

# INCO TRIANGLE



### Kiss of Farewell

**1** Cruising the bush near his home on the Sault road, Tony Bubba, Copper Cliff hoist fireman, came upon this baby deer, befriended it, brought it home with him. Thriving on a milk diet and frolicking throughout the day with neighborhood children, it showed no inclination to return to its native wilds. Tony grew very fond of it and in a month had even taught it to kiss him when he returned from work. The welcoming kiss the Triangle camera caught was really a farewell one, though, because next day the deer took sick and died.

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### Saved Three Lives

**2** A vallant triple-rescue in the swift waters of the Vermillion river, just above the Onaping Falls, was kept secret for a week by the modesty of Robert McLean, pumpman in Copper Cliff concentrator, who July 3 saved the lives of a girl, her father and her cousin.

A strong swimmer, McLean dived into the water fully clothed after the three. He first rescued Mary Podrozny, 18, then her father, Stanley, 40, Balfour Township farmer, and her cousin, William Maraska.

The girl and her cousin were playing in the shallow water not far from the river bank when the youth stepped into a deep hole. The girl attempted to assist him and got into difficulties herself. Then Stanley Podrozny ran to the aid of the pair, but could not swim either, and all three were floundering in the deep water when McLean, who was on a picnic with his family, noticed their plight and rushed to help them.

Bringing out the girl and placing her in shallow water on his first dive, McLean somehow managed to carry the 225-pound man and his nephew to safety together when he entered the water a second time.

It was a Sudbury merchant who brought McLean's feat to light days after it had occurred. Photo shows McLean at his Elizabeth St. home with his son, Bruce. He formerly worked at OBCO, is 30 years old.

McLean's modesty made it difficult to secure details of his feat. Even to most of his fellow-workers he failed to mention the incident. Maybe a pumpman gets so used to water that life-saving is second-nature.

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### Bill's Hole-in-One

**3** W. T. Waterbury uncorked a paneful shot last month at Idylwyde Golf and Country Club when he let fly from No. 9 tee and put his ball clean through a window in the clubhouse. Cheerfully posing for the Triangle camera following the incident, he charged that a certain member of the foursome in which he was playing distracted his attention just as he was shooting, or he would have been successful in dropping the ball down the chimney, at which he was really aiming.



**WON COSTUME PRIZES**

Gloria and Sylvia Ferguson, of Copper Cliff, costumed as daffodils, won second prize in the individual costume group in the Lions Club parade in Sudbury, July 1st. Dennis Thyne, better known to his Copper Cliff smelter co-workers as a

magician of no mean ability, was awarded \$10.00 for his humorous outfit and the distinction of being the funniest man in the parade.

Monel trolling wire has become a standard item of fishing tackle.



**Closely Matched**

Eleven innings of airtight baseball failed to break a 1-1 deadlock between Creighton and Coniston on July 18, with the N.B.B.A. leadership at stake. Babe Marchildon and Slim Johnson, the hurlers, whiffed a total of 23 batters between them, and Snell Blake and Hal Dewey, rival short-stops, had a fight. Altogether it was a large evening. The camera caught Captain Jimmy Bryce of Creighton and some of his Cubs on their bench, closely watching the play. Left to right: Jack Rountree, Babe Marchildon, Guy Perclante, Bill Tennant, Hal Dewey, Jimmy Bryce, Secretary Bert Behenna. Incidentally, Marchildon pitched hitless baseball for nine of the eleven innings. A few days later the same two clubs had to go 10 innings before Creighton won 3-2.

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**Friends in Need**

"Boogey" Signoretti flashes a big smile from his cot in Copper Cliff Hospital, and why shouldn't he? His pals rallied around after the popular little Refinery player broke a leg in a baseball game, staged an All-Star benefit match in which Red McLaughlin and Bert Flynn captained rival squads, glowered at each other as in days of old, and raised \$400 to help tide "Boogey" over his long convalescence. That accounts for Boogey's big smile, but what makes it a grin is the fact that he holds one of the Sickness and Accident insurance policies made available to all INCO employees, and will collect \$15 a week for 13 weeks. And to top it all off, the INCO doctors did a beautiful plate job on the difficult fracture. Who'd blame "Boogey" if he lay there and wished he were an octopus?

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**Pigskin Pursuers**

It's no quarter given or asked when Garson and Frood football squads take the field in S.D.F.A. fixtures, but the two gangs of pigskin-chasers are the best of friends before and after the whistle. Here they line up in a joint group for the Triangle camera. Nice hunting grounds, eh girls?

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**In Tennis Racket**

Not in a top spot in the very successful Nickel Belt Tennis League, but nevertheless giving an excellent account of themselves are the Coniston players. They help keep Tony Desautels' bailiwick on the map: Left to right, back row, Verdel Price, Francis Forestell, Ken Montgomery; front row, Bob Forestell, Grace Huggl, Margaret Gagnon, Ronald Duncan. Creighton, Copper Cliff and Sudbury are the three teams with best prospects of copping league laurels this season.

**SEARCH WAS FRUITLESS**

Despite a dramatic search of many days' duration, the body of John Skoglund, Frood miner, who drowned in Ramsay Lake, June 21, was not recovered. Frood Mine Welfare Association assisted in the search by supplying divers who were brought from Coniston, where they were working on the cofferdam of the Hydro-Electric Power Commission on the Wahnapitae river.

**NOW IT'S "FROOD ROAD"**

Declaring that no name is of more importance to Sudbury than that of the Frood mine, a majority of the City Council favored a bylaw authorizing a change in the name of Monck St. to "Frood Road."



Published for all employees of The International Nickel Company of Canada, Limited.

EDITORIAL OFFICE COPPER CLIFF, ONT.  
Don M. Donohue, Editor

VOL. 2, No. 6

AUGUST, 1938.

## HE TRAVELS BEST

A story once familiar to all children told of a wise king who was opening a new highway and offered a purse of gold to the one who should "travel best" over the new highway. Few realized what was meant by the term "travel best," and on the day of the event a great array of contestants arrived prepared to travel the road as speedily as possible.

At the close of the day, when most of the competitors had arrived at the destination, all complaining of a pile of stones on the new road which impeded their progress and made travelling difficult, a youth arrived with a bag of gold he had found beneath the pile of stones which he had removed. He took the gold to the king and asked that it be returned to its rightful owner. The king said, "Keep the gold. It is the prize for which so many have competed this day. You alone, of all the multitude, have shown that you realize that he who travels best makes the way safer for those who follow."

## LET'S TELL 'EM

Guido Gobbo often sends his copy of the Triangle to an uncle in Rome; John Livingstone to his son in Scotland; I. J. Simcox to a friend in Northern Rhodesia; many INCOites to their parents or relatives across Canada. Thus spreads the story of the people of INCO; of their advantages and activities; of how they do their work; of how their jobs, through diligent research and ingenious application, are woven into the warp and woof of world welfare.

Even in our own Canada many people still think of Northern Ontario as a rock-ribbed wilderness out of which, in some mysterious manner, come metals. To them our clubs and recreational facilities, our high-class sports attractions, our health services, our low-rate group insurance, our retirement system, and the general broadness and fullness of our living, would be an eye-opener.

Why not pass along your copy of Triangle to a friend in some distant city, so others may get a glimpse behind the scenes of what is often called Canada's greatest industry.

## A Drink At the Sink

A man had twelve bottles of whisky in his cellar and his wife told him to empty the contents of each and every bottle down the sink "or else." So he said he would, and proceeded with the unpleasant task.

He withdrew the cork from the first bottle and poured the contents down the sink, with the exception of one glass, which he drank. He extracted the cork from the second bottle and did likewise, with the exception of one glass which he drank. He then withdrew the cork from the third bottle and emptied the good old booze down the sink, except a glass, which he drank. He pulled the cork from the fourth sink, and poured the bottle down the glass, which he drank.

He pulled the bottle from the cork of the next and drank one sink out of it, and poured the rest down the glass. He pulled the sink out of the next glass and poured the cork down the bottle. He pulled the next cork out of his glass and poured the sink down the bottle and drank the glass. Then he corked the sink with the glass, bottled the drink and drank the out.

When he had everything emptied, he steadied the house with one hand, counted the bottles and corks and glasses with the other, which were twenty-nine. To be sure, he counted them again when they came by and he had seventy-four. And as the house came by, he counted them again, and finally he had the house and bottles and corks and glasses counted except one house and one bottle, which he drank. So.

## Reach Finals Of N.D. Tourney

Port Colborne: The new tennis courts at the Recreation Club are a really busy spot from early morning until dark, with over 100 members participating in the various events.

Nipper Wilson and Howard Tuck were the winners of the first Doubles elimination tournament, defeating Al Prittie and Bill McDonald in the finals.

A Group Doubles Tournament splitting the entries into two groups is being drawn up by the Committee and play is expected to start right away in this tournament.

The Singles Championship Tournament for the male members of the Club is under way with Al Prittie, last year's champion, ready to defend the J. L. Agnew Trophy against all comers.

The INCO Club in the Niagara District League is at present in second place, two points behind the leaders, and are working hard to take over the top spot.

### REACH N. D. FINALS

In the Niagara District Championships played at St. Catharines, July 1, 2, 3, two members of the INCO Club, Madeline Matthews of the General Office staff, and Mrs. Durbin Nixon reached the finals in the Ladies Doubles but were not able to bring the championship home. Mrs. Nixon also lost out in the finals for the Ladies' Singles championship. Better luck next time, girls.

A big entry is assured from the INCO Club in the Welland County championship being played at Welland, August 1st, and we hope to see some of the laurel wreaths resting on the heads of INCOites at the completion of the tournament.

## Welfare Groups Equip Picnic Grounds



Frood, Creighton, Copper Cliff and ORCO welfare associations are sure to come in for congratulations from their members on their decision to equip joint picnic grounds at INCO-owned Morrison's Farm, on Simmons Lake, about 10 miles from Copper Cliff on the Sault road. (1) shows the bath-houses under construction and in (2) the games booth is being erected. A large field for baseball and races is available, and the sandy beach is being cleared out.





## From Sulphide to Oxide

A Brief Visit to the Oxide  
and Sinter Departments of  
INCO's Port Colborne  
Refinery

By W. J. Cook

The nickel sulphide matte from Copper Cliff is shipped to Port Colborne in cars each containing about 46 tons. These sulphide lumps, ranging in size from small pieces that can be shovelled, to pieces that weigh 150 pounds each, are crushed in Blake type jaw crushers. The matte coming from the crusher is the size of a man's fist or smaller. These pieces are then ground in Krupp type ball mills to the desired fineness.

There are two types of sulphide received at Port Colborne, High Copper and Regular. Both go through the crushing and grinding process, but the treatment from here on is different.

Let us follow, first, the Regular sulphide. This material is softer and contains more sulphur and less nickel than the High Copper. In addition it also contains less impurities (iron and copper) than High Copper. (It is to be noted that sulphur is not considered an impurity but an integral part of the matte.)

### LEACHED 4 TO 6 DAYS

The Regular sulphide is ground in ball-mills to about the same degree of fineness as coarse flour. It is taken from the ball mills to leaching tanks in wheelbarrows and washed with hot water from four to six days to remove the soluble sodium salts remaining from the sodium sulphate separation in the Orford plant at Copper Cliff. The leaching tanks hold about 75 tons of ground sulphide. After the water wash, the regular sulphide is given an acid wash, with dilute sulphuric acid to dissolve and remove about half the original iron content. The sulphide is then given a further light water wash to remove the acid and the tank is drained.

The sulphide is now ready for conversion to an oxide. This is done in coal-fired double decked Edwards calciners, 96½ ft. long. The mechanical hearth, which has two rows of 12 rables each, is 52 ft. long. The lower hand-paddled hearth is 31 ft. long and the upper hand-paddled hearth is 22 ft. long.

### MAKING GREEN OXIDE

The washed sulphide, containing about 27 per cent. sulphur, is charged to the cool (700 degrees F.) end of the furnace and mechanically rabbled to the "drop," i.e., the start of the hand-paddled hearth, which is about two feet lower than the mechanical hearth. At this point the sulphur content of the material is about 2½ per cent. and the temperature 1800 degrees Fahrenheit. Salt is mixed into this hot material which converts the copper into a soluble copper chloride. The material is paddled by hand along the lower hearth and removed at the draw door at about 600 degrees F. This is known as regular green oxide. It is first leached with hot water and then with a little sulphuric acid to remove the soluble copper and sulphur. This green oxide is now mixed with soda ash ( $\text{Na}_2\text{CO}_3$ ) and charged to the top hearth at about 2000 degrees F. and hand paddled to the draw door, where it is removed at about 2400 degrees F. It is again washed with hot water and a little hydrochloric acid to remove the sodium sulphate and calcium sulphate as calcium chloride. This is

known as black oxide, and it is dried, packed and shipped.

There are two such furnaces. Each burns about eight tons of coal per day and produces five tons of black oxide.

The High Copper sulphide is ground in the ball mills to two different sizes, fines for S.R.S. calciners (about the size of coarse flour), and coarse for the Sinter Department (about the size of buckwheat or granulated sugar). This is leached similar to the regular sulphide, although the time required is less since less acid is used. Only a limited amount of iron can be removed by acid leaching of High Copper sulphide.

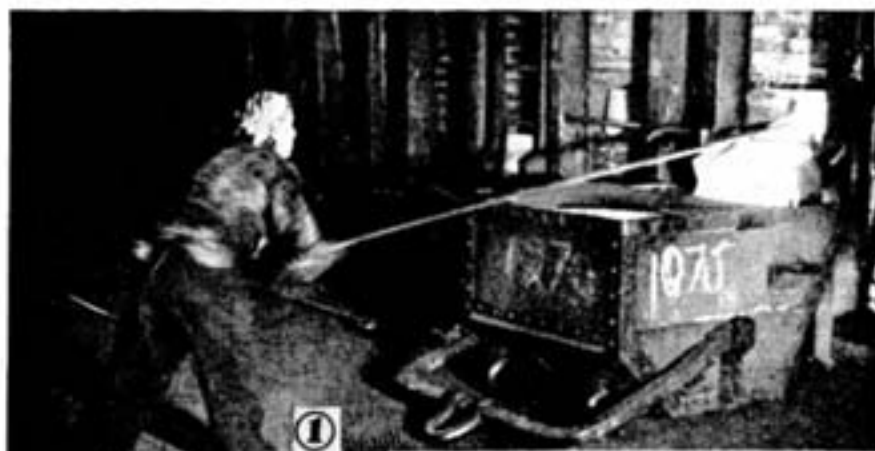
### USE COOLING TABLE

The fine High Copper sulphide is charged to the S.R.S. calciners which are oil-fired, single hearth, all mechanical calciners, having two rows of 18 rables each. The matte, containing about 25 per cent. sulphur, is

charged to the cool end (about 750 degrees F.) and mechanically rabbled towards the burner end. It is drawn from the furnaces at about 2200 degrees and contains 5 to 7 per cent. sulphur. From here the material goes to a cooling table. The hot calcines are rabbled back and forth on top of the water cooled channels which make up the table. This reduces the temperature of the calcines 100 degrees F., and they are immediately packed and shipped to Clydach for the production of nickel by the Carbonyl process. There are six, draws about 40,000 lbs. of oxide per day and burns about 58 Imp. Gals.

Each of the S.R.S. calciners, of which

of oil per hour. The coarse High Copper sulphide is used exclusively for the production of sinter and comprises about 70 per cent. of this department's production. The coarse sulphide, after leaching, is dried on steam coils to



(1) John Romanovitch is drawing soft roasted sulphide from a calcining furnace at Port Colborne Refinery, and, after a trip over the cooling table, it will be packed for shipment to INCO's plant at Clydach. In (2) are seen Dwight and Lloyd Sinter machines in operation. In the accompanying article W. J. Cook describes this equipment.





Philip Labrie transporting a calciner charge with a telfer

1 1/2-2 per cent. water, remilled in a Krupp ball mill and used for sinter production.

**BURN OFF SULPHUR**

There are seven Dwight and Lloyd sinter machines, each 36 ft. long, and provided with individual fans operated by 125 H.P. motors. The charge, put on a moveable table, is ignited by oil and passes over a wind-box on which the fans maintain about 20 inches of water vacuum. This draws air down through the feed bed, supporting the ignition and burning off the sulphur. As the material comes off the end of the sinter machine, it is ground in a 5 1/4 ft. Symons crusher and three-size separations made: (a) Material which passes through a 7/16" screen and is called returns; (b) Material which passes through 1/2" but stays on a 7/16" screen, which is production; (c) Material which does not pass through a 1/2" screen and is called grate layer.

(A) and (C) go through the sintering process again. Since nickel sulphide is difficult to sinter, it is necessary to use about 85% of reverted material with about 15% sulphide.

**THREE-LAYER CAKE**

The grate layer is put on the table first for protection of the grates, then the feed layer composed of an intimate mixture of returns and sulphide with just sufficient water to make a porous mass. The top or ignition layer is composed of returns and coke breeze intimately mixed, and as the name implies, is used for quick ignition of the mass.

Each sinter machine will consume about 3 1/2 tons of sulphide per hour, the production having a sulphur content of 1/4% or less.

The sinter produced goes to the anode furnace department for the production of anodes for the electrolytic refinery.

The acid and alkaline liquors from the sulphide washing are separately pumped to the precipitation department, where they are mixed, throwing down any dissolved nickel as a slime. This slime is collected in filter presses, dried in an oil-fired rotary drier, and shipped back to Copper Cliff as Wet House Slimes, containing about 23% nickel.

**MAKE REDUCED NICKEL**

Reduced nickel is also made in this department by the Mond process. This reduced nickel is used in the electrolytic refinery for the removal of copper, which will be explained in a later article.

The Mond Reducers are in reality enclosed Wedge furnaces. They are 40 ft. high, composed of 20 boxes, each of which has its own heating chamber. The oxide is charged at the top of the reducer, rab-

bled back and forth on each hearth, gradually working its way to the bottom where it is removed. Water gas, made from coke and steam, enters the bottom of the reducer and works its way to the top, counter-current to the flow of the oxide. The exhaust or waste gas is used for heating the reducers.

Each reducer consumes 11 tons of oxide and 400,000 cu. ft. of gas per day. The temperature is maintained at 840 degrees F. The reduced nickel produced is about 92% active. The reducers are hermetically sealed, and operated at about seven inches of water pressure.

**PUPIL NOW TEACHER**

All last winter Bill Mapes regaled his wife with tales of the joys of fishing, and promised to teach her the delicate art this summer. Bill is a motorman on 2,400 level at Frood. So he and his brother Marshall, who punches in Copper Cliff converter building, took Mrs. Mapes fishing one day in early July, on Lake Agnew near Webbwood. After one brief lesson she hauled out a 12-pound pike and a 14-pound muskie, and had her picture taken with them just in case the boys' memories need refreshing now and then. On more recent trips she has always pulled in a nice catch, while the lads often get nothing. A fisherman has his worries, particularly if he happens to be married.

**Ask Co-Operation From Phone Users**

Announcement was made some time ago of the proposed change of Copper Cliff telephone system to dial operation early next year.

In the process of changing over to dial service, it will be necessary to change many of the Copper Cliff telephone numbers. It is planned to make these changes coincident with the issuance of the next telephone directory, which will be August 4.

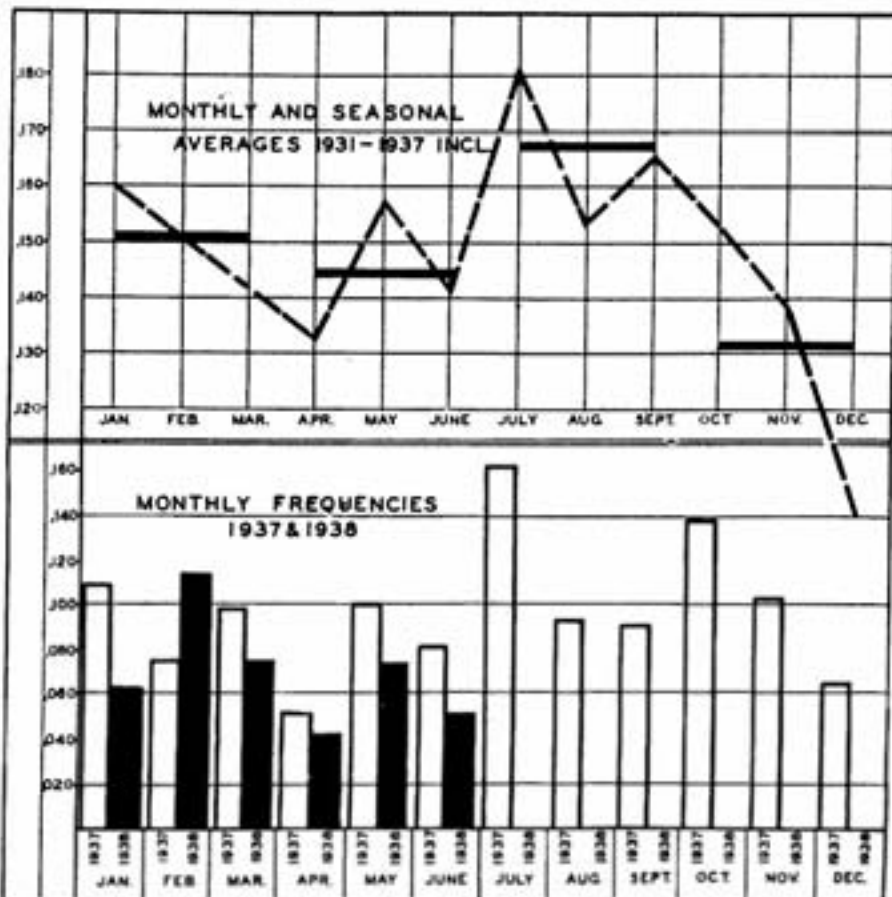
To facilitate this change, all subscribers are requested to consult the new telephone directory before giving a number to the operator.

The following Copper Cliff emergency numbers are listed for convenience: First Aid, 431; Hospital, 421; Police, 600; Fire, 431.

Copper Cliff's new telephone system will compare favorably with those now serving many of the largest Canadian cities, and will be adequate for the communication needs of this growing community for many years to come.

One of the newest jewels from Paris this season is Schiaparelli's huge platinum strawberry, studded with rubies and surrounded by green enamel leaves.

**Looks Like Midsummer Bogy is Beaten**



The good work continues. The excellent co-operation of all departments in INCO's Mining and Smelting Division scored another notable victory over Old Man Hazard in June, when the combined rate of accidents-per-1000-shifts-worked was .851, a definite improvement over June of 1937 and over the June average for the past seven years. With this excellent start on the campaign to banish the midsummer accident bogy, every employee in the two Divisions is urged to redouble his efforts, in order that 1938 may dodge the big up-trend in accidents which seems to have struck every other year during the summer months.



### Once Just Swamp

1 Camera-conscious tourists invariably pause to click their shutters at the plush lawns, neatly trimmed trees, and colorfully plotted flower beds of Copper Cliff's park. Standpipes wave white plumes of spray over 30 broad and beautiful acres which were once unsightly swamp land. Thousands of tons of fill were hauled to build up what is now one of Northern Ontario's finest plantings.

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### Coniston Comfort

2 A lovely border of peonies at the residence of Dr. W. S. Johns, Coniston, also provides a foreground for the residence of J. L. Fraser, nestled deep in shade trees and hedges. Looks like California, eh?

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### Beautiful Peonies

3 One of the district's finest shows of peonies this year was in the carefully-tended grounds of J. W. Garrow, Copper Cliff, who is seen, with inevitable cigar, inspecting a full-blown Sarah Bernhardt.

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### Hospital Setting

4 At Levack Mrs. J. H. Stanyon was busily engaged in building a rock garden at the side of the handsome new INCO hospital when Triangle's camera came along. Her doctor-husband had taken advantage of a quiet moment during his afternoon office to offer some advice, unsolicited and quite unnecessary because she was doing a first-class job.

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### They Own Their Own

5 Next year there'll be profusions of bloom around these three neat, new homes, built in Sudbury by a trio of Frood employees who like their own roofs over their heads. The owners are Ed. Campbell, machinist; Guy Pozzo, station tender at No. 3 shaft; Clem Smith, stope boss on 2800. Smith and Campbell erected their houses themselves and Pozzo had a contractor build his.

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### Bit of England

6 Like a bit of old England is the rock garden at the home of Mrs. R. L. Peck, Copper Cliff, who spends many happy hours with her gardening hobby. A riot of brilliant colors, the rock garden vies for her favor with beds of beautiful roses in other sections of her grounds.

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### Luscious Berries

7 Long recognized as a leading Creighton gardener, Ed. Myhill poses with hands full of luscious strawberries just freshly picked in the grounds back of his house. To make certain that these were real strawberries, the cameraman obligingly ate the evidence, and then promptly decided he should have a second helping before being convinced.

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### Often Wins Prizes

8 With his pretty little cousin from Chicago, young Jack Angove was snapped in his father's well-known flower garden at Coniston. Sgt. John Angove has often won INCO horticultural prizes for his beautifully-kept grounds.

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### Transformation

9 From the rock pile back of the town hall the cameraman caught this attractive view of a section of Copper Cliff. Old-timers who remember the roasbed days

would have difficulty recognizing the well-treed streets, the carefully tended home grounds, the smart new houses.

## \$70.00 Radio Prize For Admission Ticket

With three elimination contests of the series of six still to be staged as Triangle goes to press, the success of the 1938 INCO Amateur Nights at Stanley Stadium is assured. Slow to reach full competitive pace because many performers are reticent about appearing on early programs, the contests are now in full swing.

Garson, Levack, Coniston, Frood, Creighton, Copper Cliff and ORCO will all have been represented in the lists before the series ends, and the final contest on Monday evening, August 22, promises to eclipse both previous events of this nature.

Tickets are now on sale for the final

contest, at 25 cents each. Holder of the lucky number in a draw that night will receive a door prize of a \$70.00 RCA Victor radio, donated by Cochrane-Dunlop Hardware of Copper Cliff. The nine best numbers in the finals will win C.C.A.A.'s free trip to the Canadian National Exhibition, with special entertainment in Toronto by INCO'S office there.

### WINNERS TO DATE

Those who to date have qualified to take part in the finals, by winning out in the weekly elimination contests, are Joe Measlini and Roger Martin, cornet duet, Coniston; six Ukrainian girls in costume, Cosack Dance; Michael Cannon, Copper Cliff, dance; Phyllis Clarke, ORCO, vocal; Larry Laycock, Frood, vocal with guitar; June Campbell, Frood, vocal; Violet Cruise, Frood, mouth organ; Margaret Bryce, Coniston, acrobatic dance; John McKinnon, Copper Cliff, piano impersonations; Phyllis Duberry, Copper Cliff, vocal; Fred Rogal, Frood, vocal, mouth organ, ukulele.

## Amateur Night Crowds Average 1500



(1) Section of the audience at an INCO Amateur Night program in Stanley Stadium. Two small boys and one man were the only ones in the group who preferred the camera to the contestant. In (2) Song-leader Johnny Davidson, perennial favorite, leads the crowd in a rousing rendition of "Oh Mama," with Jack Cole at the piano. Community singing at this summer's Amateur Contests has had more pep and zip.



### SCORES 17 STRIKEOUTS

Wes Wortowy, the season's sensation in baseball, hung his hat in the hall of fame June 27, when he set a modern Nickel Belt

strikeout record. Wes, who works at Froid but pitches for Sudbury, zipped his speed-ball and his sharp hook past no less than 17 Creighton players without touching any solid hickory.



## Froid Welfare's Picnic Draws 2,000

If all the ice cream the Froid kids ate at their Welfare Association picnic were piled in one heap and allowed to melt, it wouldn't be much good to anybody. But it was mighty good to the mob of youngsters who devoured it first and let it melt later, along with peanuts and other delightfully indigestible ingredients, and they had a wonderful time.

First Welfare Association picnic at the new grounds on Morrison's farm, the annual Froid outing drew 2,000 people, was an unqualified success. Designed chiefly to give the young folks a whale of a time, it nevertheless provided a real day's entertainment to the oldsters, too. Races, both land and water, were run for all-age groups from five years up. There was canoe-tilting, and a softball exhibition between A. Massey's underground recruits and Shiny Shinbein's Royal Trading League entry, with the latter winning by a narrow margin.

### NICKEL JOINS G-MEN

A recent development in the war against crime is an armor plate for police cars. Made of nickel chromium steel, it can be formed, punched, drilled or otherwise fabricated.

## Safety Dividend

A summertime safety feature which has proven popular with Froid employees is the Divisional Safety Draw. The mine is divided into six divisions, 1600-2000 levels, 2200, 2400, 2600, 2800, and 2950-3100, and the division with the highest number of shifts during the month is taken as the basis for calculating the safety ratings of the other divisions. All men employed in the winning division on the last day of the month, plus those on holidays, receive a chance in a prize draw for which the Company donates \$50.00. In June Safety Engineer Foster Todd's records showed the best record was that of 2600 level, which worked 10,557 shifts without a lost-time accident, and Wm. Busch, switchman on 2600 South, won the \$50.00 in the draw, which was handled by the Welfare Association. Photo shows Welfare President McDonald presenting the fifty to the delighted Busch; while Secretary Dickie holds a watching brief. The July award will be split three ways: \$25.00; \$15.00; \$10.00; the draw will be made on or about August 5.

## Timber Yard Tans

Timber yard workers at Froid don't need to lie blistering on the beaches at week-ends to acquire their sun tans. They brown while they work, and by taking Old Sol in careful doses at the start of the season, they suffer no painful peeling. These huskies, busy handling some of the 4,000,000 board feet of timber Froid uses every month, are browner than most Indians.

## Holiday Hangover

The shadow of the law became a grim reality for F. J. Eager, Froid mine superintendent, when he returned from his vacation last month. It happens in the best regulated families. Driving through Long Branch on his way South, he apparently let his foot linger on the accelerator, and the local G-Men promptly jotted down his license number. When he got back to Froid, Sgt. Fraser was waiting solemnly to present him with a summons. A nice reception committee.



## "Pep" Roe is Golfing Champ

Port Colborne: The first Golf Tournament of the INCO A.A. was held May 28th with over 50 members participating. The low 16 net scores qualified for the John More Trophy, the handicap cup of the Association. Jim Walter led the qualifiers with a net 60 (Jim hadn't started to worry about his wedding yet). Some real matches were played including several ties before the finals were reached when Preston (Pep) Roe, Jr., defeated Roy Howard 5 and 4 to become the 1938 holder of the trophy.

### COP TEAM PRIZE

The Port Colborne team, composed of Bill Freeman, Bill Wallis, Finlay Lymburner of INCO, and Jack Young of The Maple Leaf Milling Co., were successful in winning the team prize at the Canadian Manufacturers Association Tournament at Look-out Point, Fonthill. Jack Wilson of INCO, also was a prize winner at this tournament, having low net on the first nine in the Industrial Class.

Roy Howard was winner of the low net prize and Jim Ross tied for the low gross award of the Cost Accountants Association Tournament at Waterdown Golf Club, Hamilton.

Saturday, July 9th, was qualifying day for the championship at the Port Colborne Country Club and, of the 16 who qualified, 11 were INCO members, and it is hoped one of the INCOites will carry on to the Club championship.

### STARTS AUGUST 6

The second tournament of the INCO A.A. is scheduled for August 6th, when the 8 low gross scores will qualify for the INCO A.A. Championship Trophy. It is hoped to have as large an entry as the first tournament competing for the usual prizes as well as a chance to play for the championship.

## Narrow Escape From Railway Crash

Leaping from his car on a level crossing, 30 miles west of Sudbury, only seconds before it was crashed by an east-bound C.P.R. passenger train June 21, William Martin, of Copper Cliff, had a narrow escape from possible death. The automobile was carried over 100 feet before the train was brought to a halt, but no one was injured. The steering gear on the car locked as Martin was about to approach the crossing, returning to Copper Cliff from Nairn Centre. Fearful of crashing into the ditch across the tracks, Martin stopped his car on the right-of-way. Hearing the approaching train, the Copper Cliff driver leaped from the parked machine and only cleared the side of the tracks as the train struck the machine.

### OBTAIN CERTIFICATES

At examinations held by the Dept. of Labor at the Oddfellows' Hall in Sudbury, the following Power Plant employees at Copper Cliff were successful in obtaining certificates: J. Williams, Fourth Class engineer; E. Bennett, Third Class engineer; E. Emery, Fourth Class engineer.

### SMOKE YARDSTICK

Heart of a device for measuring smoke in the air in stations and roundhouses of the Chicago, Burlington and Quincy Railroad is a Menel seamless tube. This replaced a tube of ordinary steel which soon corroded away.

## Old-Timers Cut Fancy Soccer Capers

Perhaps not quite as kipper as they were in their hey-day, a group of Frood and Garson old-timers nevertheless gave the crowd plenty of action in their exhibition soccer match July 1. Each team had only one S.D.F.A. performer on its lineup. Bert Kemp and Pete Drogoski scored for Garson, and Bill Grassam and Ingles for Frood in the 2-2 deadlock. Lineups were: Frood—Sid Kemp; Pressinger, Jardine; Sinden, Jack J. Duncan; Spy, Morrison, W. Grassam, Parker, Ingles. Garson—Bradley; "Red" Duncan, Young; Bradley, Gordon, Otley; Cookie, B. Kemp, Drogoski, Armstrong, Kuula.

## First Aid Teams Honored at Banquet

Hearty congratulations to the winning Coniston team, and to all whose enthusiasm and efforts have furthered First Aid and general Safety work within the company, were extended by General Supt. R.

D. Parker, when he presented his Inter-Plant First Aid Competition Shield at his dinner party for the competing teams. Inter-Department shields were presented by their donors, Mines Supt. H. J. Mutz, Smelter Supt. F. F. McDonald, and ORCO Supt. F. Benard. Presiding during the presentations was E. A. Collins, and a review of INCO First Aid activities was given by General Safety Engineer G. S. Jarrett.

## Recreation Club Gets New Trophies

Port Colborne: Two fine new trophies have been presented to the Recreation Club, one by Frank Gallinger, Master Mechanic at Port Colborne, for team competition in 10 Pins with handicap, and the other by Richard Dwor in memory of his father, the late "Max Dwor" who was a well known and much respected figure around the Port Colborne Plant. This trophy will be known as "The Max Dwor Memorial Trophy" and is for competition as a 5 Pin Doubles Challenge Trophy. The addition of these two fine trophies will certainly increase the interest in bowling this coming season.

## ORCO Shops Hang Up Safety Record



With a total of 351,686 hours worked, or 43,960 man days, without a lost-time accident, ORCO Shops on June 2 proudly wound up the best no-accident year in their history. This achievement is the more remarkable when consideration is taken of the many hazardous jobs mechanics handle in the course of their duties. To this spotless record Machine Shop contributed 87,390 hours, Electricians 45,045 hours, Carpenters 49,618 hours, Plate

Shop 44,288 hours, Pipefitters 25,148 hours, Millwrights 25,446 hours. (1) shows the Shops crew in a noon-hour picture; in (2) Mechanical Supt. Al Welblund has a Safety session with a group of his supervisory assistants: left to right, L. Kitchener, H. Lovatt, H. Kurtz, C. Reynolds, A. Welblund, M. Bell, T. Bell, A. Cote, F. Ness. Foremen not in the picture: H. Clements, H. Picard, H. Limoges, D. Forster.

# Nickel...and Its Uses

## PLOUGHING AT 300 FATHOMS Nickel Comes to Rescue of Puzzled Western Union Engineers

It is an old expression of the sea to speak of ships as "ploughing the waves," but it is a brand new idea to use a ship for actually ploughing the bottom of the ocean. And the success of this idea depends upon the strength which nickel can impart to alloy steel.

The reason behind this novel development is the damage which has been done to trans-Atlantic cables by fishing trawlers off the Irish coast. In going about their business these deep sea fishermen have caught and broken with their dragnets the cables which lie along the uneven floor of the ocean. Faced with this problem, the engineering staff of the Western Union Telegraph Company decided that the best solution was to plough the cable into the bottom.

### 4,200-FOOT LINE

This solution immediately created two problems of its own. One was to design a plough which could make a furrow for the cables and then cover them up. Such an ingenious device was finally constructed. The other problem was to devise a practical means of drawing this plough along the ocean floor which is from 500 to 3,000 feet below the none too placid surface of the North Atlantic. In considering this problem, it was decided that the angle of pull should be 22 degrees off horizontal and that the plough line should therefore be 4,200 feet long in order to provide for contingencies.

The next phase of this second problem was to select the type of "line" best suited for dragging a deep sea plough with a net weight of nine tons. Because of the peculiar nature of the operating conditions, it was determined that the line must be as flexible as possible, that it must be capable of withstanding stresses up to 65,000 pounds, and that it must be of a type that can be paid out gradually from the ship while ploughing under full load. What was required, in short, was a type of line that could pull the plough and still be handled and stowed by the ordinary equipment of the cable ship.

### PICKED CHAIN TYPE

A steel cable was obviously the first thought, because one of sufficient strength and length could be manufactured without undue difficulty; but such a cable would be so stiff that it would be hard to handle and stow aboard ship, and it would tend to develop a torque under tension and foul the communication cable used in conjunction with it. Therefore the Western Union engineers turned to a chain type of towing line. They decided that it should be of stud link design in order to eliminate the danger of kinking.

At this point their calculations developed an interesting point. Remember that the cable has to be 4,200 feet long and that it has to have a tensile strength of at least 65,000 pounds. To withstand this proof load a 11-inch crane chain of ordinary link design would have to be used, but 4,200 feet of such a chain would weigh some 95,000 pounds, or considerably more than its proof strength. As stud links are heavier than ordinary links and as a chain is no stronger than its weakest link, such a chain made of carbon steel would break of its own weight!

### NICKEL SAVED THE DAY

Here is where nickel, in the form of

33 per cent. nickel alloy steel, entered this modern engineering drama and made a happy ending possible. So great is its increased strength over that of ordinary carbon steel, that it was possible to reduce the diameter of the chain wire to one inch, thus cutting the weight of the complete chain to 43,000 pounds. At the same time, this nickel steel chain withstood a proof load of 84,000 pounds (comparable with the 65,000 pounds specified as minimum), and has an ultimate strength of 117,000 pounds.

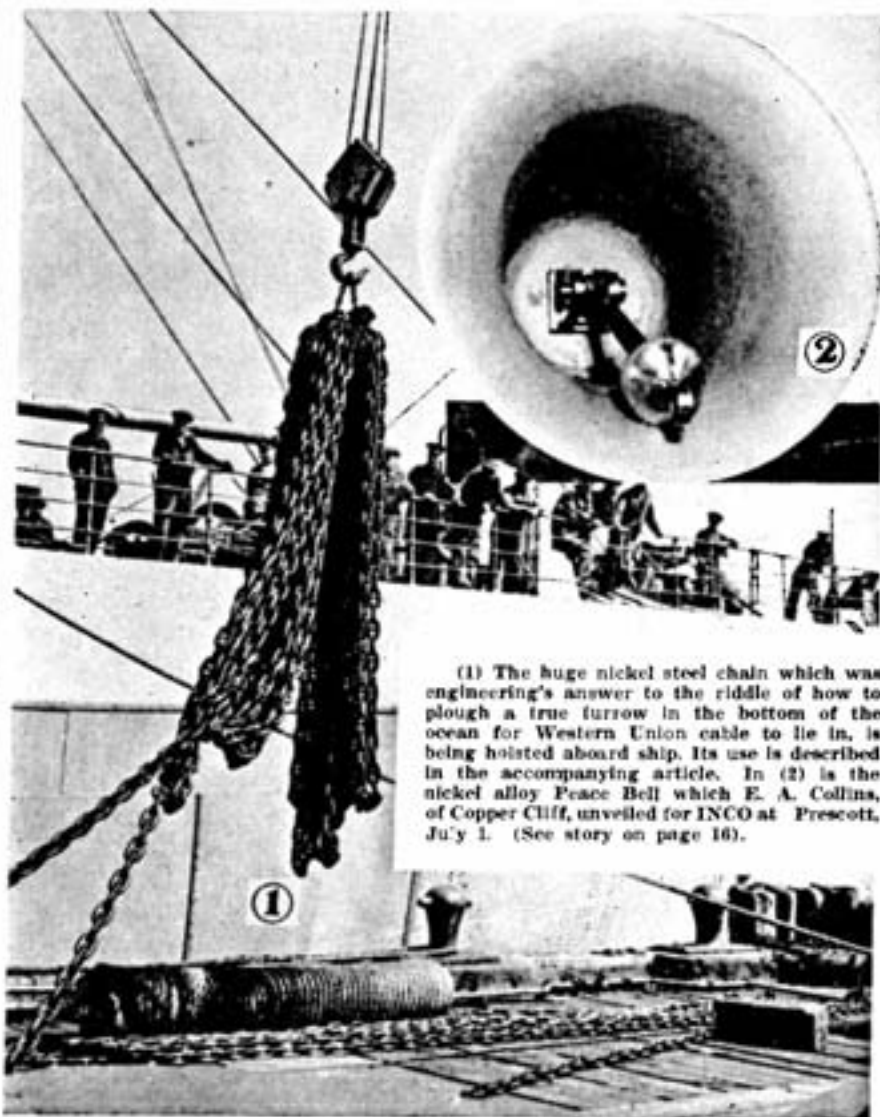
There remained the final problem of manufacturing such a chain, transporting it to ship-side and stowing it aboard. After extensive investigation and tests a Di-Lock type of stud-link chain was decided upon. The product of the Baldr Anchor Chain and

Forge Corp. of Chester, Pa., this type of chain is of drop-forged construction and must be "woven" link by link from one end. For years it has been established manufacturing practice to limit marine chain to 15-fathom lengths. Thus a standard "shot" of chain is 90 feet. But this particular order was for a continuous chain 4,200 feet in length. Furthermore, the specifications on this order called for a maximum tolerance of plus-or-minus one-sixteenth of an inch in every twenty-six inches of chain link, a requirement about five times as severe as that which is standard in U. S. Navy specifications.

### TECHNICAL ACCURACY ESSENTIAL

This extraordinarily rigid exactness was necessitated by the peculiar conditions under which the chain is to function. As a rule, marine chain is strained very little while being paid out and is under full load only when made fast or being pulled into the ship. Because of the nature of the deep sea ploughing operations, however, this particular chain must be both paid out and pulled in over the same gear, or "wildcat," while under full load. Thus the double operation calls for two opposite kinds of fit for each link in the pockets of the "wildcat," and an exceedingly close tolerance on the size, shape and partic-

## Nickel Connects Continents, Proclaims Peace



(1) The huge nickel steel chain which was engineering's answer to the riddle of how to plough a true furrow in the bottom of the ocean for Western Union cable to lie in, is being hoisted aboard ship. Its use is described in the accompanying article. In (2) is the nickel alloy Peace Bell which E. A. Collins, of Copper Cliff, unveiled for INCO at Prescott, July 1. (See story on page 10).

ularly the length of each individual link is needed to assure smooth running of the chain over the "wildcat." As there are some 12,500 links in the completed chain, one can appreciate the closeness of the technical control necessitated throughout the manufacturing process.

Once completed, the chain was laid out in long loops which were gathered into seven bundles weighing approximately 5,000 pounds each. Between each bundle were left 135 feet of free chain, thus making it possible to handle each bundle separately, provided the distance moved in loading from factory into gondola car and then unloading at ship-side, was not more than 135 feet.

#### STRESS REACHES 30 TONS

Marine ploughing, unlike that on land, must be done only in the Summer months when the sea is comparatively calm and will permit of the necessary precision in manoeuvring ship above the cable "furrow." Another aspect of the operating problem is that the dead load of the plough with its tow chain when being lifted off the bottom in 450 fathoms of water is 19 tons, but stresses may run as high as 30 tons when the ship's head rises to the waves.

And that is why Canadian nickel, mined 2,000 feet or more underground in Ontario, is finding a dramatic use 2,000 feet below the surface of the North Atlantic.

### He Gets Around

**1** Because there is nothing spectacular or "thrilling" about his flying, Herbert G. Fales is not a headline-hitter, but because of the casualness and safety with which he has utilized his airplanes for many years, he is regarded as an outstanding figure in private aviation development. As an INCO executive, he travels a great deal. Prior to the purchase of his first airplane in 1926, he travelled between 15,000 and 20,000 miles per year by car and an average of 25,000 miles annually by train. In recent years, however, he has averaged only 5,000 miles by car, 3,500 miles by train, and 30,000 miles by airplane. Photo shows his S3D1 Wasp-powered Lockheed Vega, formerly owned by Wiley Post, taking off from the field near Larchwood, where he lands on his trips from New York to Copper Cliff. The flight usually takes about three hours. A typical example of Mr. Fales' vacation trips was the one taken last year. He covered 7,170 miles in slightly over 44 hours flying time during the two weeks July 5-19, cruising westward from North Beach to Chicago, Minneapolis, Winnipeg and Vancouver, B.C., and down the West Coast to San Francisco and Los Angeles. After several days in Los Angeles, he hopped eastward by way of El Paso, Fort Worth, Nashville and Columbus.

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### Daisies Won't Tell

**2** Accompanying H. G. Fales on a recent visit to Copper Cliff was A. P. Hague (right), general manager of the Mond Nickel Company of London, England. On their return trip to New York they persuaded R. L. Peek to accompany them as far as Port Colborne. When the motor was being warmed up for the take-off, Mr. Peek, suddenly impressed with the uncertainty of life, picked a bouquet of daisies to be presented to Pete McDonald. The latter's comment, on receipt of this touching memento from the Larchwood landing field, was not released for publication.

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### Ready for Takeoff

**3** Just before the Fales ship hopped off for Port Colborne and New York: Left to right, R. D. Parker, A. P. Hague, H. G. Fales, and R. L. Peek.

### CALLED IN "DOC" INCONEL

When a manufacturer of "anekers" experienced corrosion in the metal calendar drum used for drying the rubber-backed inner-soles, he substituted an Inconel-covered roll. This high nickel chromium alloy resists corrosion, is non-tarnishing, bright and remains velvety smooth.

### RECLAIMS ALCOHOL

A large hospital laboratory in the Middle West now reclaims alcohol used by physicians for washing their hands. Reclamation apparatus consists of a funnel-shaped Monel sink leading into a still. Monel is used because of its sanitary appearance and because of its corrosion resistance.



# the CANDID CAMERA



## E. J. Barrett

His deep interest in welfare work naturally resulted in the election of Edwin James Barrett as secretary of the Employees' Welfare Association at Port Colborne Refinery. Some years ago it almost resulted in his joining the ministry, in which case Triangle's camera might have caught him



fashioning sentences from a pulpit, instead of fashioning metal in the machine shop, where he was working at his lathe.

The son of a millwright, E. J. Barrett was born at Napanee on November 17, 1905. Before he had completed his high school training he had decided to become a minister, and went on to spend a year in a preparatory course in theology at Albert College in Belleville. For several reasons, chiefly financial, his life's course then veered from ministry to machines, and the latter became his trade. After an interval with Maple Leaf Milling Company, he joined INCO's force in 1929 at the Refinery.

On and off since 1926 he has been leader of the Beacon Tuxis Group for teen age

boys, but his chief hobby has been Sunday School work. In 1917 Refinery Superintendent John More gave one of the first Company bunkhouses for a Union Sunday School on Port Colborne's East Side, after the churches of the community had started a movement to interest families not affiliated with any of them. Barrett commenced taking an active part in this Union Sunday School in 1922, and has been superintendent since 1925. He holds a regular Sunday evening service for the adults, and thus finds an expression for the work to which he first decided to commit himself.

"The Man Nobody Knows," Bruce Barton's famous book, is his favorite volume of contemporary writing. The saxophone is his favorite musical instrument.

Now he is not particularly active in sport, although he has played left wing at hockey, softball, and first base in baseball.

He was married in 1930 to Edith Berry of the Refinery office staff. They have one son, two daughters.

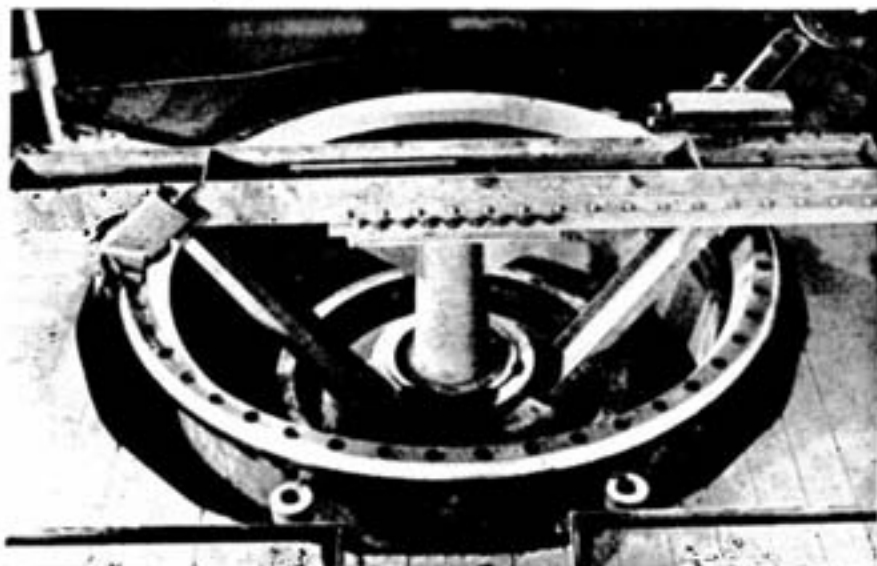
## Plant Softball Builds Up Interest

Port Colborne: The Plant Softball League, composed of eight teams from the various departments of the plant, is well under way and interest is very keen in every game. The Machine Shop Team is at present in the lead, still undefeated, but the remaining teams are hot on their trail and many a change in the standing is promised before the prizes are awarded at the completion of the schedule. Bob Cochrane, who is piloting the Electrical Shop team which has suffered only one defeat, is quite confident his team will be the winner of the R. C. Stanley Trophy and not the Machine Shop, his former team connection.

The INCOS and the Nicketlets, the two representatives of the Plant in the Town Softball League, are both going great guns. INCOS are at present leading the league and Nicketlets, who were late hitting their stride, are gunning for a playoff spot. INCOS, who are the present holders of the J. R. Tuck trophy emblematic of the town championship, hope to repeat again this year and all the plant members are pulling for them.

A large producer of electrolytic caustic soda found that pure nickel tubes in caustic liquor evaporators have a life of about 12 times that of an equal gauge of iron. Also nickel prevents harmful metallic contamination.

## Shops Handle Novel Machining Job



The action of a Symons cone crusher, in Copper Cliff concentrator's crushing plant, has been described as being like "an animated toadstool dancing around upside down inside a metal sphere." When the ore runs between the sides of the sphere and the gyrating "toadstool" it is crushed to the required size. Actually the sphere is cut in two, and connecting the two halves are heavy tension springs, so that if a piece of tramp steel happens to get in with the ore flow, the top half of the sphere can rise sufficiently to allow it to pass through without any casualties. Eventually, however, the edges of the two halves get worn and out of line. Then the normal procedure, if it weren't for the ingenuity and enterprise of the Shops crew, would be to take down the crusher and pack away some 24 tons of parts to a foundry for repairs, which would take about six weeks. But the Shops experts move in with their equipment, separate the two hemispheres, build up the edges with electric welding, and then improvise a big lathe right on the spot, so they are able to machine the job in place. It takes them about 10 days. Photo shows the lower part of a crusher being machined, with the lathe fitted right on to the bottom half of the "toadstool." The motor that drives the crusher is stepped down to drive the lathe. It's almost a self-cure.

## Inco Inter-Plant Golf Tourney Planned

An all-INCO Golf Tournament, in which four-man teams from the various plants will play 18 holes, medal score, for the Company championship, will be run off at Idylwyde Golf and Country Club on a Saturday afternoon early in September.

R. L. Beattie, General Assistant to the General Manager, has generously donated a trophy for annual competition in this event. A banquet will probably be staged at the conclusion of the matches, at which the trophy will be presented.

An INCO golf tourney would hardly be complete without representation from Port Colborne, and golfers within the northern Company ranks will be glad to know that a team is almost certain to enter from the southern plant. Frood, Smelter, ORCO and General Office are definite entries.

**NIGHT PHONE SERVICE**

As a further service to employees residing in Sudbury, an attendant will remain at the telephone throughout the night in INCO's Medical Centre, and will locate a doctor in answer to all calls coming in. This service is now in effect, and the number is 840.

**BOILERMAKERS' BALL**

First of what many hope will become an annual function was the Boilermakers' Ball, staged by the Copper Cliff boilermakers, in the Nickel Range Hotel, under the chairmanship of E. G. Farrell. A snappy floor show, favors, and good music made the affair a big success.

**Bowling Champions**

Champions have finally emerged from a 10-team ladies' bowling league at INCO Employees Club, after a nine-game round-robin tournament which hit all the high spots of competitive excitement and at times threatened the Club personnel with a complete nervous breakdown. The winning team, pictured here, and the averages they bowled throughout the tourney, are: Left to right, back row, Mrs. Moore, 114; Mrs. J. Risdale, 122; Mrs. J. Browne, 118; front row, Mrs. D. Paul, 163; Mrs. L. Williams (captain), 179; Mrs. M. Kupchank, 165. They win individual trophies donated by the Club, and the \$10.00 first prize from the league jackpot. Second prize of \$5.00 went to Mrs. D. Shoveller's lineup, who, with averages, were: Mrs. H. Labrick, 173; Mrs. Smart, 149; Mrs. Wilcox, 142; Mrs. G. Barnett, 169; Mrs. G. Grant, and Mrs. Shoveller, 207. Third prize of \$7.00 was won by: Mrs. H. Clark, 168; Mrs. Shillington, 197; Mrs. M. Clarke, 182; Mrs. Wilson, 167; Mrs. Jones, 162; Mrs. Beaudry, 160. Best three-string score of the league was bowled by Mrs. Shoveller, a nifty 712. Top dogs of INCO Club men's bowling are undoubtedly Hurd's Frood team, who won their mine league and then went on to trim the league champs from Copper Cliff and ORCO in a three-way playoff for the Club title. They will be custodians of the handsome new Club trophy until after the autumn tournament is completed. Lou Midgely spilled them high, wide and handsome for a three-game average of almost 300 in the final match of the playoff, to stamp himself one of the Club's crack bowlers.

**British Chemists**

A party of distinguished British chemists, many of them world names in industry, visited INCO during a recent trip to Canada. Here they are at Frood, awaiting their buses after an inspection of the surface plant at No. 3 Shaft. In the foreground, General Supt. R. D. Parker is explaining operations to Sir Gilbert Morgan and, immediately behind them, Lord Leverhulme is seen chatting with Vice-President Donald MacAskill. Mines Supt. H. J. Mutz is talking with another group at the right of the photo.

**At Scout Camp**

Squinting and squirming in one spot only long enough for the camera to click, these Boy Scouts were away at full gallop as soon as the photographic ordeal was over, because it was "free nigger" day at their Windy Lake camp and posing for pictures was an awful waste of time. Sons of INCO dads, they were an enthusiastic section of the 190-boy gathering which was under the direction of Walter Morden of Copper Cliff time office, a district Scout leader.

**INCO FLEETFOOTS**

There was nobody at the Lions Club celebration, July 1st, who could keep pace and puff with Bill Neva, of Frood, who showed a clean pair of heels to all opposition in the 10-mile marathon, and crossed

the finish line 400 yards ahead of his nearest rival. Clark Burlingham, of ORCO goalkeeping fame, showed class in the 100-yard dash and placed second. The ORCO team of Burlingham, Scott, McArthur and Leigh, ran second in the relay race.



## Metallurgy Wins Where Surgery Fails . . .

AND, IN THE RUMBLING MILLS OF THE COPPER CLIFF CONCENTRATOR,  
 . . . "Siamese Twins" Are Separated at Last

In a previous issue Triangle told how those "Siamese ore-twins," Copper and Nickel, first start on the road to separation when they pass through the concentrator crushing plant at Copper Cliff.

When the crushing plant's Symons crushers and Traylor rolls have done their job of hammering and battering the pieces of ore from an average diameter of six inches down to a maximum diameter of one-sixth of an inch, the "Siamese twins" head for the rod mills.

All of the crushed ore, which is to say, the undersize from the primary and secondary screens, falls together upon a conveyor belt and is carried up a long incline to the top of the concentrator building. Here it is discharged into the fine ore storage bin, by means of a travelling belt-unloader which may be spotted over any portion of the bin. This bin extends across the full 400-foot length of the grinding section of the concentrator. It has a total capacity of about 14,000 tons of ore.

### STILL TOO BIG

At this stage of the operation, the ore is still dry and a portion of it is in the form of particles as large as a sixth of an inch in diameter. At this size, any individual piece is likely to be composed of several different minerals, and no simple washing process could separate the constituents until they are broken free from each other. For Frood ore, experience has shown that this point is reached, practically speaking, when all of the ore has been reduced to about one one-hundredth of an inch. At that size, most of the Siamese twins become separate individuals.

Therefore, before actual flotation concentration can begin, the size of the ore must be reduced from its present one-sixth of an inch to one one-hundredth of an inch or less. In the process, about half the ore is broken down to very fine sands and slimes which are less than one one-thousandth of an inch in individual diameter. The final result of the grinding operation is that every pound of ore is broken down into over three thousand million particles. If these particles were seeds planted one-half inch apart, one pound would girdle the earth at the Equator.

### TO ROD MILLS

Mechanical reduction of this order is, of course, beyond the range of dry crushing machines such as we have in the crushing plant, and we now resort to wet grinding in machines of the rod mill type.

In elementary terms, the rod mills may be described as revolving horizontal cylinders, half-filled with steel rods which tumble upon the ore and break it up. More technically, the grinding section consists of 17 Marcy mills, each 6½ feet in diameter and 12½ feet long, revolving at 16.5 r.p.m. They are lined throughout with heavy manganese or nickel steel plates. A complete set of liners weighs 21 tons and lasts approximately a year and a half. Each mill is charged with about 23 tons of high-carbon steel rods which, when new, are 2½ inches in diameter, each rod weighing 200 pounds. A mill charged with rods and feed weighs about 70 tons. Work has commenced on the lengthening of all mills to 15½ ft., with an increase in speed to 23 r.p.m., 400-h.p. motors

and longer rods, which will make the total weight of a charged mill about 95 tons.

Each of the 17 mills is in closed circuit with its own classifier, which is a machine for the control of the size of ore particles which can pass on to the next process. In operation, the ore is drawn from the fine ore bin by a revolving feeder; at this point, the first water is added. The ore is sluiced into the classifier, where about two tons of water is added for each ton of ore. The coarser particles of ore settle rapidly through the water because of their weight, and as they reach the bottom of the machine they are dragged along an incline and out of the bath by means of reciprocating rakes. This coarse material drops into the adjacent rod mill.

### LAST STAGE

The finer material in the classifier tends to settle more slowly and the continuous flow

of water carries it over the overflow lip of the machine, at the opposite end from the sand discharge. The classifier sand discharge, after passing through the grinding mill, is returned to the same classifier and goes through the identical procedure a second time. No material can leave the circuit permanently until it is fine enough to be carried over the lip by the gently rising current of water.

When the ore reaches the point of overflowing the classifiers, it has completed its course of mechanical preparation. No further grinding is done at any subsequent stage. It is now ready for truly metallurgical treatment for the separation of copper and nickel minerals from the gangue and from each other.

A description of how the flotation process effects this separation will be carried in a future issue of Triangle.



The battery of 17 rod mills in Copper Cliff concentrator, where metallurgy does with ore what surgery can't do with people, and separates the "Siamese twins." A novel experiment is being tried on one of these big mills, whereby it broadcasts its own appetite. A microphone is placed beside the mill, and if insufficient feed is passing into the machine the louder rolling and rumbling of the rods is picked up by the "mike" and passed to a relay, which automatically increases the amount of feed. On the other hand, if the mill is getting too much feed, the consequently heavier slush inside will deaden the normal sound of the rods and then the "mike" passes on the message to cut down on the ore calories and vitamins.

## 'De Niccola'

To C. A. Kuttel of Port Colborne, Triangle is indebted for an opportunity to peruse an ancient document "De Niccola," although it must be admitted that our perusal of the curio produced little more than a violent headache, since it is written almost entirely in Latin. We thereupon called in a scholar, presented him with "De Niccola" and a box of aspirin, and left him to his own devices. In a remarkably short time he returned with these notes:

In 1775, in the morning of the 12th day of July, there occurred an event of especial interest to producers of nickel. On that occasion one Johannes Afzelius Arvidsson submitted for public consideration this paper on the chemistry of Nickel. Apparently this was an occasion of considerable importance. From the title page of the printed text of the address, it was delivered before the distinguished faculty of philosophy, which at that time embraced the natural sciences. The gathering was presided over by Torb. Bergman, Professor of Chemistry, Dean of the Faculty, a Knight of the Royal Order of Waasa, a member of Royal Academies of Sciences at Stockholm, London and Upsala. He enjoyed many other distinctions. While the title page is void of any mention of the scene of this address it, presumably, was at Upsala, Sweden. At any rate, there the official text was printed. As the custom was in those days, the learned men addressed their colleagues in Latin. The printed form, however, contains some pages of notes in the native tongue.

### CRONSTEDT'S WORK

Perhaps to those who are mining, pioneering and fabricating nickel, this book would have an especial interest since much of the address is devoted to the labors and investigations of an illustrious Swedish Mineralogist, Axel Fredrick Cronstedt, the discoverer of Nickel and he who gave it its name.

The early pages are devoted to the conflict of opinion between Cronstedt and other contemporaries who seemed to think that the Bavarian ores, which apparently formed a subject of considerable contention, were ores of copper or cobalt and arsenic with traces of copper. Master Cronstedt, however, disposes of their contentions by stating that "neither they themselves, nor any other, as they admit, were able to extract even a little bit of copper."

Thereupon he undertook some very careful investigations which he published in 1751 and 1754 as a result of which he affirmed his discovery of what he calls a "semimetal." The author, Arvidsson, notes that the investigations of Cronstedt were confirmed after his death by Sage and published in the records of the Royal Prussian Academy. This same Balthasar Georges Sage was the founder of the French School of Mines.

The details of the various processes of roasting, calcination and fluxing are given with considerable precision and with unstinted praise for the patient investigations and clear reasoning of Cronstedt.

### PHLOGISTON DOCTRINE

A very interesting feature of the paper is the frequent reference to dephlogisticated air and to the use of phlogiston in the process of combustion. While the phlogiston doctrine of combustion was still accepted and probably had not been seriously questioned at the time Cronstedt was making his investigations on Nickel, however, Lavoisier and Priestley had done much of their investigating which led to their theory of oxidation before the address of Arvidsson was printed. It is of par-

ticular interest to note that Cronstedt himself noted after adding phlogiston that the weight of his substance did not diminish during the roasting but rather added one-quarter to its weight.

Perhaps the most striking quality depicted in the pamphlet is the amazing patience of these independent investigators like Cronstedt who, with their limited facilities and imperfect equipment, were able to speak of their discoveries with the assurance which comes from careful preparation, logical reasoning and skilful experimentation.

## Club Facilities Continue in Demand

Out of a starting list of some 75, about 40 are still in the hunt for championship honors in the snooker tourney at INCO Employees Club. It's a round-robin affair, and any player is eliminated who drops five matches. A Club trophy will be presented to the winner.

Interest in Club bowling and horse shoes holds steady despite midsummer weather, and teas and bridge parties are also continuing to be popular. The Club's bi-weekly dances draw an average of 150 couples, and are acclaimed by members as "the tops." Paul Koster's Froid Orchestra seems to

grow in popularity with each of these events, and the big 10-piece band wisely caters to the demands of the members by keeping right up with modern dance music trends.

## Big Program for Froid's Field Day

Next big item on the Froid sports calendar is the monster Field Day at Athletic Park, Sudbury, on August 24. Froid Welfare is planning an elaborate program which will keep the public on the hop from morn till night.

Open events in all branches of track and field sports, baseball, football, softball, a special big show feature, and a boxing and wrestling card under the floodlights, will be some of the attractions.

### STAND HIGH PRESSURES

Cast bronze injectors, lubricators and valves produced at the Detroit and Windsor plants of the Penberthy Injector Co., are required to withstand hydraulic pressures up to 300 pounds per square inch. Production of these castings has been facilitated by the adoption of 1 1/2 per cent. to 2 per cent. nickel for the various bronze compositions.

## Engineers Whoop It Up at Annual Picnic



Despite the unavoidable absence of George Holmes, the annual Engineers' Picnic at Long Lake was a big success. In (1) Matador Karl Lindell and Gondoller George Thorpe are about to submerge after a furious tussle with Jimmy Pett and Johnny Kossup in the canoe-tilting event. George looks as if he expects the water to be chilly. In (2) George Fleming (left) and "Toar" Lemmon get ready to heave a couple of ringers in the horse-shoe pitching, which was won by "Duke" Jarrett and "Speed" Cousins of Copper Cliff. A grudge softball game was a feature of the day, Froid and Creighton Survey offices deciding an argument of long standing. Froid took the short end of a lopsided score, probably because the match was played right after supper and such well-known epicures as Matthewman, Sell, Monteith, and others were placed at a hopeless disadvantage for the first hour of play.



## Nickel Peace Bell Unveiled

An international peace celebration, to commemorate the hundredth anniversary of the last armed invasion of Canada along the St. Lawrence River front, was held in Prescott, Ont., and Ogdensburg, N.Y., from July 1st to 6th, when the amity existing between these two communities and all other centres of the one hundred mile waterfront from Kingston to Cornwall, was cemented anew.

### NICKEL PEACE BELL

Feature of the celebration was the unveiling by E. A. Collins, Copper Cliff, of a 200-pound Peace Bell of nickel alloy, gift of INCO to the cause of international understanding, and the first such bell ever cast by the Company. Its mellow tones will ring out a proclamation of the peace and goodwill existing between two great countries for more than a century.

It was in 1838 that the rebellion in Upper and Lower Canada, begun in the preceding year by William Lyon Mackenzie, Louis Joseph Papineau and William Gourlay, came to a climax in the Battle of the Windmill at Prescott, Ont. After Mackenzie fled from Toronto he took up residence in Upper New York State, and with many rebel names of history, such as the Brigand Bill Johnston, General John Erge and the Polish patriot, Nicholas Von Schoultz, organized a series of Hunters' Lodges along the boundary line of the St. Lawrence. In April of 1838, Mackenzie and Von Schoultz held a mass meeting in Ogdensburg at which final plans were laid for the invasion which eventuated in the fall of that year.

### THREE-DAY BATTLE

History books tell of that three-day battle, but little acknowledgment is given to the fact that it was the lesson of the Windmill which led directly to the eventual establishment of responsible government in Canada. Von Schoultz, who led the 300 odd rebels into Canada, was later taken prisoner to Kingston and tried at Fort Henry. He was defended by John A. Macdonald, (later Sir John) and executed, and it was this unnecessary sacrifice which finally forced the Family Compact to abdicate their reign of injustice in favor of the franchise of the people. The contribution that Von Schoultz made to Canada on that occasion, hitherto unrecognized, was commemorated on July 1st with the unveiling of a plaque to his memory by

## Lake Erie Mecca

1 Christened "John More Park" in honor of a former superintendent of INCO's Port Colborne Refinery, and more familiarly known as "Nickel Beach," this inviting sweep of soft sand along the shore of Lake Erie is the mecca of Port Colborne employees during the summer months.

## A Family Picnic

2 Dick Marshall, ironworker, enjoys a picnic with his wife and family at Nickel Beach while a cooling breeze off the lake puts him in the right frame of mind for his next shift at the Refinery.

## Cupid's Caravan

3 Patricia and Ann English, daughters of Ed. English, "the Bert Flynn of Port Colborne," are the charming crew of the "Honeymoon Express" which brought a load of lovely wedding presents to Mae Pritchard, pretty bride of J. H. Walter.

Consul Jan Pawlica and Hon. Norman Rogers, before an official delegation of at least one thousand Polish delegates from Windsor, Hamilton, Toronto, Sudbury, Ottawa, Barry's Bay and Montreal, as well as several New York State points.

Prime Minister Mackenzie King had a particular interest in the centennial of this battle for, not only was his maternal grandfather directly responsible for its instigation (and was, in fact, believed in the Windmill at the time of the battle) but his paternal grandfather, John King, headed an artillery brigade from Kingston which bombarded it and finally forced the surrender of the rebels.

Three more fishing trawlers are being built with nickel-clad fish holds, following the successful introduction of such holds about a year ago.

## Canoed 78 Miles On Fishing Jaunt

Harold Bruce, Chic Cochetto, W. G. Beaver and Vic Baker were the four Copper Cliff stalwarts who set off like Vikings July 1st for a hike into the hinterland. Taking to their canoes at Benny, on Onaping Lake, they paddled a total of 78 miles, and made six portages, longest of which was one mile. Only casualty was Vic Baker, who set out ahead of the party to explore a portage and fell prey to a roving tribe of arrow-head mosquitoes. Temporary antidotes were administered but the patient did not completely recover until he had spent a couple of hours at the Boilermakers' Hall.

