explore for the continuation of the ore encountered in old Hole No. 17 near the South boundary of the Negaunee Mine property, was standpiping in surface material at a depth of 25' on the first of the year. This hole was drilled with a dip of -87° due South in order to encounter the ore cut in Hole No. 17 at a point about 75' North of a point vertically below the collar of the latter. Hole No. 17 was not surveyed so we don't have the exact location of the ore as cut in this hole. Hole No. 29 was carried well into the footwall Siamo slate and bottomed in the latter at a depth of 774' on April 28th. No high grade ore nor appreciable enrichment of the jasper was encountered. This exploration proved to be a keen disappointment because we were unable to demonstrate any sizeable continuation of the ore encountered in Hole No. 17. Drilling in this locality was discontinued on the completion of Hole No. 29.

G-5. - EXPLORATIONS IN SECTION 3, 47-27, MICHIGAN

Early in November, it was decided to start a drilling campaign on two of the Forties in Section 3 which are held under lease from the Lake Superior Iron Co.- namely, the $SE\frac{1}{4}$-$NE\frac{1}{4}$, just West of the Mather Mine property, and the $SW\frac{1}{4}$-$NW\frac{1}{4}$. The first work in this campaign was started on the $SW\frac{1}{4}$-$NW\frac{1}{4}$ with Hole No. 33. It was drilled vertically from S.2200 and 19,800 W. This places it about 400' due West of Hole No. 24 which was the Westernmost of three holes that encountered the deep Section 3 ore body. Due to our limited drilling personnel and the difficulty of augumenting it, this work is being done under contract by the E. J. Longyear Company of Minneapolis. The object of this hole was to explore for a Northwesterly extension of the deep Section 3 ore body. Standpiping at Hole No. 33 actually began on November 21st. The hole had reached a depth of 431' and was drilling in the main greenstone intrusive sheet on the last of the year.

G-6. - EXPLORATIONS IN SECTION 5, 47-27, MICHIGAN

Diamond drilling in the $N\frac{1}{2}$ of the $S\frac{1}{2}$ of Section 5, in a campaign to explore for possible ore bodies and the development of a new mine, which was started in March, 1941, continued through the current year. At first, only one drill rig was employed but in April, following the completion of drilling in Section 5, 47-26, on the Negaunee Mine surface, the second drill was added and continued the balance of the year.

A study of outcrop geology followed by two incline holes along the North-South center line of the Section, and drilled in 1941, disclosed a possible dike intersected with the slate footwall, suggesting a fault which has displaced the footwall and formed a favorable structure for ore concentration. During the year, a series of 7 holes was completed and 2 others started, Nos. 9 - 17, inclusive. Instead of a single fault displacement in the footwall, this drilling disclosed 4 such faults, one striking Northwest-Southeast and three striking Northeast-Southwest. The pattern of this faulting, together with the resulting geological struc-

tures, are almost identical with that existing at the Lloyd and the Lloyd East Mines in Section 6, about a mile to the West. Hole No. 10, the first hole to be drilled vertically into one of these structures, encountered 50' of high grade ore, from 545' to 595'. This ore averaged 61.95% iron and .030% phos. An additional 20' of ore was encountered from 670' to 690' in contact with the fault dike which bounded the crotch on the South. This ore averaged 59.18% iron and .048% phos. The dip of the iron formation is so nearly vertical, however, that this footage of ore, in itself, does not demonstrate any material thickness. Unfortunately, none of the additional drilling during the year was able to develop any sizeable extension of this ore. We must assume, therefore, that it represents a narrow vertical stringer.

Hole No. 16, which was drilled with a dip of -65° due South on the 7000 E. meridian and directed into an inverted pyramid structural fault block, encountered 55' of high grade ore, from 135' to 190'. This ore averaged 63.16% iron and .209% phos. This hole was still drilling in faulted footwall slate at 379' at the end of the year.

Hole No. 17, which was drilled with a dip of -50° due South from its position in the main footwall on the 7800 E. meridian, to explore the iron formation from the footwall side, was drilling in slate footwall at a depth of 72' on the last of the year.

Although we have been unable to develop, as yet, any merchantable body of high grade ore in this campaign, the drilling to date, nevertheless, has demonstrated intense faulting which has formed structures favorable for ore deposition, and has found the presence of ore making activities. It is our plan to continue this drilling vigorously in hopes that our efforts will be crowned with a discovery of a new mine somewhere in this area.

G-7. - SPIES EXPLORATION, SECTION 24, 43-35

All of the property in Section 24, 43-35, formerly owned by the Spies Mineral Land Company and including the land on which is located the Spies Mine Shaft, was purchased by the Company early in the current year, as a result of negotiations which commenced in 1941. This comprised approximately 320 acres of fee and 160 acres of mineral rights. It was decided to start a campaign of drilling to explore along the East side of the Section for favorable structures in iron formation and possible ore bodies. Drilling actually commenced on April 25th with one drill rig under contract by the E. J. Longyear Company of Minneapolis.

It was known that a steeply dipping band of iron formation trending a little Northwest and Southeast, and containing a body of merchantable ore, existed on the Bates property to the East. Our first hole, No. 61, was located to follow a possible Westerly continuation of this productive iron formation onto Spies land. The hole was drilled with a dip of -62° due North from a point about 950' South and 150' West of the Northeast corner of the Section. Considerable difficulty was experienced in getting the standpipe down to ledge on account of the numerous boulders. Three tries were made before a standpipe was finally ledged, at a depth of 179'. This hole was carried to an ultimate depth of 1585' where it crossed the North boundary of the property and was stopped in unoxidized cherty iron carbonate. For the most part, the ground was gray and black slate with a narrow band of iron formation, from 1104' to 1165'. No enrichment was found.

The drill was moved 1000' farther South on the same meridian and Hole No. 62 was drilled with a dip of -70° due North. At this steeper angle, and with less troublesome boulders, ledge was attained without much difficulty, at a depth of 122'. The hole drilled continuously the balance of the year, practically all in black slate and unoxidized cherty iron carbonate, and had reached a depth of 1109' on the last of the year.

G-8. - CANISTEO MINE, SECTIONS 29, 30, 31 & 32, 56-24, MINNESOTA

A total of 34 structure holes was drilled in the Canisteo Pit and around its perimeter during 1942. Twelve of these holes were drilled on the South Bovey leases. Of these, ten were drilled on the NE¼ of the NE¼ of Section 31, and two on the NW¼-NW¼ of Section 32. Twelve holes were drilled on the Snyder lease, all of them on the SE¼-SW¼ of Section 30,- the West Snyder. Ten holes were drilled on the Hemmens lease, the SW¼-SW¼ of Section 29. A total of 5404' was drilled. Of this footage, 4123' was drilled under contract by J. S. Schultze of Grand Rapids, Minnesota, and the balance, or 1281', by Company rigs. This drilling all was in connection with current mining operations, and to determine the outline of ore under the present banks for the purpose of directing stripping operations preparatory to the ore season of 1943. A total of 1635' of crude wash ore and jig material was encountered in this work.

G-9. - HILL-TRUMBULL MINE, SECTION 17, 56-23, MINNESOTA

A total of 68 structure holes was drilled in the Hill-Trumbull Pit and around its perimeter in 1942. The total footage drilled was 7874' and 2640' of crude wash ore and jig material were encountered. The holes were drilled in connection with current operations, and to determine the limits of stripping ahead of 1943 operations. Thirty-eight holes were drilled on Hill property,- 25 holes on the SW¼ of the NE¼ of Section 17 and 13 holes on the SE¼ of the NW¼ of Section 17. Thirty holes were drilled on Trumbull property,- 29 holes on the NE¼ of the SW¼ of Section 17 and one hole on the NW¼ of the SW¼ of Section 17. Of this drilling, 5278' was drilled under contract by J. S. Schultze of Grand Rapids, Minnesota, and the balance, or 2596', by Company rigs.

G-10. -HOLMAN-CLIFFS MINE, SECTIONS 21 & 22, 56-24, MINNESOTA

A total of 42 structure holes was drilled in the Holman-Cliffs Pit and around its perimeter in 1942. The total footage drilled was 7561' and 3845' of crude wash ore and jig material was encountered. Six of these holes were drilled on the Holman lease,- the SE¼ of the NE¼ of Section 21. Twenty-two holes were drilled on the Brown No. 2 lease,- the SW¼ of the NW¼ of Section 21. Fourteen holes were drilled on the North Star lease,- 9 holes on the NE¼ of the NE¼ of Section 21 and 5 holes on the NW¼ of the NE¼ of Section 21. Of this drilling, a total of 2046' was drilled under contract by J. S. Schultz of Grand Rapids, Minnesota, and the balance, or 5515', by Company rigs.

H. UNDERGROUND EXPLORATIONS

H-1. - CLIFFS-SHAFT MINE

One diamond drill operated continuously in the Cliffs-Shaft Mine throughout the year. In addition to this rig, a one-man "Gopher" drill was operated from the latter part of August until the first of November. Seventeen holes were drilled by the diamond drill and four holes by the "Gopher" drill. The diamond drilling holes were numbered from 496 to 506, inclusive; 508, 512 to 515, inclusive, and No. 299, which was an old hole reopened and deepened. The holes drilled by the "Gopher" machine were numbered 507, and 509 to 511, inclusive. A total of 3696' was drilled by both machines. This work developed 237' of high grade ore (above 57% iron); 144' of second-class ore (from 50% to 57% iron); and 169' of lean ore (45% to 50% iron).

Hole No. 496, was being drilled on the first of the year at a depth of 105', after having just previously encountered 8' of high grade ore, from 97' to 105', averaging 58.19% iron and .186% phos. This hole was the third of a series

of four horizontal holes which were planned to be drilled from the hangingwall crosscut on the Northwest end of the 8th Level, "A" Shaft, Bancroft lease. Although some enrichment was encountered, no additional high grade ore was cut and the hole was bottomed in a dike at a depth of 774'. Hole No. 497, the last of this series of holes, encountered 6' of good ore from the collar of the hole, averaging 63.25% iron and .029% phos. This was followed by 4' of 50% second-class ore and again by high grade ore extending from 10' to 28'. This 18' of ore averaged 59.22% iron and .127% phos. The drill entered a dike at 28' and, with the exception of magnetic chert and a seam of lean ore, from 126' to 160', continued in dike until it bottomed at a depth of 206'.

Hole No. 498, was drilled horizontally on a course N.36°E. from the North side of the 9th Level, "A" Shaft, in order to explore an area of iron formation between two old stopes about 150' apart. Two narrow seams, and one wider seam, of high grade ore were cut. The first seam, from 119' to 127', or 8', averaged 60.00% iron and .046% phos.; the second seam, from 207' to 215', also 8', averaged 58.01% iron and .080% phos.; and the third seam, from 226' to 253', or 27', averaged 64.69% iron and .148% phos. In addition to these three runs, there were several feet of second-class material, averaging from 53% to 56% iron, adjacent to the high grade ore which, undoubtedly, will be mined and mixed with it. This will add an additional 20' of ore thickness to the aggregate of the high grade ore. It seems quite apparent, therefore, that mineable ore in considerable width will be found to extend all the way through this pillar separating the two stopes.

A series of three short horizontal holes, Nos. 499 to 501, inclusive, were drilled due South from the 9th Level, "A" Shaft, spaced about 300' apart, and beginning approximately 300' East of the Shaft. The object of these holes was to explore an area of hard ore jasper between the present workings and the diorite footwall, about which we had no information. Hole No. 499, found no high grade ore and encountered the footwall at a depth of 49'. It was carried to an ultimate depth of 138'. Hole No. 500, had 8' of ore at the start of the hole, averaging 64.65% iron and .051% phos. It cut another 7' of ore, from 17' to 24', which averaged 58.51% iron and .041% phos. This was followed by footwall dike and the hole was carried to an ultimate depth of 268', without further ore discovery. The third hole, No. 501, encountered no iron formation and was carried to an ultimate depth of 199'.

Hole No. 502 was drilled horizontally and due North from the main ore body on the 4th Level, "A" Shaft, and about 350' Northeast of the Shaft, in order to explore for a possible ore connection between stopes to the East and West of it. It encountered 8' of ore, from 102' to 110', averaging 61.64% iron and .231% phos. This is of mineable width and it very well may indicate an ore connection between these two stopes which will develop to be considerably wider.

Hole Nos. 503 and 504 were short horizontal holes drilled from the main drift on the 5th Level, "A" Shaft, about 500' East of the Shaft. Hole No. 503 was drilled due North in a pillar between two stopes, and Hole No. 504, due South from the opposite side of the main level drift to explore the ground between the drift and the slate hangingwall. No. 503, encountered 5' of ore at the start of the hole, averaging 63.10% iron and .087% phos. It then entered footwall material and was bottomed at 151'. No. 504 had several runs of high grade ore, as follows:

From	To	Amt.	Iron	Phos.	
0	2'	2'	65.65%	.109%	
9'	15'	6'	65.07%	.110%	
18'	28'	10'	54.38%	.116%	(Second-class)
28'	48'	20'	62.93%	.136%	
61'	66'	5'	59.72%	.282%	
66'	73'	7'	54.65%	.133%	(Second-class)

This hole encountered the hangingwall slate at 73' and was bottomed in it at 87'.

Hole No. 505 was drilled horizontally and N.23°E. from the extreme East end of the 10th Level, "A" Shaft, on Company fee land and at a point some 600' beyond the East boundary of the Bancroft lease and between the latter and the New York property. The floor of a stope, about 200' North of this drift and on this same elevation, has been removed and the object of this hole was to find out if this ore extends East of the stope at this elevation. The hole did not encounter an extension of this ore but, before reaching the footwall, it did encounter three other bands of ore; the first, 9', from 200' to 209', averaging 61.14% iron and .136% phos. The second ore seam was encountered from 263' to 275', 12', averaging 59.66% iron and .073% phos.; and the third from 279' to 290', 11', averaging 57.25% iron and .033% phos. These last two runs were lenses between two runs of dike which probably represent the footwall greenstone sheet. The hole was bottomed in the latter dike at 381'.

Hole No. 506, was drilled horizontally and N.8°W. from the Northeast side of the 7th Level, "A" Shaft, to test a virgin area North and East of the main deposit. The hole was bottomed at 197' in a footwall sideritic chert after having passed through 195' of hard ore jasper in which no high grade ore was found.

Hole Nos. 507, and 509 to 511, inclusive, were drilled from the East side of the 9th Level, "A" Shaft, to explore the walls of stopes and, in the case of No. 507, the floor below a stope, for possible ore extensions and additional ore seams in the immediate vicinity of these stopes. Ore was encountered in Hole No. 507, from 29' to 35', or 6', averaging 60.55% iron and .034% phos.; and again from 36' to 42', or 6', averaging 66.31% iron and .039% phos. Very likely the 1' jasper seam between these two seams of ore can be picked out in mining, resulting in a stope approximately 13' wide. The hole was carried to an ultimate depth of 117'. Hole No. 509 was drilled to a depth of 118' and encountered considerable lean and second-class ore with narrow seams of good ore, but not of commercial width. These seams may increase to mineable widths in their extensions along the strike. Hole No. 510, drilled to a depth of 56', cut 18' of good ore, from 10' to 28', which averaged 65.30% iron and 0.54% phos. Hole No. 511, drilled to a depth of 82', encountered 18' of good ore, from 0 to 18', which averaged 62.40% iron and .071% phos.

Hole No. 508 was drilled from the bottom of old hole No. 37 which was drilled many years ago, horizontally and N.70°W. from the main "A" Shaft workings on the 5th Level and at a point about 300' West of the shaft. The old hole stopped in footwall siderite and it was decided to extend it to see if an indicated anticlinal fold in this locality would bring the ore horizon down to the elevation of this level. A few seams of enriched jasper were cut, but no commercial ore, and the hole was stopped at a depth of 459'. This included 137' of old hole which did not have to be redrilled.

Hole No. 512 was drilled N.1°W. from the Northwest side of the 8th Level, "B" Shaft. It was a continuation of old Hole No. 109. 100' of the old hole was used and the new hole was drilled to an ultimate depth of 295' into footwall dike without encountering ore.

Hole No. 513 was drilled horizontally and N.73°E. from the North side of the 10th Level, "B" Shaft, to look for a downward continuation of ore being stoped in this vicinity above the 8th Level. It encountered nothing but footwall dike, however, and was bottomed at a depth of 222'.

Holes No. 514 and No. 515 were short horizontal holes drilled from the 8th Level, "A" Shaft. No. 514 cut across a jasper pillar between two stopes in the main deposit and encountered 9' of ore, from 6' to 15', averaging 60.80% iron and .069% phos. It was bottomed at an ultimate depth of 135' when it holed into the stope on the South side of the pillar. Hole No. 515 was drilled into virgin territory from the Southeast side of the level toward the old Moro Mine property. It had reached a depth of 119' at the end of the year and all in hard ore jasper, with

the exception of a 1' seam of ore, from 67' to 68', which averaged 58.20% iron and .056% phos.

Hole No. 299, is an old hole that originally was drilled in 1919, horizontally on a course of N.45°W. from the North side of the 10th Level, "B" Shaft, to a depth of 307'. When stopped, it was in hangingwall slate and quartzite, but did not completely cross a synclinal fold. For this reason, the hole was reopened in December and had been deepened to a depth of 502' at the end of the year. It was still in hangingwall quartzite. An attempt will be made in this hole to reach the North limb of the syncline to determine if high grade ore exists at the hangingwall contact.

H-2. - LLOYD MINE

One diamond drill rig was employed continuously in the Lloyd Mine throughout the year. Early in November, a second machine, a one-man type "Gopher" drill, was added to drill a number of short holes on several sub-levels to aid in determining the mineable limits of the ore body.

Hole No. 125 was drilled with a dip of -31° N.79°W. from near the South end of the first crosscut on the 6th Level in a second attempt to follow down on its pitch, to the elevation of the 7th Level, the ore encountered in this crosscut. Hole No. 124 had been drilled with a dip of -38° N.65°W. in December, 1941 and it had ore to a depth of only 65'. In Hole No. 125, ore was cut at 15' but it extended to a depth of only 85'. The ore averaged 60.64% iron and .059% phos. The hole was bottomed in soft ore jasper at an ultimate depth of 170'. If this ore body does extend to the 7th Level elevation, it likely will be of small horizontal area as judged from the results of these two holes. It was decided not to make any further attempt to follow the ore down with drilling from the 6th Level, but to try to pick it up at the 7th Level elevation as the latter is developed.

Hole No. 126 was drilled horizontally and S.42°W. from the hangingwall side of the ore body on the +515' Sub-level, which is about 45' above the 6th main level. This ore body is the same as that extending below the 6th Level in which Holes Nos. 124 and 125, mentioned above, were drilled. Hole No. 126 was planned to test the ground between the hangingwall of this body and the faulted slate contact to the Southwest. It was carried to an ultimate depth of 113', but did not encounter high grade ore. A second hole, No. 127, was drilled from this same Sub-level to further test this ground. It was drilled horizontally on the course of N.68°W. and carried to an ultimate depth of 96', but failed to find any high grade ore.

With the exception of one hole, No. 131, the diamond drill rig was employed the balance of the year in drilling a series of holes from the elevation of the 7th Level, some horizontal and some dipping beneath it, to explore the complex geologic crotch structure formed by the several well defined Northeasterly and Southwesterly striking faults on the Lloyd property. These faults have a general steep dip to the Northwest and account for the main Lloyd and Lloyd East ore bodies. For many years, after a comprehensive study of the geology and faulting in this Mine, it seemed likely that a major Northeast-Southwest fault, which crosses these Northeast-Southwest faults, had limited the ore bodies in their Southwesterly pitch. During 1941, however, the Inland Steel Company discovered a new ore body on the 8th Level, Morris Mine, in two underground drill holes. This elevation is approximately 500' below the 7th Level, Lloyd. Several of the Lloyd holes in this series were drilled to try and pick up an Easterly extension, up the pitch, of this new Morris ore body. The holes drilled in this series during 1942 from the 7th Level are numbered 128 to 130, inclusive, 132 to 135, inclusive, and 137. A total of 4455' was drilled in this series of holes. Two holes, Nos. 134 and 135, both dipping Southerly, from 40° to 44° below the 7th Level and located approximately 700' apart, showed some promise that ore might be found in the fault crotches cited above. Each hole encountered 20' of high grade ore. Unfortunately, however, it was not practical to try and fol-

low up this ore from any possible drill sites that, at present, are available in the underground openings. I do not feel particularly optimistic that the ore cut in these drill holes leads to any large body. If the ore should connect, down the pitch, with the ore encountered on the 8th Level of the Morris Mine, the cross-section of the ore will be quite limited from the results of this drilling. It looks quite discouraging, therefore, for the possibility of finding any important tonnages of ore below the 7th Level in the Lloyd Mine, West of the Northwest-Southeast fault, mentioned above, which, for years, has seemed to us the Western limit of the Lloyd and Lloyd East ore bodies.

Hole No. 131 was drilled horizontally and S.25°W. from the 5th Level to test the hangingwall South of the main drift in the upward extension of the fault crotch that contained the ore developed in the first crosscut on the 6th Level. The hole crossed the faulted formation between two faulted slate blocks and found 112' of jasper, but there was no high grade ore. Evidently, the concentration did not reach to this elevation. The hole was bottomed at a depth of 392'.

Hole No. 136 was the first to be drilled with the "Gopher" one-man drill and using a Bortz bit. It was located on the +415' Sub-level and was drilled horizontally N.5°E. to crosscut the iron formation from the stoping area at this elevation to the main footwall slate. It encountered ore, from 0 to 4', averaging 64.30% iron and .060% phos., and again from 39' to 60', 21' of ore, averaging 59.21% iron and .071% phos. It was bottomed in footwall slate at 109'.

Holes Nos. 138, 139 and 140 also were drilled with the "Gopher" one-man machine. They were located on the +515' Sub-level to test the wall rock of the main ore body for possible ore extensions in the pillars. Hole No. 138 was drilled to a depth of 50', Hole No. 139 to 34', and Hole No. 140 to 20'. Some enrichment was encountered but no high grade ore. This completed the drilling in the Lloyd Mine for 1942.

H-3. - MAAS MINE

Early in April, it was decided to drill a series of short horizontal holes with a "Gopher" one man drill rig on various elevations in current workings to more definitely outline ore limits as an aid to mining. The first two holes, Nos. 37 and 38, were drilled on the +75' Sub-level. Hole No. 37 had to be stopped before reaching its objective after drilling 70' of soft ore jasper. The ground was so badly broken that considerable trouble was experienced with the Bortz bits which are used with this small machine. Hole No. 38 encountered 90' of high grade ore from 15' to 105', which averaged 60.30% iron, .164% phos. and .013% sul. The drill encountered footwall slate at 105' and was bottomed in it at a depth of 145'.

Hole No. 39 was drilled from the 4th Main Level in the same general area as No. 38, to test for an upward extension of the ore encountered in the latter hole. It was blank after cutting 95' of soft ore jasper, where it entered the footwall slate in which it was bottomed at 130'.

Two holes, Nos. 40 and 41, were drilled on the +25' Sub-level and both of them encountered ore and aided in outlining its limits. Hole No. 40 had 35' of high grade ore from 25' to 60', which averaged 63.40% iron, .037% phos. and .033% sul. This evidently represents a riser from the main ore body in its pitch below the 5th Level and indicates an area of ore on the latter level not heretofore known. The hole was bottomed in 54% iron, second class ore, at a depth of 120'. When the drill had reached this point, enough ore had been indicated to plan raises and development work from below and this accounts for stopping the hole in rich ground. Hole No. 41 had three runs of high grade ore. The first extended from 17' to 45', 28', which averaged 63.55% iron, .040% phos. and .020% sul. 45' of ore was cut from 95' to 140', averaging 62.63% iron, .031% phos. and .094% sul. The hole

again encountered ore at 160' and was still drilling in it at a depth of 210' when it was stopped. The ore averaged 61.51% iron, .041% phos. and .125% sul. Here again the hole was stopped when it was decided that enough ore had been encountered to warrant development from the 5th Level. This ore undoubtedly connects with that encountered in Hole No. 40.

Hole No. 42 was drilled from the 5th Level to determine if a riser of ore came up to that elevation ahead of one of the main development drifts and warrant the extension of the drift. It encountered high grade ore at a depth of 40' and was bottomed in it at 80', having obtained sufficient information for extending the main drift. The ore averaged 60.68% iron, .086% phos. and .056% sul.

A series of three holes, Nos. 43 to 45, inclusive, next were drilled from the +100' Sub-level to outline the ore on the West end of the Northwest limb of the deposit. Hole No. 43 started in ore, which extended for a distance of 10', averaging 57.30% iron, .184% phos. and .017% sul. Ore again was cut from 15' to 25', which averaged 60.77% iron, .096% phos. and .011% sul., and at 60' in which the hole was bottomed at 80'. This ore averaged 61.10% iron, .043% phos. and .012% sul. The hole was stopped when development of the ore in this direction was proved to be warranted. Hole No. 44, drilled toward the footwall,was blank and was bottomed in footwall slate at a depth of 55'. Hole No. 45 started in ore and continued in it to a depth of 22'. This ore averaged 60.41% iron, .128% phos. and .012% sul. The hole then passed into hangingwall jasper and was bottomed in it without further change at a depth of 110' at the end of the year.

H-4. - NEGAUNEE MINE

A series of five short holes, Nos. 33 to 37, inclusive, were drilled in the Negaunee Mine, beginning the middle of February, with the "Gopher" one-man drill rig to aid in current mining. Hole Nos. 33 and 36 were drilled from the +295' Sub-level. Hole No. 33 was drilled horizontally, S.67°E., and was blank after drilling to a depth of 85'. Hole No. 36 was drilled with a dip of -18° S.76°E. toward the footwall and also was blank. It was bottomed in transition slate and jasper at a depth of 65'.

Holes Nos. 34 and 35 were drilled from the +260' Sub-level in the same area as Nos. 33 and 36. Both of them were drilled horizontally to the Southeast. Hole No. 34 encountered 10' of enrichment, a second-class ore averaging 53% iron, from 0' to 10', and then entered jasper, in which it was bottomed without change at 78'. Hole No. 35 encountered 10' of ore at the start of the hole, averaging 59.93% iron and .030% phos. This was followed by unenriched jasper and the hole was bottomed in it without further change at a depth of 45'.

Hole No. 37 was drilled horizontally and S.6°E. from workings on the elevation of the 13th main level which were developed from raises put up from the 14th Level near the Southwest end of the deposit. It encountered ore at 15' and was bottomed in it at a depth of 25'. This ore averaged 64.40% iron and .024% phos. Further drilling in the ore was unnecessary as its existence in this location will warrant its development in mining.

H-5. - PRINCETON MINE

In October a "Gopher" one-man drill rig was put into the Princeton Mine to drill two short horizontal holes, Nos. 1 and 2, that were needed to assist in the current mining development. Both of them were drilled from a winze on the +875' Sub-level, which is the elevation of the old 7th Level in the No. 1 Shaft, Section 19. The object of this drilling was to crosscut the formation just above the footwall to explore for the downward extension, on the pitch, of the ore lens just North of No. 1 Shaft. The footwall is relatively flat but undulating. Hole No. 1 cut two 5' seams of high grade ore, the first from 5' to 10' and the second from

85' to 90'. It had just cut ore again at 129½', which very likely represents the main ore body, when the ground started to cave so badly that further progress was prevented. The hole, therefore, had to be abandoned at a depth of 130'. This 6" seam of ore averaged 67.45% iron and .280% phos. Hole No. 2 was drilled to a depth of 24'. The ground was enriched to a depth of 15' but was not high grade ore. The remaining 9' of drilling was in hangingwall jasper. This completed the drilling for the time being in the Princeton Mine.

H-6. - VIRGIL MINE

In June, a "Gopher" one-man drill rig was placed underground in the Virgil Mine to drill two holes, Nos. 124 and 125. Hole No. 124 was drilled horizontally and N.20°E. on the -115' Sub-level to test a fold in the footwall slate for a possible repetition of iron formation and ore. It was finally bottomed at a depth of 208' and all in slate. Hole No. 125 was drilled with a dip of -35° due South from the 8th Main Level. The object of this hole was to get additional information preliminary to planning a deeper hole to explore a possible ore bearing synclinal structure at some considerable distance below the level. It was carried to a depth of 210'. Drilling was in slate with the exception of a 14' seam of iron formation from 69' to 83' and another seam from 95' to 135'.

Hole No. 126 was then laid out and drilled with a regulation diamond drill to explore the deep part of the main synclinal fold discussed above. The hole was drilled with a dip of -60° N.12°W. and the work was done by the E. J. Longyear Co. under contract. The hole was carried to a final depth of 596' and was all in footwall black slate. It was completed on November 20th and terminated the drilling underground in the Virgil Mine. It was hoped that this hole would develop a broad synclinal structure in depth which would include the ore horizon to the North with the possibility of high grade ore. The results, however, prove that the ore horizon to the North is limited by a close narrow fold which developes an anticlinal structure between the ore and Hole No. 126, thus removing the probability of an extension of high grade ore in depth along this meridian. Although the results were negative, nevertheless, by doing this work, we have satisfied ourselves, and have gone out of the way to demonstrate to the fee owners, that we have done everything within reason to develop additional ore at depth in the Virgil Mine.

I. - EXPLORATIONS AND NEW DEVELOPMENTS BY OTHER COMPANIES

Each year that the war continues, thus placing an abnormally heavy demand for iron ore from the Lake Superior District, emphasizes the fact that the high grade ores of the District are being depleted at a dangerous rate. All the large operating companies, consequently, continued to explore new ground to the very limit of equipment and personnel. Running parallel with this activity, has been the continued search for, and investigation of, methods for concentrating the leaner ores. To record, in detail, the important activities in both these fields would require a voluminous report in itself, to say nothing of the time involved in assembling the data. Due to the limited time at my disposal, I have not been able to collect or correlate sufficient information to make my usual chapter on this subject of particular value and, therefore, I am omitting further comments at this time.

J. - EXAMINATION OF MINERAL LAND OFFERS

A total of 57 land offers were received by this office during the year 1942. Forty-seven of these were mineral land offers. Of the remaining ten offers, eight of them were of real estate in the City of Negaunee, and two of them real estate in the City of Ishpeming. The offers and their numbers are as follows:

Offer No.	Description	Remarks
2185	Lot 7, Block 25, Pioneer Iron Co. Plat, Negaunee (2 houses)	Declined
2186	Molybdate deposit near Iron Mountain, Michigan	"
2187	West 20' of Lot 37, Iron Plat, Negaunee	"
2188	Hartman, Tioga and Marr properties, Mesaba Range, Minnesota	"
2189	Hunter & Preston properties on Cuyuna Range, Minnesota	"
2190	Manganese property at Elkton, Virginia	"
2191	Iron ore near L'Anse, Michigan	"
2192	Iron ore lands in Atkin County, Minnesota	"
2193	NW¼ of SW¼, Section 34, 47-29, Cuyuna Range, Minnesota	"
2194	Lot 34, Block 5, Jackson Iron Co. Addition, Negaunee	Pending
2195	Iron ore lands in Iron County, Michigan	Declined
2196	Gold, silver and lead in 46-24 and 46-25, Michigan	"
2197	Spurr Mine, Baraga County, Michigan	"
2198	Brule Mine, Iron County, Michigan	"
2199	1060 acres in Township Ley, Ontario	"
2200	Champion Mine, Michigan and Ford-Neely lease, Iron County	Withdrawn
2201	Magnetite in Northern New York State	Declined
2202	Iron and manganese in Pennsylvania	"
2203	Frantz Mine in St. Louis County, Minnesota	"
2204	Mesaba Mountain Mine, St. Louis County, Minnesota	Rejected
2205	Lands in Section 7, 63-9, Vermilion Range, Minnesota	Declined
2206	Magnetite ore in Central Arkansas	"
2207	McColman Mine, Iron County, Michigan	"
2208	Lots in McKenzie, and Kirkwood and Kellan Addition, Negaunee	Pending
2209	Old Atikokan Mine, Ontario	"
2210	Mineral rights in Gogebic, Iron, Houghton and Ontonagon Counties	Declined
2211	Iron ore in Ontario	"
2212	Lands in Section 13, 62-14, Vermilion Range, Minnesota	"
2213	The Ramsdell House, 110 North Street, Ishpeming	Purchased
2214	Lands in Dickinson County, Michigan	Pending
2215	Manganese property near Durango, Mexico	Declined
2216	Lean magnetite deposit in Burks County, Pennsylvania	"
2217	M. F. Lally House, Oaks Street and Lot 108, Nelson's Addition, Ishp.	"
2218	Crystal Falls Mine, Iron County	"
2219	Iron ore lands on Labrador Peninsula	"
2220	Magniferous iron ore in Section 23, 48-27, Cuyuna Range, Minnesota	"
2221	Mineral lands near South end of Hudson Bay, Quebec	"
2222	Miller-Rinehart Manganese Mine in Batesville District, Arkansas	"
2223	Lot 14, Block 30, Pioneer Iron Company Plat, Negaunee	"
2224	East 28', Lot 11, Block 15, Pioneer Iron Company Plat, Negaunee	"
2225	Various descriptions in 42-35 and 43-36, Iron County	"
2226	Several properties in Pioneer Iron Company Plat, Negaunee	Pending
2227	Lot 7, Block 2, except West 4', Matiland Addition	"
2228	Thirteen claims on Peninsula in Steep Rock, Lake Ontario	Declined
2229	195 acres brown iron ore lands, Reynold's County, Missouri	"
2230	Lands in Section 24, 58-20, Mesaba Range, Minnesota	"
2231	Part fee and part mineral rights in E.½ of Sec. 25, 43-35, Iron Co.	"
2232	Kloman Mine, Republic, Michigan	"
2233	Manganese property on Batchawana Bay, Ontario	Pending
2234	Titaniferous iron ore in Canada	"
2235	Commonwealth and Davidson Mines, Florence County, Wis.	Declined
2236	Half interest in minerals, Sec. 19, 47-27, Marquette Co., Michigan	Withdrawn
2237	Tilden Mine, Gogebic Range, Michigan	Declined
2238	Colby Mine, Gogebic Range, Michigan	"

Offer No.	Description	Remarks
2239	Indiana Mine, Dickinson County, Michigan	Declined
2240	Brown iron ore in Juneau County, Wis.	"
2241	A 1943 offer - will be included in Report for 1943.	
2242	A 1943 offer - will be included in Report for 1943.	
2243	NW¼ of SE¼, Section 18, 56-23, Itasca County, Minnesota	Declined

K. - RESEARCH & EXPERIMENTS

Samples of brown ore from the Poplar Bluff district, Southeastern Missouri, were tested in our laboratory at the Hill-Trumbull Mine early in the year in order to determine the proper flow sheet for a simple concentrating plant to treat the ores mined by the Missouri-Cliffs Mining Company in which this Company has a one-half interest.

In the fall of 1941, a carload of crushed Cliffs-Shaft ore was shipped to the Mines Experiment Station at the University of Minnesota, Minneapolis, Minn. The silica content in this material has been increasing since scrapers have been used for loading the material into tram cars from the stopes. It is particularly high in the so-called "pills" which recently have been produced by screening out all of the 2½" plus ¾" sizes, leaving as "pills", the -¾" to 0. Numerous tests were made by crushing all the oversize to 1", using both a jig flow sheet and, on the smaller size, a so-called "double classification" flow sheet. The latter is similar to that being used in our new heavy density concentrating plant at the Hill-Trumbull Mine. The results of these tests have been compiled in a separate report. In short, the "double classification" flow sheet did not seem to be satisfactory, whereas, the use of jigs has produced considerably better results and may be used to treat this material at a later date.

Considerable time was spent in the first half of the year in connection with the proposed construction of a metallurgical plant by the Government on the Cuyuna Range for the concentration of manganese from the black ores of that Range and, particularly, from the ores we anticipate mining from the Pontiac property. In this connection, I had a conference on the proposed flow sheet and other related matters with Mr. Frederick Leist, Executive Metallurgist of the Anaconda Copper Company, at his office in New York City. The Anaconda Company was selected by the Metals Reserve Company, representing the Government, as consultant and operator of such a proposed plant. Later, the whole matter fell through and the Government withdrew all of its plans for such development.

In October, a carload of Princeton Mine plastic ore was sent to the Mines Experiment Station at the University of Minnesota, Minneapolis, Minn. for the purpose of experimenting in agglomerating this material to facilitate its handling. The actual tests were not made until January, 1943 and will be covered in my report for 1943.

The work on construction of new experimental laboratories was started during the fall by both the Butler Brothers Company and Pickands Mather and Company. The Butler plant is located near its general office at Cooley and the Pickands Mather plant near the Scranton Mine. Plans are under discussion for a similar test laboratory to be constructed by the Mesaba-Cliffs Mining Company near the Holman-Cliffs Mine. The need for such a plant is becoming increasingly evident as the high grade ores approach exhaustion. Leaner ores will occupy an increasingly larger proportion of shipments from the Range in the future. The so-called "jig" ores will be the first to reach large tonnages, and shipments of concentrates of this material have already begun. The heavy density plant at the Hill-Trumbull Mine was designed and

erected to treat this material. Laboratory test work will be necessary in increasing volume to develop the proper adjustments in the flow sheets of the concentrating plants to best handle this material and the leaner ores to come.

Late in the year, the Mineral Separation North American Corporation, successor to the Phosphate Recovery Corporation, with headquarters in New York, leased the former Zinsmaster Bakery building in Hibbing and equipped it with the most modern machinery for making flotation tests on Mesaba Range taconites. Their attention will be directed first to recovering much of the free iron, in the fine state, now lost in the tailings that are wasted from the washing plants. Later on they will experiment with lean ores and taconites which have to be ground to fine sizes to separate the iron particles from the gangue. This company is negotiating with us for the construction of a pilot size plant, without expense or obligation to us, to be located at the site of one of our present mills, in order to carry on this work on a scale approaching a commercial operation.

Mr. George H. Beasley has continued to have charge of our own laboratory tests on ores from the Canisteo, Hill-Trumbull and Holman-Cliffs Mines. The increased need for these tests, as mentioned above, has outgrown both capacity and design of the equipment of our present makeshift laboratory. I have already referred to our plans for a more completely and specially designed laboratory for our entire Minnesota needs in connection with our current mining operations.

L. - EXPENSE STATEMENTS

Tables VII and VIII which follow, show a detailed statement of charges to Geological expense for the year 1942, and a comparative statement of these charges for the last three years. They are self-explanatory.

TABLE VII

STATEMENT OF CHARGES TO GEOLOGICAL EXPENSE FOR THE YEAR 1942

Salaries	$ 14,212.05
Travel and Entertainment	2,448.74
Operating Automobiles	980.24
Supplies and Office Expense	1,537.17
Personal Injury	2.00
Unemployment Insurance Tax	153.11
Old Age Benefit Tax	95.68
Unclassified	113.06
TOTAL	$ 19,542.05

TABLE VIII

COMPARATIVE STATEMENT OF CHARGES TO GEOLOGICAL DEPARTMENT
FOR LAST THREE YEARS

	1942	1941	1940
Salaries	$ 14,212.05	$ 14,439.59	$ 12,609.09
Travel and Entertainment	2,448.74	1,911.11	1,793.92
Operating Automobiles	980.24	691.00	854.21
Supplies and Office Expense	1,537.17	1,749.11	1,187.10
Personal Injury	2.00	22.50	251.14
Unemployment Insurance Tax	153.11	357.85	310.52
Old Age Benefit Tax	95.68	108.44	94.11
Unclassified	113.06	163.60	12.76
TOTALS	$ 19,542.05	$ 19,443.20	$ 17,112.85

Respectfully submitted,

E. L. Derby, Jr.

Geologist

ELD:el
12-28-43