

## Smelter Team Tops in Fast Broomball League



These husky smeltermen "hit the ball" not only when they're on shift at Copper Cliff. They also smack the spheroid with great vigour and excellent accuracy in scheduled games of the Sudbury Broomball League.

Reverb, converter, and Orford departments all contribute talent to the Smelter Broomball team, and it is an exclusively Copper Cliff lineup with the exception of three lads "imported" from last year's Banker squad. The players are:

Back row, left to right: L. Maltby, 2nd line rover; D. Thyne, 1st line centre and team captain; M. McGrath, 1st line left wing; C. Menard, 2nd line right wing; J. Cation, 1st line right defence; E. Maynes, 2nd line right defence; J. Dingle, 2nd line centre; S. Wilson, team manager.

Front row, left to right: C. Griffin, 2nd line left defence; D. Llewellyn, 1st line rover; R. Carroll, 2nd line forward defence; R. Bain, 1st line right wing; S. Brooker, goal; C. Lane, 1st line forward defence; E. Desroches, 2nd line left wing; Lafleur, 1st line right defence. Missing from the picture is Jimmy Sime.

Lane, Bain and Brooker are the trio from outside the smelter. Pioneers of the club, which was organized in 1934, are McGrath, Thyne, Carroll and Maynes. Hustling Denis Thyne is president of the Broomball League, which he got started in 1934.

Under Steve Wilson's coaching eye the team is perched confidently at the top of the league standing, and is determined to be there when the final broom is waved at the end of the season. Opposing clubs in loop are St. Louis, Canadian Creosote, Canadian Order of Foresters, Sudbury and Sault Ste. Marie Regiment, Ryan Athletic Club.

Scheduled games are played on Tuesday and Thursday nights at the Palace Rink in Sudbury, and often as many as 400 fans turn out to watch them. Financing themselves, the Copper Cliff entry get excellent support from its smelter pals, which they hope will continue throughout the season. There's nothing like a good rousing cheer, now and then, to put the old pepper into a broomball player, or anybody else for that matter.



### Saved His Eye

Another enthusiastic disciple of safety measures, particularly in respect to the wearing of safety goggles, is Isaac LeClair, Copper Cliff smelter employee. Fortunately, LeClair's enthusiasm did not date from the day after the accident. He was wearing his goggles at the time, and when a piece of Bessemer matte flew up to his eye while he was breaking matte on a grizzly, the thick lens fully protected him. Here are the goggles, clearly showing what they saved their wearer.

## Cliff Juniors Have Strong Lineup

Head and shoulders above the North Bay and Sault teams with which they are playing a league schedule, Copper Cliff juniors are being groomed as a Memorial Cup hope by "Maxie" Silverman.

From last year's Cub Wolves the Cliff team have Shewchuck, of Brantford, defence; Heximer, of Niagara Falls, right wing; Edwards, of Sudbury, sub goal; Zuke, of the Sault, right wing; Venturi, of Sudbury, right wing; Lemieux, of Sudbury, left wing; Webster, of Sudbury, centre.

From last year's N.O.H.A. champs, South Porcupine, they drew Godfrey, defence, and Hamill, left wing, both of Toronto, and on the New York Amerks reserve list.

Albright, their goalie, is from Walkerville, but was in the district last year. Pat McReavy, centre ice, hails from Owen Sound and St. Michael's College, and arrived last September. Frenette, defence, came from Nova Scotia last October; Currie, Refinery left winger, is from Cayuga.

Hashie and McKinnon are from Copper Cliff, and are spares at centre and defence respectively.

## INSTITUTE IN GREAT FAVOR

A nominating committee's slate of officers for 1937 received prompt and hearty endorsement at the annual meeting of the Sudbury Branch, Canadian Institute of Mining and Metallurgy, held January 9 in the Nickel Range Hotel.



W. A. MacDonell

The officers are: Chairman, W. A. MacDonell, Coniston; secretary-treasurer, A. E. Cave, Garson; vice-chairman, G. S. Jarrett, Copper Cliff; executive members, W. E. Bawden, Frood; T. Austin, Coniston; H. W. Reed and E. H. Jordan, Sudbury; R. C. Mott, Falconbridge; S. R. Fredeen, Creighton; A. B. Yates, Copper Cliff; A. D. McKechnie, District.

The annual meeting took the form of a banquet, attended by more than 175.

Speaker of the evening was Principal A. E. Morgan, of McGill University, whose thoughtful address on "Freedom" was thoroughly enjoyed.

Reviewing activities of the Sudbury Branch during 1936, Secretary Cave reported five successful meetings with an average attendance of more than 140. As a medium for explanation of mining and metallurgical practices in the district, and as a get-together for members of these professions who otherwise may not come in contact with each other, the Sudbury Branch of the Institute is accomplishing an effective and very popular purpose.



A. E. Cave

### NEW GARSON RINK

Construction of a skating rink, 77 by 154 feet, has been completed at Garson, and future hockey luminaries of that mining camp are making the best use of it.

Recently re-opened after a long shut-down, Garson can be expected to figure in the spotlight with renewed vim and vigor, particularly in soccer, in which last season they won the coveted Star Trophy.

## Wolves Soon Weary With Eli on Their Trail

Any time you would like a nice wolf served up, hot off the trail, just get in touch with Eli Kiviahio, of Creighton Mine.

Eli picks off wolves like professors nab butterflies.

Eli, who is 41 years old, has been at Creighton since 1910, and has worked at all types of jobs. For the past 10 years he has been a machine doctor. He's also something of an inventor, but if he were a second Thomas Edison it would still be of minor importance compared with his athletic feats.

Eli's favorite sport is running down wolves. He does this by trailing the wolf until it tires. The wolf eventually stops and howls, probably in sheer exasperation. Eli then shoots it. He says that the wolves never turn and chase him for a change, but if they did he says he would not stop to howl. This is where the wolves make their mistake, and a very foolish mistake it is, too, because Eli is a crack shot.

Eli says it rarely takes him more than six hours to track down a wolf in soft snow. He uses skis. He starts out in a likely wolf district and just circles around until he gets a track. Then he is off, at a tireless pace, and five or six hours later he has his quarry. The wolves around Creighton are reported to be getting very tired of this sort of thing, but there isn't much they can do about it.

Naturally a man who is continually out-puffing wolves must be in first class physical condition. Eli keeps himself in shape by running, summer and winter. In winter he runs from Creighton to Copper Cliff and back, at least once a week, and the trip one way is covered in 45 minutes.

### TROTTER FARMER

On a cool day in summer Eli runs out to his farm near Whitefish, after his shift in the mine is over. It's a distance of 17 miles, and he makes it in one and one-half hours.

When he bought his farm from the Company one winter several years ago, Eli telephoned from Creighton to the office of one of the Copper Cliff officials and said he had the money for the farm and would be right in to pay it. The official said okay, hung up his phone, and almost as soon as he glanced up from his desk Eli was standing there, not even breathing unevenly after having hiked in from Creighton on his skis.

About four years ago, on the first of July, Eli decided he would give himself a little endurance test, to see just how far he could



Eli Kiviahio

### NEXT ISSUE

According to the present schedule, Triangle will be published once each six weeks in 1937. The next issue will be distributed March 15.

## Sharp Contrast In Weather Records

Sudbury district denizens are comparing with relief the balmy weather of the present winter with the frigid siege laid to their comfort last year by J. Frost and his aides.

Just to refresh memories, it is recalled that the average mean temperature from January 12 to February 23, 1936, was 3.4 degrees below zero. During that period the thermometer reached zero, or below it, every day except three. There were 21 days on which the temperature reached 18 below zero or lower. The lowest recording in Copper Cliff was 32 degrees.

## FRANK STACK FLASHES TO NEW SKATING TRIUMPHS

Frood Athletic Association's colors flashed to new triumphs during January as Frank Stack swept honors in various speed-skating meets. An outstanding triumph was his victory in the crack Paul Bunyan International Speed-Skating Championships at Bemidji, Minn., on January 18. He won the 220-yard event and placed second in the quarter-mile, the mile, and the two-mile, to amass a total of 90 points and annex the men's title by a margin over his nearest rival of 20 points.

Stack has collected something like 60 trophies and 100 medals since he started his speed-skating career in Winnipeg, his home town, at the age of 15. Now about 30 years old, he's still going like a house afire.

At present he holds three world records: the five mile indoor, 15:42 1/5; the 500 metre, the one mile. In addition he holds several titles picked up when he toured Europe in 1933.

Some of the championships he has held: Wisconsin Outdoor Speed-Skating; Illinois Outdoor; U. S. National Indoor; Dominion of Canada 220-yard; American South West States; City of Chicago Indoor (three times); North American Indoor (twice); Chicago Daily News Silver Skates.

He was a member of the Canadian Olympic team performing at Lake Placid in 1932, and garnered 10 points for the Maple Leaf.



FRANK STACK

# TELL TRIANGLE

If the "Tell Triangle" budgets seem briefer this issue, readers are asked to be indulgent. Many of our correspondents, scenting the "story of the year," dashed off duty to cover the 'flu. Doubtless our next issue will carry several articles such as "Creighton Nose Breaks All Running Records," and "Copper Cliff Joins Full of Aches."

## Port Colborne

¶ The many friends of Col. Bob Baker will be glad to learn that he is making satisfactory progress after undergoing an appendicitis operation.

¶ Miss Dolina Godfrey, one of our charming stenographers, told us that her stocking was well filled at Christmas. Among her presents was a beautiful diamond ring. Best wishes Dolina.

¶ A number of the boys have admitted buying a lot of hay and oats for Dyke's horses lately, but a certain member of the Sample Dept. has been more fortunate. He claims that Dyke paid for a new pony coat for his wife.

¶ A pretty wedding was solemnized on Saturday, January 2nd., when Miss Margaret Pul became the bride of Paul Torok.

¶ In the Welland Hospital at the present time are, Alex Laird, Urban Teal and Dan Dobrint. All are reported as making satisfactory progress.

¶ Wm. E. Mayhew is retiring on pension at the end of January after thirty-five years' service with the Company.

¶ The "INCO" hockey team is leading the urban section of the rural hockey league. They recently played an exhibition game with the Port Colborne Seniors and were defeated by only 4 goals to 3.

¶ When the new electrolytic units were put in operation on December 1st., the Company fittingly recognized the years of service and careful, diligent attention to their assigned tasks of W. Jarram, H. Swift, and W. Wegerich, by appointing them foremen of the new department.

¶ Born: To Mr. and Mrs. Henry Boyer, a son, John. Henry, who was formerly a shining light on the local O.H.A. Intermediate team, as well as the INCO A.A. entry, until shift work interfered, says the young lad has already developed a fair left wing shot.

¶ Three of the bricklayers, Joe Byng, G. R. Cowper, and Pat. McKenna, while going home from work about 3.30 A.M. recently after working 19 hours, noticed a fire in the basement of a house on Davis St. Joe Byng ran back to the Company's gate to give the alarm and Cowper and McKenna broke into the house. Cowper carried out the two children while McKenna woke the parents.

¶ Glenn Winger defeated Bob Cochrane in ten pin bowling for the Walter trophy, and has since defended the cup successfully against C. E. Wolfe.

¶ The "INCO" five pin bowling team are wearing new uniforms.

¶ Why go to Florida? — Archie Saville and Glenn Winger played golf on New Year's Day at the Port Colborne Country Club.

¶ Capt. F. H. Lymburner, assistant to H. P. Roe in No. 4 building, has decided he needs a chauffeur to keep track of his car. Thursday morning was very wet and "Lym," rather than walk from the garage to No. 4 building, parked his car near No. 4 office. At noon, force of habit led him to the garage. Moral:—Have a car in every port.

¶ "Blackie" Hughes bemoans the snowless winter. Last year he did quite a business shovelling driveways and thereby getting free rides to work. This year the roads have been quite bare, and "Blackie" has to pump the old bicycle.

¶ Anent the recent five pin bowling game between No. 3 and No. 4 buildings:—No. 3 building triumphs again. The pride of No. 4 building had their challenge of defiance hurled back into their teeth by those bowling bulwarks from No. 3. Amid great cheering and jeering Cote settled an ancient feud with "Nipper" Wilson as to who is the best bowler, while the other McQuire-coached men were hurling hardwood in all directions to the discomfiture of the fuming four from No. 4. The final tally gave No. 3 a 424 point margin for the three games.

The scores:

NO. 4 BUILDING				
Nipper Wilson	151	151	141	443
F. Lymburner	117	115	147	379
H. P. Roe	181	115	166	462
S. Augustine	149	200	170	519
	598	581	624	1803

NO. 3 BUILDING				
Eli Cote	128	235	205	568
R. C. McQuire	124	133	188	445
W. J. Cook	143	205	199	547
H. Kern	194	228	245	667
	589	801	837	2227

## Coniston

¶ The friends who presented Weather Comptroller Jack Dale with a nifty new thermometer at Christmas, are fervently wishing they had done so long ago. The improvement in climatic conditions is little short of sensational since Jack was properly equipped to keep his eye on the mercury's antics. Everybody is delighted with the system he has put into effect—

holding back some of the winter chill to release when July and August come around. Here's hoping he keeps on doing things by degrees.

¶ Miss Flora Lafrance, popular Coniston girl, has taken over the referee's bell as far as J. McCabe, one of our hockey players, is concerned. They were married recently. The bridegroom's home is in Almonte.

¶ After several months' absence due to a stubborn illness, Bill Warwick is welcomed back at the First Aid Classes, and Coniston can now settle down in earnest to preparing to defend its championship laurels when the inter-plant tests are held in the spring. The local St. John's Ambulance experts have definite intentions concerning the new R. D. Parker Trophy.



Fond associations and happy memories for many older INCO families are packed into this picture of five Coniston old-timers, all of whom have passed to their reward. Left to right they are: Michael Walsh, pensioner; Denis O'Brien, postmaster from the founding of the town until his death in 1935; Samuel Kidd, old INCO employee; Frank Johnson, pensioner, and Alex Colquhoun, pensioner. The picture was snapped at a birthday party given for Mr. Kidd by his daughter, Mrs. Wm. Wright, now of Sudbury. Triangle is indebted to the anonymous contributor who sent it along.

¶ Mr. and Mrs. W. McKee have returned to make their home in Coniston. An electrician, Mr. McKee was transferred to Garson in 1931. Now he is back at his old job here, welcomed by many friends.

¶ A recent donation from the Copper Cliff Library of 70 books, heartily appreciated, has been added to the shelves of the Coniston library. The local Library Board is also taking advantage of the Government offer to augment their stock of books by 50 volumes each four months. Last year the Board also bought more than 70 new books, and now members have an excellent range of material from which to make their selections.

¶ The Athletic Association's dance on New Year's Eve was attended by one of the largest gatherings in the history of the

clubhouse, and everyone had a full measure of fun. The official Coniston welcome to the infant 1937 must have been clearly audible in Mexico City, Fort Resolution, and other points north and south.

¶ Trading in Coniston hockey futures was brisk on the local exchange the morning of January 16, when news came over the ticker of the birth of a second son to Mr. and Mrs. Verdal Price at Brockville.

## Frood

¶ "Long John" Botsford has bade tearful adieu to the Frood Survey Department, and has teamed up with Federal Kirkland Gold Mines. Another recent departure was Wally Smith, one-time hero of the "Mainly for Women" column, who went to Chicago to take a position with the Johns-Manville Co. as one of their Canadian representatives.

¶ Bert Souche and George Thorpe are in the real estate news this issue. Bert has blossomed into a bit of an architect, and if the completed house is as classy as the plans he's drawn for it, Sudbury has a new beauty-spot in the offing. George joined the ranks of the land-owners, purchasing an enviable property on Douglas St.

¶ Lou Rettie, former timberman on 2600, and Bob Smith, also of Frood underground fame, have joined the Efficiency Department staff.

¶ Recent Frood weddings: Edward Warzecka and Mary Kreutzweiser, of Waterloo, at Sudbury on January 12, with Mr. and Mrs. "Lefty" Esbaugh as attendants; Milton "Slim" Craddock and Marjorie Anne Laver, of Saskatoon, Sask., on Saturday, January 16, "Slim" being a motorman on 2290 North; R. Goodate to Doris Teed, of Saskatoon, Sask., on January 1.

¶ Recently arrived on the scene of action: To Mr. and Mrs. Wm. Hay, on December 8, a daughter; to Mr. and Mrs. M. Mandrescul, on December 16, a daughter; to Mr. and Mrs. Douglas McLaren on January 16, a daughter; to Mr. and Mrs. Joe MacFarlane, on November 16, a son; Mr. and Mrs. H. Clemens, on January 18, a son.

¶ Soccer followers will regret to hear of the nasty accident which happened to the mother of the three Grassam brothers, "Perch," "Smiler" and "Bulldog," who need no introduction. Their mother slipped on an icy sidewalk in Toronto and suffered a severe injury to her back, spending several weeks in Toronto General Hospital. She is now convalescing at "Perch's" home, and it is to be hoped the bracing northern air will complete her recovery.

¶ Frood's 1937 soccer prospects took a decided upswing with the recent arrival of Jimmy Winning from British Consols, Toronto, who will perform with us this year. Jimmy is a husky chunk of a lad, 5 ft. 10 ins. and tipping the beam at about 170 lbs. He plays any of the inside positions. In the 1933-34 season he performed with Bolton Wanderers in the English First Division. At the end of that season he hiked home to his native Clydebank, Scotland, and there had a hand in the building of the new Mistress of the Seas, the R.M.S. Queen Mary. He returned to Canada in 1935, and has been with British Consols since. Great things are expected of him when he turns out this year for the Frood.

¶ The familiar and perennially popular lines of "Paddy McGinty's Goat" are missing

from lower level lunch hours these days, what with Mike Doyle of 3100 convalescing at home following a serious operation. His pals hope to hear his Irish blarney soon again.

¶ When Frood Mine trimmed the Falcons 4-3 on January 6, a neat little prize of \$50 plunked into the lap of Ed. White, of 2600 level, who picked off a pool organized by some of the boys on 2800. Ed. would have sold his ticket for a song, five minutes before the final bell, with Falcons leading 3-2, and he did some powerful hollering when the Frood turned on a last-minute surge of power and pulled the match out of the fire.

¶ Kitchener must have thought "Old Home Week" had suddenly been declared during Christmas, when this prominent Froodian delegation arrived back there for the Yuletide holiday: Mr. and Mrs. "Bingo" Kampman, "Jit" Sprung, Eddie Wargecha, Jimmy Mead, Mr. and Mrs. "Lefty" Esbaugh, and Mr. and Mrs. Reg. Prior and the various little Priors.

## Refinery

¶ Interdepartmental bowling was resumed with the first scheduled game on January 14th. The Office team, bolstered by G. A. McFarlane's spectacular playing, took three points from the Shops, winners of the first half.

¶ Plans have been made for an interdepartmental hockey league to compete for the C. H. Aldrich trophy. Four teams have been entered. "Fred" Sheridan, Acid Plant foreman, is convener.

¶ Mr. and Mrs. Herb. Cavers spent their vacation during the holiday season at Woodstock, New Brunswick. "Herb" reports that All's Well in the "herring choking" industry.

¶ Born:—To Mr. and Mrs. Joe Mikelcic, on January 7th, a son; To Mr. and Mrs. George Butler, on January 10th., a daughter; To Mr. and Mrs. A. Egan, on January 15th., a daughter; To Mr. and Mrs. Jack Duncan, on December 17th., 1936, a daughter, Mary Lee; To Mr. and Mrs. George Furchner, on December 16th., 1936, a daughter, Nancy Joyce; To Mr. and Mrs. "Pop" Cote, on December 28th., 1936, a daughter, Marie.



Bill Burden, 3-year-old son of W. Burden, anode casting foreman, challenges his father's prowess as a hunter. "Well, pappy," young Bill is remarking to his dad, "Guess we'll donate the horns to the Coniston Band."

¶ Among those missing from the Nickel District during the Christmas holidays:—W. R. Koth and wife, to Perry, New York; J. C. Bischoff, to Bridgeport, Conn.; W. Sander-son, to Toronto; C. Marshall and wife, to Ottawa; W. Long, to Niagara Falls; J. Sey-  
mor, to Ottawa; J. G. MacDougall, to Dal-  
housie, Que.

¶ We announce with pleasure a wedding which took place on February 1st, Raymond Watt, narrow gauge brakeman, to Laura Cameron, of Perth, Ontario.

¶ Married: "Nick" Koniuk, of the Anode Casting crew, to Miss Polly Twardowski, on December 13, 1936.

## Copper Cliff

¶ That famous knot was tied recently for: Victor Buisson and Edith Kimberly; Maurice Buisson and Beatrice Hearn; George Allen and Helen Carefoot, of Collingwood; William Whiteside and Violet Rae; J. "Scotty" Stewart and Kathleen Savage, of Toronto.

¶ Christmas and vacation were simultane-ous for Jim Parlee, who visited his home in Edmonton. Contrary to expectations, it was Santa Claus, and not Aberhart, who came down the chimney there again this year.

¶ There are always knowing smiles when our American tourist friends arrive in these parts during the summer with winter sports equipment. But the laugh was on Bruce Allen when he took skis and skates to Southern Ontario during the Christmas season, and found everybody wagging golf clubs and tennis racquets.

¶ Chicago and surrounding points were the Christmas vacation haunts of Bert McFeeters.

¶ Morrow's Shift hockey team visited Capreol Seniors New Year's Night and lifted a 3-0 decision with Rusty Abrams scintillating in goal.

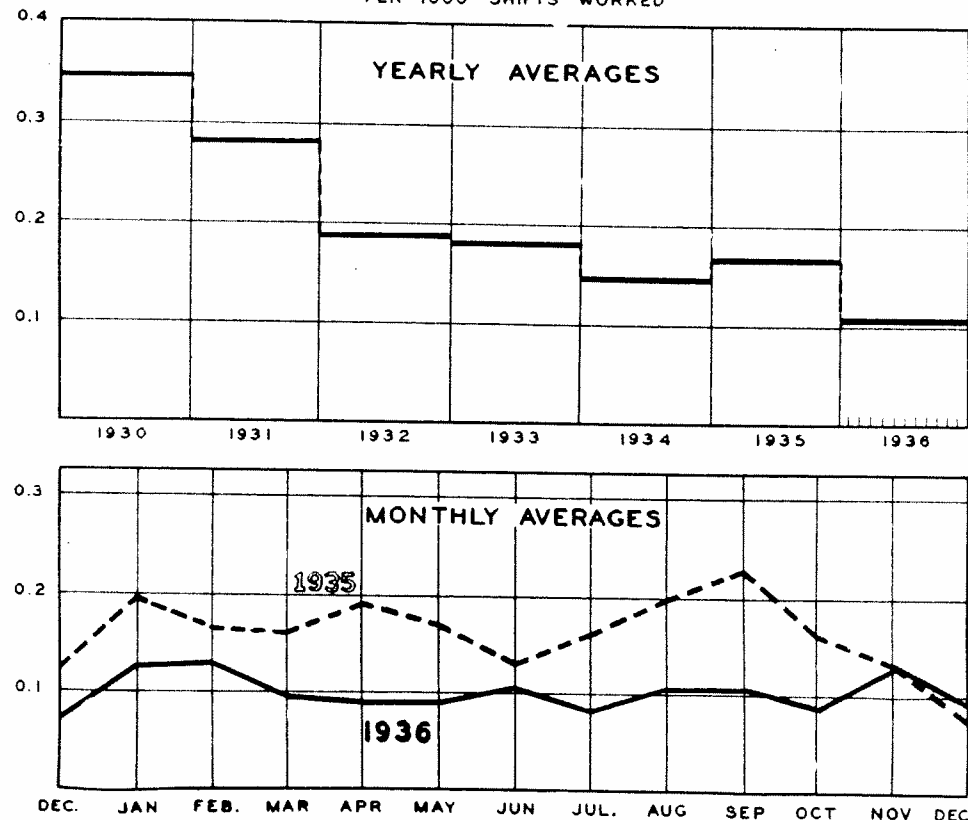
¶ Visiting over New Years in Montreal, Phil Sheridan saw his high school chum, "Toe" Blake, going at a great gait in the Canadian uniform.

¶ Termed the "best yet" was the New Year's Eve dance at Copper Cliff Club, which drew a record attendance. High-class novelties added to the evening's enjoy-ment.

¶ Triangle advertising pays, says Harold Talbot, who announced in our second issue that anyone supplying him with a deer's tail could count on a fine trout next spring. He's going to have to take a month off to fill the orders which have come in.

## TRIANGLE'S INDEX OF ACCIDENT FREQUENCY

PER 1000 SHIFTS WORKED



## "How Are We Doing?"

In only one month of 1936 did the monthly average of accidents-per-1,000-shifts-worked fall to show an improvement over the corresponding figure for 1935, and that was in December. It is only fair to say, too, that the mark for December, 1935, was the lowest monthly average since 1930. December of 1936 came along with the very creditable figure of .97 accidents-per-1,000-shifts-worked, and you can trace for yourself in the lower chart the substantial improvement recorded last year as compared with 1935. Yearly averages, shown in the upper chart, illustrate 1936's big gain over all other years. Will 1937 produce even better figures? That's a tough assignment, but the hand-in-glove co-operation of all employees would make it possible. Do it the SAFE WAY, make EVERY DAY A SAFE DAY, and the Mining and Smelting Division will go on to greater safety achievements this year. But every man must help!





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

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

VOL. 1, No. 4 FEBRUARY, 1937

## World Welfare

A bond to bring all departments of the INCO organization together, and to weld them in a realization of their common purpose, is the review of "The Nickel Industry in 1936," recently from the pen of INCO's president, Robert C. Stanley.

Here is a survey of vital, glowing achievement. Mr. Stanley looks at the world industrial scene and finds nickel everywhere a leader in modern development.

Nickel flows in various forms through an increasing diversity of channels into the industrial processes of the world. But the significant feature of the Age of Alloys into which the world is steadily moving, is that it leads not only to an intensification of activity in established industrial centres, but also to an extension of this activity to remote areas which hitherto have been commercially inaccessible. Points far into Northern Canada and into the jungles of Africa and British Guiana are now being tapped for their mineral or other resources by the use of aeroplanes for the conveyance not only of men and supplies but even of heavy machinery parts which can be assembled into mining and drilling equipment miles beyond the present terminals of effective surface transportation. In this extraordinary development of modern industry nickel alloys provide the vital parts for the aeroplanes as well as for much of the machinery.

Nickel today is undoubtedly one of the greatest factors in the march of civilization.

This is the nickel which the departments of INCO produce. Every INCO employee, from the miner below surface to the research and development engineer who discovers new uses for the metal and encourages its consumption, can take pride in its record. The thousands of us within the INCO organization are naturally primarily interested in our jobs because they give us a comfortable living and many extra advantages for the happiness of ourselves and our families. But, over and above that, there is a deep satisfaction in knowing that through our jobs we are making a very definite contribution to the happiness of peoples all over the face of the globe.

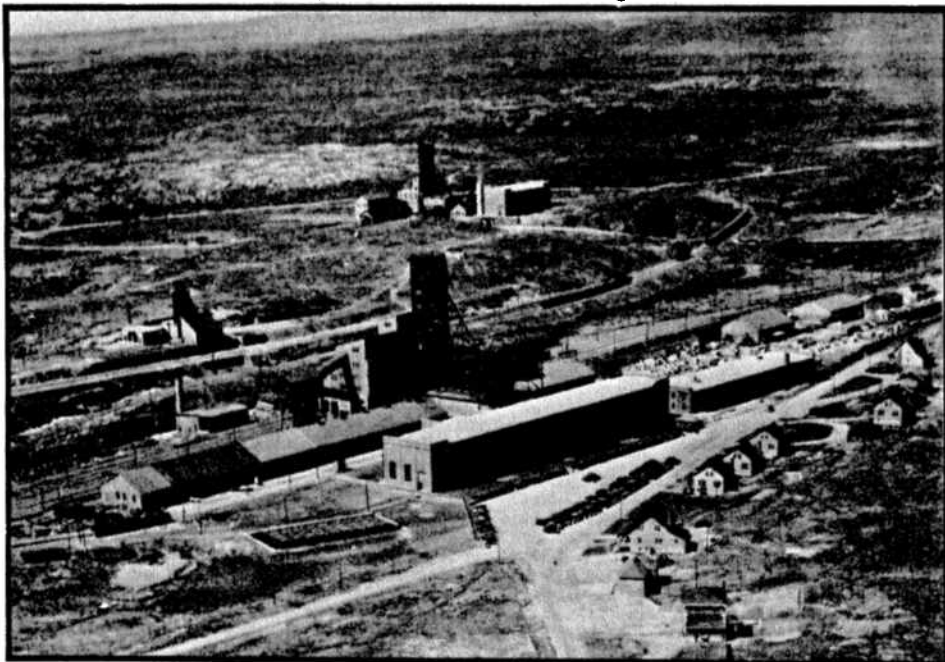
## De Re Metallica

The Triangle has received from The Mining Magazine of London, England, kind permission to reproduce some of the text and wood cuts from their 1912 edition of "De Re Metallica", by Georgius Agricola, translated from the first Latin edition of 1556. The translation was done by Herbert Hoover, former President of the United States, and his wife, Lou Henry Hoover. A limited edition was published, and copies of it are now connoisseurs' prizes, one of which is in the library of Mr. R. L. Peek, Copper Cliff.

One must go back a great deal farther than 1556, of course, to trace the history of mining. Rio Tinto copper mine in Spain, recently in the news when rebel forces confiscated its output, is the "Methuselah of all known mines." The first semi-authentic account of operations there dates from the eleventh century before Christ, when the Phoenicians traded in copper made from its ores.

Lack of earlier descriptive material, however, makes Agricola's work invaluable, and by publishing a series of articles comparing mining methods of his time with those in practice at INCO's famous Frood today, Triangle believes it will have a feature of much more than passing interest. The series will commence in our next issue.

## Aerial Views of INCO — No. 2 — Frood Mine



The aerial photographer caught this excellent view of the three shafts at the Frood Mine. In the foreground is No. 3, the main hoisting shaft, which handles all men and supplies. Its headframe towers 175 feet in the air. The long brick building in the foreground is the hoist house, and to its right is the changehouse. Other surface buildings include the carpenter, machine, and blacksmith shops. Immediately behind No. 3 shaft headframe in the photo is No. 1, the ventilation shaft, concrete lined and absolutely fireproof. It has hoisting facilities for handling men in case of emergency, but its chief duty is done by its two large fans which pump 360,000 cubic feet of fresh air into the mine every minute. In the right background is No. 4, an ore-hoisting shaft, which has a rockhouse similar to that at No. 3.

## NICKEL . . . AND ITS USES

### MODERN MIRACLE MAN

. . . or How Sudbury Nickel Aids the Chemist to Work Modern Magic

One of the most interesting figures of ancient times was the alchemist. Working with such knowledge as he had and with a belief in the power of magic, the alchemist hoped to do such marvellous things as change base metals into gold and find a cure for all the ills of mankind. Unfortunately, however, despite the fact that people believed for generations that alchemists could perform miracles, alchemy was, on the whole, a failure.

### MODERN MIRACLE MAN

Today, however, civilization has the direct descendant of the alchemist, the modern chemist or chemical engineer, who can do things which would make the old alchemist stare in amazement. And today, well-informed persons say, the world is entering the Age of Chemicals, for chemistry can create materials and perform miracles such as the alchemist scarcely dreamed were possible. Instead of magic, the chemical engineer uses science. Where the alchemist had little real knowledge, the chemical engineer has compiled an ever growing fund of valuable information. And instead of the crude equipment and the meagre supplies at the disposal of the alchemist, the chemical engineer has the complex machinery and the valuable materials of modern times.

One of the most valuable of these materials, moreover, is nickel; for just as it is true that there is scarcely an article in use today which does not owe some of its quality to the chemical industries, so it is true that there is scarcely a chemical industry which does not make use of nickel or of materials processed in equipment made of nickel or some nickel alloy. Thus, whereas the old-time alchemist merely hoped to find a way to perform miracles, today nickel is actually helping to perform what would have been called miracles a few years ago.

### RAYON, CELLOPHANE, SOAP

To illustrate the chemical industries and their use of nickel, one may take caustic soda, which most of us know as lye, and three of the products which are made with it. These products are rayon, the artificial silk from which articles ranging from underwear and dresses to draperies are made; cellophane, which in a few short years has become one of the most important packaging materials; and fine soap, including the ordinary bar soaps and also shaving creams, soap flakes and the like. These products illustrate how the chemical industries take ordinary substances like salt and wood pulp and transform them into a wide variety of useful and beautiful things. They also show how nickel helps in almost all steps of the processes employed.

In the production of caustic for rayon, cellophane and soap, purity is the consideration which is, perhaps, more important than any other; and the need for purity explains, to a large degree, why nickel is used so extensively in this process. Nickel does not contaminate the caustic soda, and hence permits the manufacture of rayon which will take clear, light colors and which will be free from stains, of cellophane which will be perfectly transparent and of soap without stains and impurities. In addition nickel provides strength and corrosion resistance which make for strong, efficient equipment.

### IN AT THE BEGINNING

Caustic soda is made from salt, and so we find Monel right at the beginning of the

story because Monel is standard material for salt refining equipment. In the manufacture of the caustic itself nickel and nickel clad steel are used for evaporators, heaters, pumps, valves, pipe lines, filters and settling tanks. Nickel cast irons are used for caustic pots, pipe lines and in pumps and other equipment.

The usefulness of nickel in the manufacture of rayon by no means stops with the production of caustic soda. Rayon is made from wood pulp or cotton linters, which are forms of cellulose, by treating them with carbon disulphide and caustic soda to make viscose. Viscose is aged in nickel-clad steel tanks and then pumped through nickel pipes to so-called spinnerettes. These spinnerettes are cup-like objects pierced with tiny holes through which viscose is forced to form the fibres from which rayon is spun. The spinnerettes, incidentally, are made from another product of the Sudbury mines, platinum, which is alloyed with gold.

### HARDENING BATH

Passing through the spinnerettes the viscose comes into a hardening bath which neutralizes the caustic and regenerates the cellulose in the form of rayon fibres. This hardening bath is contained in part of a complex machine which picks up the rayon fibres and converts them into thread, and many parts of this machine are made of Monel to resist the corrosive effects of the acids used.

The production of cellophane is similar to the production of rayon except that, in-

stead of being extruded through spinnerettes, cellophane is put through a hopper, the essential part of which consists of two parallel lips through which the viscose passes into the hardening bath. The lips are made of Hastelloy, an alloy containing a large percentage of nickel. They are spaced just far enough apart to make sheets of cellophane of the desired thickness. Nickel covered steel rolls and other nickel bearing materials are also used in the manufacture of cellophane.

### IN MAKING SOAP

The importance of nickel in the production of high grade soap may be seen in the following outline of the soap manufacturing process: In this process purified oils or fatty acids, which are processed frequently in nickel-clad steel equipment, are placed in huge soap kettles made of nickel-clad steel and equipped with Monel heating coils. Then caustic soda is introduced and reacts with the oils or fatty acid to form the soap. Next salt or salt brine is put in to "salt out" the soap—in other words to separate the mixture into soap and glycerine. The soap is then run off into crutchers and amalgamators, where ingredients for special soaps are added. These ingredients include coloring matter, perfumes and the like. The crutchers are made of nickel-clad steel, while amalgamators have shells of nickel-clad steel or Monel and are equipped with Monel shafts and agitators. Other items of soap manufacturing equipment which are made of Monel include conveyors, salt hoppers and chutes, brine pumps, brine lines, valves and fittings, slides, dies and parts of packaging machinery.

### POSSIBLE BY NICKEL

Thus we see another way in which nickel serves mankind. In the home nickel's service is direct—nickel alloys like Monel, nickel silver and stainless steel come into the house to lighten the tasks of the housewife and to lend a fine white color to the decorative scheme. In the field of communications, also, nickel's service is often direct, for nickel alloys are present in telephones, radios and other communications devices. The same is true of transportation, where nickel is used to give strength and to help reduce the weight of automobiles, railroad trains, ships and aeroplanes. But in the case of these chemical products, nickel's service is indirect. We do not actually use the nickel ourselves, but nickel has, nevertheless, made it possible for us to enjoy the silken beauty of rayon, the sanitary and ornamental qualities of cellophane and the luxury of high grade soaps.

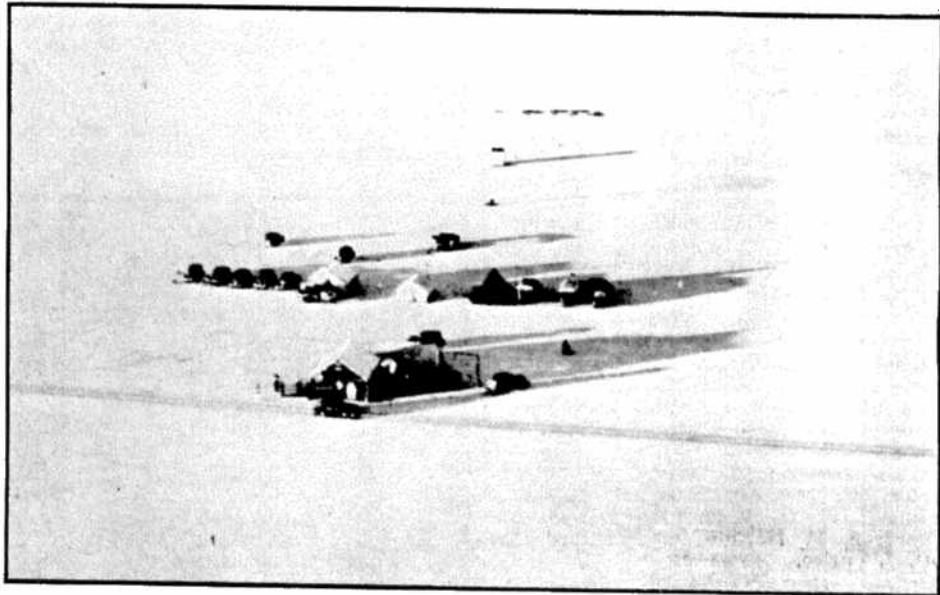
### NICKEL LITERATURE

In the library over Copper Cliff Town Hall "The Triangle" has arranged to place current issues of a wide variety of publications which describe nickel's interesting progress in world industry. These will be available to all INCO employees for study or reference during library hours, which are from 1.00 to 10.00 o'clock, p.m., every day except Sunday.

Not only current issues, but also neatly bound volumes of numbers reaching back to 1929, are included in the files of the INCO Magazine, chronicle of the march of the nickel alloys. Written in language that any layman can understand, the INCO Magazine today has a circulation of some 25,000 copies.

Many INCO employees are keeping their own files of "The Triangle," but for those who do not, the Copper Cliff Library will have a complete set.

Other nickel literature on hand will be "The Silvery Kitchen," of particular interest to housewives; "Nickel Cast Iron News," published in the interests of the producers and users of cast iron; "White Metal News Letter," devoted to news concerning white metals or alloys containing white metals; "Nickelsworth," which is distributed regularly to their customers by the suppliers and users of Monel Metal and Rolled Nickel; "Monel News," which pictures recent important installations of Monel Metal; "Nickel Steel Topics," published in the interests of producers and users of nickel steel.



## Nickel Takes Torture Tests

Almost all the 1937 automobiles are nickel-bearing vehicles. Not so well known to the general motoring public perhaps as such subjects as streamlines is the importance of the new alloys now being used in automotive construction, including an increasing number and variety of nickel steels. These are among the fundamental reasons for the increased ruggedness, stamina and longevity of modern cars. The salt deserts of Utah have become increasingly popular as a species of mechanical torture chamber, where the cars receive exhaustive tests, including continuous runs of 2,000 miles at top speed, or 24 hour speed trials. The photo shows the test camp and desert speedway at Bonneville Flats, Utah, where one well-known make which uses nickel extensively was proved in official tests before being shown to the public.

# Keen Competition As Shift Hockey Underway

## NINE TEAMS AT THE CLIFF

When the season's final carnival is staged at Stanley Stadium, and the moment comes for presentation of trophies, will it be Captain Howard Murray of the Orford Aces who steps forward to accept the Cochrane-Dunlop Shift League Trophy on behalf of his team?

Eight other squads now entered in this annual Copper Cliff puck-and-hickory scramble most emphatically state that it will not be Captain Murray, nor anyone even remotely resembling him. And so the shift Shift League plunges headlong into another hard-fought schedule, compared with which the Spanish struggle pales into shoddy insignificance.

**SURPRISE VICTORY**

Frank Wolfe's Orford Aces copped the Shift League laurels last year, although Bowman's concentrator team was in top spot at the end of the schedule. The Bowman outfit fell before the fourth-place Acheson line-up in the playdowns, and then Aces put the skids under Acheson's men.

Aces return to the tussle this season with practically the same line-up, and run up against eight strong clubs which will give them some fancy arguments in their bid to repeat their 1936 triumph.

The other Orford building team in the loop is a wicked combination from the Spalding and Trotter shifts, under the mentorship of Jack Wilson. A last-minute entry, and probably one of the darkest of dark horses, this team had not picked its final line-up when Triangle closed its forms for the press.

**3 CONVERTER TEAMS**

From the converter building comes Alf Wulff's shift squad, stronger and more determined than ever, and another strong converter team represents a combination of Dubery's shift and also Sid Smith's shift in the reverb department, with J. Morrison in the coach's seat. The third converter department aggregation is the well-paced Morrow shift line-up.

Only team recruited entirely from the reverb department is the Hughie Johnson shift, with M. Bennett as coach and H. Moore holding the managerial reins. Other reverb players, from the Somers shift, however, are included in the Jim Parlee concentrator crew, as well as on the Dubery team as mentioned above.

**BOWMAN IS BACK**

Ivan Bowman's brigade from the concentrator are once again in the thick of the scrap, and promise an entirely different verdict from that of the 1936 playdowns. Equally prepared for emergencies is the crushing plant crew of huskies, master-minded by the old Silver Fox himself, Jim Closs.

No Nickel Belt league talent is eligible for the Shift League, which means that this loop provides hockey for more than 100 who would otherwise be "born to blush unseen and waste their talents in the bleachers." The loop is operated by the Copper Cliff Athletic Association, and comes under the hawk-like eye of Thomas "Frank Calder" Birney.

**THE LINE-UPS:**

This was the way the line-ups looked at the start of the schedule on January 18:

**Orford Aces:** Goal, E. PaPierre; defence, G. Orasi, L. Scanlon, Wm. Thornton, H. Hickey; centre, H. Murray, A. Giacometti, D. Halanen; right wing, H. Mahoney, O. Dickey, J. Ranta; left wing, B. Stewart, R. Johnson, W. Vaillancourt, E. Patterson.

**Dubery (Smith):** Goal, R. Klem; defence, K. Madill, D. Cameron; left wing, S. Laverin; centre, L. Duggan; right wing, D. Corelli; subs, D. Salhani, W. Reid, E. Ranta, S. Godin, J. Murray, J. Morrison, A. Gervais.

**Morrow:** Goal, Rusty Abrams; defence, Jack Turnbull, Robert Klem, Phil Sheridan, Lloyd Edwards; forwards, Jack Gladstone, G. Corelli, George Roque, Eddie LeBlanc, Jack Carty, George Walker, Herb Sands.

**Wulff:** Goal, G. Fritz; defence, W. O'Donnell, H. Gilbert; centre, S. Ryan; right wing, R. Geger; left wing, W. Davis; subs, L. Sleaver, W. O'Brien, R. Gallacher, R. Cooper, J. Scanlon, I. Lemieux.

**Johnson:** Goal, R. Taylor; defence, R. Upton (captain), B. Brazier; centre, L. Bennett; right wing, J. LeBlanc; left wing, J. Smith; subs, R. Lund, S. King, W. Jackson, J. Seguin, T. Murphy.

**Parlee (Somers):** J. Mazzie, D. Cooper, Scanlon, G. Maybie, Lathonen, Ramsay, Greenleaf, G. Morrison, R. Trezise, E. Richardson, F. McKain, S. Pitchford, R. Scott, J. Parlee.

**Bowman:** Goal, J. French; defence, G. Hutchison, T. Scanlon, J. Heath; centres, F. Stevens, O. Godin; left wings, M. Edwards, S. Dice; right wings, W. Webster, A. Armitage. Other prospects, H. Montgomery, J. Pappin, O. Medlock.

**Closs:** Goal, Rutta; defence, MacKay, Fioliston; centre, Millar; right wing, Shaw; left wing, Burnside; subs, Sheridan, Elliott, Arthurs, McEnilt, Carson, Montgomery.

Even allowing for brothers, cousins, etc., it is obvious that this first draft of teams contains several repetitions of names, which would indicate that there is some high-pressure trading and bartering to be done before the line-ups are definitely struck.



## Defend Shift League Laurels

Out to bag another Shift League Championship are Frank Wolfe's Orford Aces, 1936 winners of the Cochrane-Dunlop Cup. This year they are faced with league opposition from eight fast clubs, and if they are successful in the Copper Cliff playdowns they will still have to handle a challenge from the Coniston Shift League champs before they really rule the roost. With a few exceptions the Aces have the same club this season as they had in 1936. Photograph is of the latter, as follows: Back row, left to right: D. Butchart, F. Wolfe, A. Simmons, G. Giacometti, B. Stewart, O. Dickie, W. Adair, E. PaPierre, H. Mahoney, H. Murray, P. Samson, W. Chapman, T. Crothers; front row, left to right, L. Scanlon, B. Piccini, G. Orasi, R. Johnson, B. Montgomery, C. Patterson.

## Regan Serene Above Creighton's Calamities

There should have been tears in Bill Regan's eyes—tears as big as hen's eggs and twice as fresh—because we were talking about the Creighton hockey team's injuries.

Ah, there is a tale to start any stout-hearted coach cutting out paper dolls. First Holt, the big and burly defence man, broke his wrist. Then Art Silver, ace goal-getter, broke his arm; then Mickey McGlashen dislocated his shoulder; then Stu Smith picked up a concussion of the brain and an eye injury; then Dotten smashed his hand; then Mickey McGlashen jumped back onto the mourner's bench with three broken ribs.

**IT STARTED EARLY**

That's the way it's been with Creighton right since the start of the season, when, as the first instalment of grief, they discovered that three of their players, Thompson, Saxberg and Higginbottom, had decided to hook up with other clubs.

Figuring it out on the basis of developments to date, it looks as if Creighton has a fair chance of getting a full club onto the ice in time for the Dominion Day celebrations. Which, of course, runs them right smack into the firecracker and sunstroke danger season.

But these world-champion connoisseurs of calamity are still very much in the Nickel Belt race, and doggedly refuse to be counted out on hospital decisions before the main bout takes place. And Citizen Regan's optics, even though all the laws of precipitation and human endurance cry nay, are still as dry as the proverbial bone. In fact every extra load of hard luck puts more sparks into them, instead of tears.

Of course Bill Regan has been through the hockey racket from corn flakes to caviar, and a hockey player sort of gets used to being bumped around, both mentally and physically.

Bill was born in Creighton in 1908, and attended public school there. Then, when he was 11, he was shipped away to St. Jerome's, at Kitchener, and from there naturally gravitated to St. Michael's College at Toronto.

**WITH ST. MIKE'S**

It was at St. Mike's, famed spawning place of hockey stars, that Bill first really got into the game. He played three years of Junior O.H.A. there, and in 1926 was on the ice for his school in the playdown against Newmarket, when 8,500 people jammed the Mutual St. arena to shatter all existing Junior O.H.A. attendance records. St. Mike's won the Prep School championship twice in a row while he was there, and he doubts if they've lost it since.

The season of 1928-29 Bill was with Kirkland Lake in the Gold Belt loop, along with Bob Gracie and other future satellites of the hockey-armsament. Baldy Northcott was playing for Haileybury that year.

Eddie Powers, Boston Bruin scout, spotted Citizen Regan as a very likely gent for big-time defence purposes, and promptly got his John Henry on a two-year contract in the Canadian-American League. Bill stayed with Boston half a year. The following February he was sold to Lester Patrick of the New York Rangers, and a boyish dream had come true.

**BIG BROTHER CHING**

It was some thrill for the Creighton kid to line up on defence beside Ching Johnston and bust 'em high, wide, and handsome for dear old Patrick. The Cook brothers, Keeling, Dillon, Siebert, Frank Boucher, Murdoch, and other great players were on the roster too, but it was Johnston whom Regan wanted to know.

Ching took Regan under his wing, taught him a bag of tricks. Local fans see Bill on defence with his stick stuck out in his right hand and his left arm out and forward on the other side. That's the typical Johnston stance as opposing forwards sweep in on the goal. About the only Johnston characteristic that Bill didn't pick up was Ching's gleaming bald pate.

The second year he was with the Rangers, Citizen Regan got his steering mechanism bawled up one eventful night, and ran bang into Citizen Dit Clapper's elbow. Citizen Clapper, be it known, has a very sharp and sound elbow, and when they hauled Creighton William to his feet, his nose was broken in eight places. He was out of the game six weeks.

In 1932 the Rangers and the Amerks joined forces to sponsor a team in the Bronx, hoping to open the way for a third New York franchise which would operate at the Coliseum. Regan was transferred to the defence of the new club, which played in the Can-Am loop, but although they reached the finals and made a first-class showing, the scheme fell through.

**ON AMERK LINEUP**

The following year Bill went to Springfield, the Ranger farm, and at Christmas jumped to New Haven. He finished up the season under a contract with Red Dutton's New York Americans, who were then sporting talent like Roy Worters, Norm Hines, Johnny Sheppard and Bill Bridges.

In the fall of 1933 he went to Syracuse for three months along with Schriener, now one of the leading marksmen in the game. After that there were brief sojourns with Buffalo and Cleveland, and Citizen Regan opined it was a bit tiring to have Rangers and Amerks swapping him all over the place, so he headed for home.

Back in Creighton he was immediately drafted into coaching service, although it was two years before he could get his amateur card back. This season sees him in the harness again, as playing coach. Sometimes opposition teams are hardly to be blamed if they think he's more like a playing express train than just a playing coach.

In the summer time he often plays golf against Charlie Langlois, of Frood. This keeps him hopped up from one hockey season to another.



BILL REGAN

## TIGHT RACE AT CONISTON

Despite "June in January" weather which has been hard on ice-makers, Coniston's smelter hockey league has seen some dizzy action this season.

At this writing Bill Johnston's Shops squad are out in front of the pack with four wins and no losses, and have their optics glued on titular honors. Stevenson's Shift, last year's champions, had an elegant chance to slide into first berth with a goodly margin on the night of January 18, when they tangled with the Day Shift. The latter, however, despite the fact that they had not scored a victory in two previous starts, turned on all their power and chalked up a 6-4 win over the 1935-36 top-dogs. This was a 4-point game, including a postponed fixture.

Stevenson's lineup accordingly remains in second place with 4 wins and 2 defeats for 8 points; McMullen's Shift is third with 3 wins and 3 defeats for 6 points; Day Shift is fourth with 4 points, and Geoffrey's Shift occupies the unenvied and inglorious cellar position.

Later in the season the Coniston League champs tackle the victorious team in the Copper Cliff Shift League, in a playdown for the Cochrane-Dunlop Trophy.

Here are the Coniston lineups:

**Stevenson's Shift:** A. Rivard, G. Bloeman, E. Dunn, B. LaFrance, F. Caverson, B. Plouffe, Leo Olivier, P. Rainville, D. Chezzie, E. Halvorson, G. Evershed, J. McMenamin, A. Legault, R. Potter. Manager, A. Blake; coach, J. Ismay.

**Geoffrey's Shift:** E. Stewart, K. Montgomery, C. Olivier, M. Olivier, B. Steele, Jno. Rapsky, Jos. Rapsky, E. Paradis, W. Buchowski, V. Martin, C. Nesbitt. Manager and coach, H. Conlon.

**Machine Shop:** J. Stacey, M. Wajciechow-ski, G. Cherbot, J. Bloeman, A. Stocker, J. Lowen, H. Benoit, O. Benoit, V. Baldesera, A. Gobbo, D. Cresswell, C. Bray, J. Baggio, K. Barrizzol, A. Eastwood. Manager and coach, Bill Johnston.

**McMullen Shift:** A. Bourjeous, A. Rainville, D. Dickson, E. Strong, A. Farnel, P. Leclair, T. Olivier, H. Cresswell, B. Benoit, E. Leclair, J. Williams, R. Pilon, E. Modesto, U. Leduc, O. Jervais. Manager and coach, Bill McLaughlin.

**Day Shift:** Snell Blake, N. Farnel, S. Rivard, F. Forestell, C. Bryce, B. Evershed, F. Caverson, H. Fitzgerald, F. Leclair, T. Storzuk, B. Baby, J. Gobbo, E. Olivier, S. Haslichuck. Manager and coach, W. B. Walker.

**ORCO PICKS PLANT TEAMS**

With F. Sheridan as convener, Ontario Refinery Athletic Association are getting the decks cleared for action in a Plant Hockey League which promises many a torrid argument before the season is concluded.

Tentative line-ups reported to Triangle by Jack Grimes before the league schedule was drafted, were as follows:

**Tank House, Silver Refinery and Acid Plant:** M. Chomysyn, coach and manager; F. Cecutti, G. Boivin, C. Billinsky, W. Solomon, B. Caswell, D. Betts, E. Brunette, J. Shiels, W. Olson, J. Duncan, F. Faught.

**Stores, Office, Laboratory and Research:** Ken Clarke, coach and manager; D. MacArthur, Pete Nazar, Phil Nazar, C. Keegan, J. Crawford, R. Lipscombe, L. Thompson, G. Wickenden, J. Aurie, L. Roy, I. Keegan, C. Wood, J. Gordon.

**Yard and Casting:** J. Bernard, coach and manager; L. Tulloch, assistant coach and manager; B. Benard, H. Greenwood, S. Ramsay, J. Latrelle, C. Matthews, H. Thornton, R. Hammond, E. Sutherland, R. Millar, J. Leigh, E. Bernard, C. Mills, R. Sinclair, A. Stewart, D. L. McKinnon.

**Shops and Power:** Punch McDougall, E. Baird, P. Coulombe, Moose Watts, L. Desilets, E. Belfrey, T. Quigg, L. Fournier, E. Phillips, E. Adcock, V. Tupling, coach; Ken Wilson, T. Smuck, R. Cooke, R. Blong, R. Price, G. Renaud, C. Bell, D. Paquette, Bill Wickenden, W. Gerrish, M. Shoveller, manager.

**Crane Wheels Are Not Good Hoops**

Two men had to take an 18-inch crane wheel from the plate shop to the hydraulic press in the machine shop at Ontario Refinery.

Instead of properly placing an iron bar through the wheel so that they could carry it safely between them, they rolled it along the floor.

When it struck the narrow-gauge track it slipped sideways, and fell on the left foot of one of the men, fracturing the large toe in two places.

There is nothing particularly pleasant about a fractured toe, and, what was more, the employee had to lay off work for 10 days.

Cut off in book.



# Five INCO Goalies Pick League's Most Dangerous Scoring Threats



HEALY

FORSYTHE

BURLINGHAM

TENO

BAILEY

"What three men give you the most grief out there on the ice?"

That's the question Triangle put to the five INCO goalies in the Nickel Belt Hockey League, and interesting were the answers.

The boys differed widely on some of their selections, but they were entirely in accord as far as Goalies' Public Enemy No. 1 is concerned. For this enviable distinction Jim Dewey, of Frood, drew four votes of a possible four. Perched atop the league scoring heap at the time of writing, with 10 goals and 9 assists for 19 points, Dewey's goal-getting record indicates why he is the pet headache of the loop's net-minders.

The next most popular Goalies' Menace is Stu Smith, Creighton winger, who, although rating only fifth place in the league scoring race at this writing, drew three out of a possible four votes as one of the peskiest people in the current N.B.H.L. edition.

## HEALY PICKS 'EM

First goalie approached for selections was Ant Healy, who guards the twine for Coniston but does his laboring at Frood. Triangle found him in the warehouse on 2400 level, and popped the question. Ant handed out a powder ration to a visiting blaster, then went into a mental huddle and finally emerged with his choices. "The three players I find hardest to stop," he said, "are Smith, left winger for Creighton; Jim Dewey, centre ice man for Frood, and Art Stuart, left winger for Falcons."

"Smith," Ant continued, "shoots without getting set, and I find it harder to follow the puck when it comes from his stick. Dewey comes in with his head up, and after a fake and three or four shifts, he slides the puck into the net unless I happen to beat him. Dewey is to me the hardest man in the league to stop. Art Stuart comes in fast, makes a shift, and places his shot better than most players. He often flips the puck rather than shooting it, and picks some opening usually high and out of reach."

## BAD-MAN MARSHALL

Triangle located Clark Burlingham, spunky and loquacious little Refinery goal-keeper, in the carpenter shop over in Cooney Wood's bailiwick. Clark was nursing a sore jaw, having only recently parted with several of his best front teeth when a chance shot from Charlie Marshall's stick caught him on the mouth during a practice session. "I guess the most dangerous man out there as far as I'm concerned," he said with a big grin, "is Charlie Marshall."

Then he settled down to his selections. "Jim Dewey, for one," he picked. "He always keeps his head up and never hurries his shot. For number two, I'd name Price, of Coniston, who has a hard fast shot which is seldom off the net. For number three, my choice is Stu Smith, of Creighton. He has the knack of firing a quick wrist shot which carries plenty of speed and accuracy."

## FORSYTHE'S CHOICE

Mac Forsythe, who came gamely back into the picture at the start of the season after having been sent to the showers with an injured eye which stayed blind too long for comfort, but eventually healed, hearkened to Triangle's question on his way back to work in the Copper Cliff purchasing department.

"Three of the biggest threats to me in this season's league," quoth "Maxie," "are Hill and Dewey, of Frood, and Smith, of Creighton. Hill with his speed and his ability to shift across the net when he gets inside; Dewey with his slow-moving tricks and his experience to outguess one; and Smith, with his speed, hard work, and good shot; all give a goalie real worries unless they are marked very closely."

In the warehouse on Frood 2800 South, Charlie Teno issued a couple of bolts to a slusherman, figuratively hammered his pads with his stick, and spoke thusly: "One of my big headaches is Fletcher, of Refinery. In my opinion he's one of the wildest of league centre-men. He's a smooth skater, feeds his wings with well-timed passes, and bears plenty of watching when there is a loose puck around the net."

## LIKES CLIFF JUNIOR

"Another bad moment for me," continued Charlie, "is Pat McReavy, the Copper Cliff junior. He is a great play-maker, has a deceptive shift, is very dangerous when inside, and has a nice wrist shot. The third selection I'd make is Taylor, of Falcons, who is a dangerous rusher, breaks very fast,

and packs a terrific drive. He has an uncanny ability for picking corners."

"Ace" Bailey, who has been carrying the torch for the injury-ridden Creighton crew during the first half of the schedule, works on 20 level. He names his three main menaces all from one club, the Frood, doubtless recalling the evening of November 30, 1936, when the Frood pumped 14 goals into the basket behind him. Dewey, Hill and Conick are Bailey's selections.

## GIVE HIM DUCK-BUMPS

"Dewey," says the "Ace" with a rueful smile, "is always aggressive, is a keen puck hawk, and is never out of the play. He's so cool and deliberate when he gets in close that he gives me gooseflesh. Hill has a good hard shot, and I never know whether he's going to shoot or draw me out, making him sort of a double-threat. Conick is another player who raises duck bumps on me when he crowds in close. He is never hurried, and can be expected to place his shot carefully every time."

So the next time you see Dewey or Smith or one of these other selections shoulder his way through the defence and go weaving in on the unfortunate gent between the gas pipes, you'll know what said gent is thinking, and why.

## DYNAMITE!



JIM DEWEY



"STU" SMITH

## ELI KIVIAHO

(Continued from Page 1)

run without getting tired. He ran from Creighton to Mond Mine to Copper Cliff and back to Creighton, a distance of 47 miles. This he accomplished in five hours and 45 minutes. At the end of this marathon Eli says his "feet were a little sore because it was a hot day."

Twelve years ago Eli entered the 10-mile marathon at Capreol, on the 24th of May, and finished second to Maki. He left Creighton at 8.00 o'clock in the morning and made the trip to Capreol on his bicycle, arriving just in time for the race. In fact the entrants were already lined up at the starting point. Eli's time for the race was 55 minutes and 30 seconds, and the winner's time was 55 minutes even.

## IN GREAT SHAPE

After 26 years working at Creighton, Eli says he feels as good as the day he got his first job at the age of 15. He thinks he could show any of these so-called "marathoners" a clean pair of heels in distances over 20 miles. Anything less than 20 miles, he says, doesn't give him time to get warmed up properly.

Previous to the present winter, Eli has done considerable trapping in the district, having snared an average of 35 foxes a year. The foxes have been either red or cross-fox, and in his 15 years of trapping he has caught only two silver foxes. In the spring he averages 150 muskrats.

Eli's most thrilling experience occurred about eight years ago while skiing near the Vermillion River. One of his ski poles went through the snow surface into a hole and he couldn't pull it out. Eli dug away the snow and found that he had broken into a bear's den, for there was a bear's head directly before him and a bear's paw was holding the ski pole. The pole had apparently disturbed bruin's winter sleep and he had just laid his paw on it.

## MADE IT THREE

Eli immediately shot the bear and then went to McFadden's camp, nearby, to get help in removing the 300-pound brute. Eli and McFadden returned with a length of cable, and as Eli was tying the cable around the bear's head, he heard a noise further back in the den. Eli warned McFadden, "there's another one in there," and McFadden opined it was time to strike out for other parts, but Eli grabbed his rifle, spotted the second bear's head, and shot him. The two men then prepared to get the two bears out when another movement in the den indicated the presence of a third bruin. McFadden promptly left. Eli stuck to his gun, so to speak, and put a bullet through the head of the third bear, which, he says, was a little smaller than the other two.

Some of Eli's accomplishments may place considerable of a strain on the credulity of Triangle readers, but Eli has a stout champion in Safety Engineer S. R. Fredeen, of Creighton, who states to whom it may concern that these tales of the prowess of Creighton's No. 1 hunter are not one whit exaggerated. And that's that.

## Obedied Rules, Avoided Trouble

On day shift at Frood December 20, the stope boss in 47 stope, 2400 level, blasted a missed hole along with several blockholes. The shots went off approximately five minutes after lighting. Several minutes after they were all supposed to have gone off, there was another explosion, possibly the missed hole.

It was due only to the fact that the stope boss and his men rigidly followed standard practice and remained away the required length of time that a serious accident was prevented. Both the Mining Act and standard practice require that no person return to the scene of a blast within a space of minutes equal to twice the length of the longest fuse used in the operation at hand.

## ONCE MUSHED NORTH TRAILS

If you want to see E. B. Geoffrey while he's on shift at Coniston, you go up on the charge floor above the blast furnaces. And if the wind happens to be in a certain direction, it's no place for a tender-foot, or rather a tender-lung. But the swirling gases don't bother E. B. Geoffrey at all. He's been up there on the charge floor for many years, and his lungs are in condition for them. When he retires from service, he'll make a swell Swiss yodeller.



E. B. Geoffrey

He was born at Joliette, P.Q., in 1875, son of a C.P.R. construction worker. When he was four years old the family moved to Pembroke, and when he was 13, he got a job driving the delivery wagon for the Express Co., with a horse named Fred. Later he became a freight checker for the C.P.R., and that was his job when he went to North Bay in 1903.

## WENT DOG-DRIVING

The wilds of the northern woods called him, and he started driving dogs from McDougald Chutes, now Madison, on the T. & N. O., which was just being built. With his dog team he'd mush through the bush to Low Bush River and Squaw Point, on Abitibi Lake, with mail and supplies. After a rest, he'd start away again for the trip west to Metagamit River, with mail and supplies for the engineers in charge of building the Transcontinental Railway.

He had six dogs, and they'd make about 40 miles in two days or two and a half days. The bush was heavy and the trail was usually very clean, so he never had any trouble in bad weather. There were no wolves in the area because the reindeer were so scarce. In the summer he made his trips by canoe. It was a great life, and he was sorry when the construction work neared completion and his job petered out.

In 1909 he headed for Victoria Mine, arriving there on April 15 and landing a job as scaleman. Later he became a furnace foreman, and that's been his post ever since.

## WED 43 YEARS

He was married in 1894 in Pembroke, to Mary Fitzgerald. Four children were born to them, two sons and two daughters. One son, Gerald L., is a general foreman at Coniston; the other son, B. V., was master mechanic for Canadian Industries Limited, in charge of building the Copper Cliff acid plant. Recently he was transferred to Hamilton. The daughters are Mrs. S. D. Smith, of Coniston, and Mrs. J. Fleming, of Falconbridge.

Twenty-seven years of service, E. B. is beginning to realize, is quite a stretch of time, but he's surprised it's gone so fast. And he never gets tired comparing the scale of present-day production with that of the open-hearth days at Victoria Mine.

## GRINDING RECORD

Nickel cast iron is responsible for the efficiency of a Super-Grinder made by the Hanchett Manufacturing Co., Big Rapids, Mich. The grinder recently established a record by "facing" 2,200 valve forgings in one hour.



## Sportimer

"Two-faced" may not be an admirable trait among humans, but "four-faced" is very much okay for clocks. At least that's what Stanley Stadium hockey patrons think about the elaborate new Sportimer which Imperial Tobacco Sales Co. placed last month in the Copper Cliff ice-drome. First of its type to be installed in Canada, the Sportimer weighs 869 lbs. and is seven feet square. Each of the four clock faces is four feet in diameter, and beneath each face is a panel of lights to indicate scores during a game. Electrically driven, the instrument is operated from control boxes in the timekeepers' pew on the east side of the Stadium. There are 31 wires in the main connecting cable.



# Petsamo — Outpost of Copper Cliff

Get out your map and take an armchair trip with A. B. Yates to this new INCO nickel concession in Northern Finland, within the Arctic Circle

During 1934 The Mond Nickel Company, subsidiary of INCO, acquired from "Suomi" a concession to prospect and explore for nickel ores in the Petsamo District, situated in the northern part of Finland. This part of the country is a portion of a greater area known as Lapland which extends from Norway across Finland and easterly into the Kola Peninsula of Northern Russia.

## HAS HECTIC HISTORY

Politically Finland has had a stormy history. The origin of the people is still somewhat uncertain, but they came into history as a group early in the 8th century. They were hardy colonists who persisted in raids on Scandinavia until King Eric, annoyed by these frequent disturbances, conquered the country in 1157. From then until 1809 there was an almost continuous struggle between Sweden and Russia for control of these people and Finland was the "buffer state" and battleground. In 1809 upon the cession to Russia of Finland and the Aland Islands the Swedish-Russian conflict ended and until 1917 Finland was a grand duchy under the sovereignty of Russia. For two years, during the Russian Revolution and the World War, Finland was in a state of flux and was ruled by various provisional governments.

## ESTABLISHED REPUBLIC

Finally on June 17, 1919, the Finnish Diet established a republic and various parties, including the Communistic, were in control from time to time. On October 14, 1920, a treaty was signed with the Soviet and that part of Lapland known as Pechenga, which included the Petsamo district, was ceded to Finland. Several disputes arose in regard to this treaty, especially in regard to the Aland Islands, but the League of Nations finally settled the dispute and Finland retained the Islands and the Petsamo District. Until 1923 political strife continued which threatened the economic development of the country, and it was not until this time that a more or less stable government was formed. Since then the country has progressed rapidly and economic development has been aided by the government and its various agencies, particularly the Departments of Trade and Commerce and the Geological Commission.

The Petsamo District, lying between latitudes 68° 5' and 69° 57' north and longitudes 26° 25' and 32° 20' east, is still more or less of a political unit with representation in the Finnish parliament and with certain custom and trade concessions not granted to other provinces or districts. They have their own Lapland Council and their own police authority.

## GEOLOGISTS ACTIVE

Since 1924 the Finnish Geological Commission, under the able directorship of the late Dr. Sederholm, one of the world's great geologists and naturalists, had been working in the district and had made several discoveries of interest. They realized after several years' work, that considerable sums of money would be necessary to explore and develop the various prospects and they were not prepared to make such expenditures, believing that someone better acquainted with the exploitation of nickel ores could

probably develop the district with greater benefit to all concerned. Since 1934 the work has been carried on by Mond with every assistance from the Finnish Government and the Geological Commission.

The Concession area, which lies about 600 miles north of Helsinki, the Capital of Finland, extends in a general east-west direction almost entirely across the narrow north end of the country. The western end is near the Patsjoki, the river that forms the boundary between Norway and Finland, and the eastern end is only a short distance from the Russian boundary. The 69° 30' parallel of latitude passes just north of the Concession area.

## IMPRESSIVE RANGE

The area follows the crest line of a prominent range of hills known as the Petsamontunturit (Petsamo Mountains), which extend entirely across this part of Finland, broken only by rather steep sided valleys, the heads of fjords that extend northward to the Arctic Ocean. The peaks of the range rise to over 1,600 feet above sea level and as the timber line is only about 1,000 feet above sea level and as the surrounding country is relatively low, they form an impressive range, especially when capped by snow as they are for the greater part of the year. An even higher and more impressive range lies just south of and parallel to the Concession range. Kuorpukas, the highest peak in the district, rises to over 2,000 feet above sea level and with its snow cap dominates the ranges, and Saraslaki, its smaller sister, nearby to the west, rises to over 1,700 feet. This last peak overlooks the camp at Kaulatunturi and the western end of the area. These mountains obscure the view toward the south, and the coastal ranges some 15 to 20 miles to the north, more or less shut out the view in that direction, but astounding glimpses of the Varanger Fjord, the Arctic Ocean and the far coasts of the Varanger and the Fischer Peninsulas can be seen looking down the long straight fjords that have been carved through the coastal ranges. Several attempts were made to photograph these spectacular sights but they were not successful. The distances were too great and constant haze dimmed the detail.

## EASILY ACCESSIBLE

On first thought of a journey to such latitudes one would imagine a rather tough trip, possibly by dog or reindeer team, snowmobile or some such conveyance; but as a matter of fact, the district is easily reached by various routes along which one can travel in perfect comfort. The most direct from Helsinki is by railroad northerly through Tampere, the principal manufacturing town, to Vasa on the east coast of the Gulf of Bothnia and along the coast northerly to Kemi, a lumber and manufacturing town at the head of the Gulf. Thence northeasterly to Rovaniemi, the end of the steel lying just south of the Arctic Circle, that imaginary line which marks the 66° 30' parallel of latitude. This part of the journey is by comfortable sleeping cars hauled by hard-working wood-burning locomotives.

At Rovaniemi a transfer is made either to taxi or to a modern General Motors passenger bus for the last 270 miles of the journey, over a picturesque, well-built gravelled highway that is fast becoming a tourist favorite.

Just north of town the road crosses the Kemijoki and goes through farming country and on into and up the beautifully wooded valley of the Rauaan, gradually climbing this tributary of the Kemijoki to a low divide and then down again into the valley of the Kitinen. It follows up this river and its tributaries gradually rising up onto the Laanila tunturi, the height of land in this part of the world, where the first glimpse is had of the high moss-covered and otherwise barren tunturi or mountain country. The pass here is something over 1,750 feet above sea level.

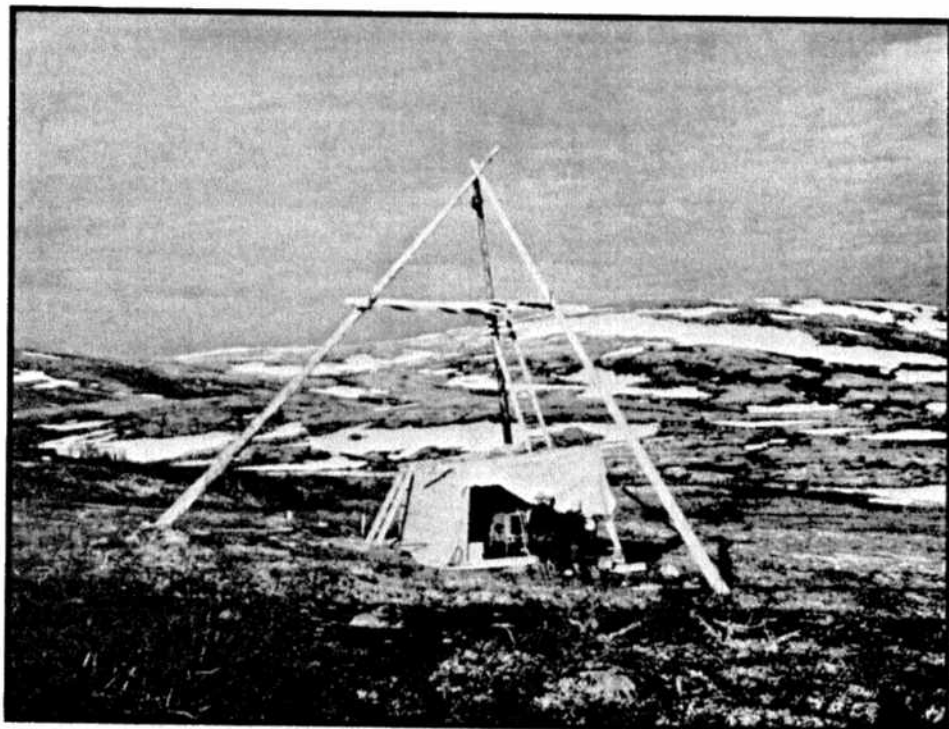
## HEAVY COFFEE DIET

From here the road winds down into the valley of the Ivalojoiki and along this river to the village of Ivalo with its comfortable Tourist Inns, where everyone piles out for the usual coffee, smoked salmon and pastries. If you are on the slow bus you stay here for the night, but the express allows only time for coffee and takes you on. The road continues along the southern and eastern shores of Inari, one of the largest lakes in Finland, through Virtaniemi, famed for its trout, fishing and coffee, then down the Patsjoki through Pitkijärvi where more coffee is served if you can take it, and on to Salmijärvi, where one gets the first real look at the Petsamon tunturit.

Salmijärvi is a village of some 80 to 100 Lapps and Finns, with a comfortable Inn, a store, a filling station, doctor, a ferry dock, from which tourist cars are ferried back and forth across the Patsjoki to Svanvik, in Norway, and the headquarters house of Petsamon Nikkeli O/Y, the subsidiary company formed by Mond to explore the district.

## PRELIMINARY WORK

Inasmuch as the first work on the Petsamo Concession was purely exploratory, members of the INCO Geological and Engineering staffs were called upon to do the preliminary work. During the first year K. V. Lindell was on the Concession and for the past two years Geoffrey Gilbert, W. A. Scott and the drill foremen, Hugh Simmons and George Oldscamp, have handled the



## Probing Petsamo Mountains

A picture to save as a souvenir is this shot of the first drill set-up erected by the INCO subsidiary's exploration party at Kaulatunturi in 1935. One of the Austin-powered portable diamond drills made by Smith and Travers of Sudbury, is about to start the intensive diamond-drilling campaign. Since that time some 28,000 feet of drilling has been completed, and results have justified INCO's proceeding with developments for the recovery of nickel from the ores of the Petsamon Tunturit, some of the higher peaks of which are seen in the background.

work. During the past two years temporary camps and a permanent road, over 25 kilometers in length, were constructed, a reconnaissance geological survey was made over the entire Concession area, detailed maps were prepared over selected areas and the more favorable sections were further explored by the dip-needle and various electrical prospecting methods. A complete triangulation system was set up and the Concession area was surveyed. Diamond drilling has been the main part of the job and two drills have been kept in continuous operation, 24 hours a day, during the working seasons, with over 28,000 feet of drilling completed. The outfits have been manned entirely by Finnish workmen under the guidance of the Canadian foremen.

## 1935 OPERATIONS

During the 1935 season, which lasted from the 20th of June, when it was first possible to cross the flooded rivers and move material up the mountain, until early November, 300 to 350 men were at work on numerous jobs. The greater number were on road construction at various points along the Concession. A smaller group were on the

drilling, trenching and sampling crews, and another small group were geologists, dip-needle and Doodle-bug operators, and engineers. We were fortunate in securing as part of the organization some of the members of the Finnish Geological Commission. Walter Nordin, who had worked in this district with the Commission for several years, is now on the permanent staff, and has been an invaluable aid in getting the work under way. Several of the younger men who had worked as students during the summer, were also very helpful.

During the winter and early spring a lot of the heavy machinery and supplies, particularly petrol, were hauled from Salmijärvi across the ice on Kuotsjärvi and up the mountain by reindeer. Included were the two portable Austin drills, built by Smith & Travers Company, of Sudbury. During the "break-up" in early June, it was impossible to move anything, and even later on most of the material came into camp on the backs of Lapp porters. By the middle of the season a temporary trail had been constructed so that light two-wheeled carts and even small wagons were used, hauled by the small brown native horses.

## CAMP BUILDINGS

In the early spring several comfortable camp buildings were constructed at Kaulatunturi and at Onkitunturi toward the eastern end of the Concession, the former being built on the site of the Geological Commission Camps. In fact some of their buildings were utilized. Other camps were located at Kammikivintunturi, about two miles east of Kaula and at Pilgujaur, some 10 miles east, so that when the parties arrived it was simply a matter of moving in and going to work.

The main camps at Kaulatunturi consisted of the Geologists' office and bunks, the time office, the stores office and core shack, the warehouse, the setters' shacks and bunks, a barracks building for the drill runners and helpers, an engineer's and surveyor's quarters, a sleeping quarter for the Lapps, several tents, and last but not least, an imposing kitchen and restaurant building, the centre of attraction, where all matters were given due consideration, over the usual black coffee. The kitchen was in the centre with a staff dining room on one side and a larger mess room on the other.

## VERSATILE CHEF

The chef was an artist who did his best at fancy fish dishes, gelatins, fruit soups and pastries, until he was told that the staff probably liked macaroni and cheese, boiled potatoes, rice pudding and oatmeal porridge, as well as anybody. The usual breakfast was porridge, oatmeal or white wheat meal, bacon, toast and coffee, occasionally eggs, and sometimes fish, if anyone had had any luck the night before or a Lapp had come into camp with his catch. Lunch was soup, cold salmon, cold meats—sausages, etc.—hardtack of various kinds, boiled potatoes and cheese. Dinner was beef—sometimes—more often fish, boiled potatoes, macaroni and the fruit soup, a peculiar gelatin pudding concoction with the odd prune or apricot plainly visible through the transparent matrix. Later on, the soup was made thick, and it became a sporting proposition whether you drew a prune or an apricot or just soup. Klim was used entirely in place of fresh milk, and cocoa made with Klim was the

(Continued on Page 7)



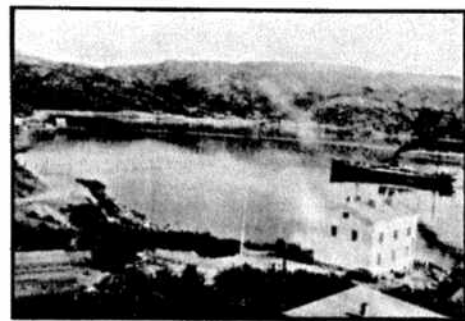
## At Kaulatunturi

The geologists' hut, one of the group of buildings in the camp of Petsamon Nikkeli O/Y, subsidiary of INCO, at Kaulatunturi. Saraslaki, 1,700-foot peak of the Petsamo mountains, looms in the background.



## Use Reindeer

In the early spring reindeer must be used for transporting supplies to the Kaulatunturi camp. Here is a scene at the camp just after the arrival of a shipment of supplies.

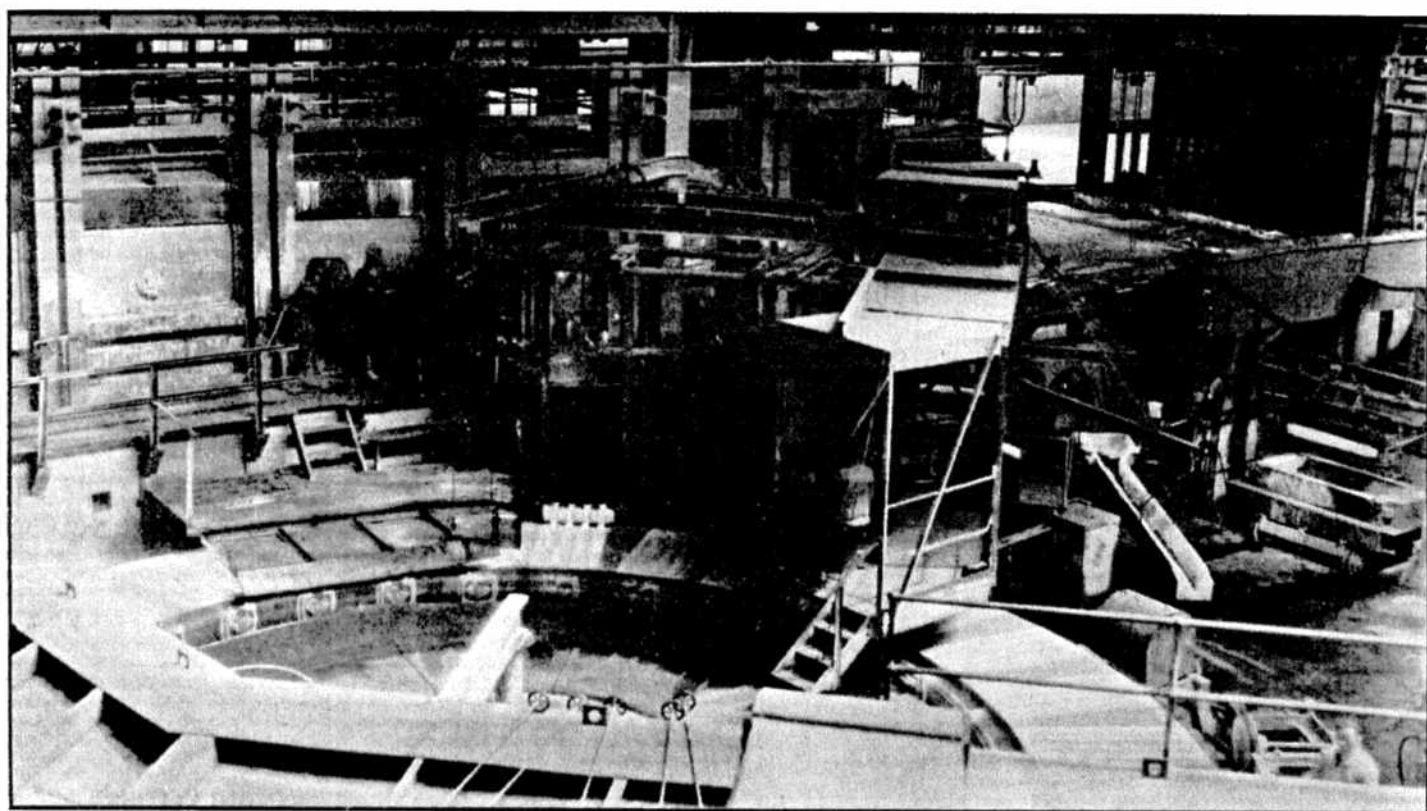


## Linahamari

The road leaves the picturesque Patsjoki River at Salmijärvi, where the INCO subsidiary's exploration camp is located, and continues easterly around the north rim of the Petsamon tunturit (or mountain range) to Luostari, one of the remaining Russian monasteries, thence northerly along the Petsamo Fjord to Linahamari, near the point where the Fjord widens into the Arctic Ocean. PHOTO shows Linahamari, which will be the main shipping point if the Petsamon Nikkeli O/Y commences production. This is a quiet little village, where is located a comfortable Inn of modern design, furnished in semi-modernistic style and yet with a tone of the Lappish and Russian influence. Here also are the large state docks, a fish factory which is quite unmistakable with the wind in the right direction, and a modern customs house and state office building that houses the immigration, customs, and port authority people. Here one is just as apt to run into a crowd of Chicago school teachers, touring Northern Europe, as a group of Lapps in their bright native costumes. Also, one is apt to meet a Butte, Michigan, Kirkland Lake, Porcupine, or Sudbury miner who has returned to his native land and turned to fishing off the north coasts.



# Strict Standards of Quality in Refinery Shapes Casting Department



## Clarke Casting Wheel in Operation

Selected as symbolic of the refining end of INCO's organization was a Clarke casting wheel, sketched on the right in Triangle's mast head. Here is a Clarke casting wheel in real life, performing its function at Ontario Refining Co. The sturdily built wheel, 40 feet in diameter, revolves with its copper moulds, and the latter are filled as they pass beneath a pouring ladle. By the time the moulds reach a tipping device the copper has set, and the castings drop into a water-filled cooling bosh.

The cathodes from the Tank House, containing as they do 99.985 per cent. copper, are the purest form of commercial copper available, and of the total amount of copper produced by the Ontario Refining Company in 1936 approximately 16 per cent. was shipped in this form to smelters possessing furnaces large enough to handle this material. The melting and casting of the remainder into shapes suitable for the various fabricating processes of industry is the function of the Shapes Casting Department. It would seem to a casual observer that the treatment of copper of this purity would be a simple matter; however, molten copper has a great affinity for various gases, and, during melting, these impurities are picked up to such an extent that it is necessary to repeat the cycle of refining operations, as performed in the anode furnaces, in order to get the copper into suitable casting condition and maintain high purity for the market.

### WIRE BAR FURNACES

The cathodes are charged, as shown in the illustration, to the wire bar furnaces in the same manner that the blister was charged to the anode furnaces. The furnaces are similar in every respect, being constructed of structural steel and refractory brick. About 310 tons constitutes a normal charge, the cathodes being charged at the rate of about 4,500 pounds per "lift" over a period of two hours.

After the furnace is charged, the process involves two definite stages. The first consists of melting the pure copper cathodes and exposing the molten bath to a period of oxidation. This is accomplished by introducing iron pipes carrying 20-pound air under the surface of the bath. In this operation the impurities which have been picked up in the melting period are oxidized, together with some of the copper, forming a slag which is skimmed off.

### MUST BE ACCURATE

The second stage involves reducing back to metallic copper most of the cuprous oxide which was formed abundantly in the first step. This is accomplished by first covering the bath with a protective layer of low sulphur coke and then thrusting large green hardwood poles into the molten copper. Throughout all these operations frequent sample buttons are taken by the furnacemen and their appearance both at surface and fracture convey to his trained eye an accurate picture of the refining progress. While it is desirable to reduce the oxygen content, by means of poling, to a low value, great care must be exercised to prevent this reaction going too far. If this is permitted, a peculiar condition results in which the copper is said to be "overpoled" and in which state it is impossible to make sound castings. Consequently, the furnaceman is restricted to a narrow range of operation and must be particularly skilled in this phase of the work. When the correct point has been reached, the copper is said to be at "tough pitch" and casting commences.

The copper may now find its way into iron bars, cakes, ingots, billets, or whatever size or shape is required at the time. The metal is tapped from the furnace to a small pouring ladle having a capacity of about 2,000 pounds. Here the copper is again protected from atmospheric contamination by a charcoal covering.

### LIMITS ARE STRICT

Adherence to strict temperature limits is a very necessary requisite during casting

operations because slight deviations result in defects which cause rejection. Skilled "pyrometer men" read the temperature of the copper periodically by means of high temperature indicating instruments and the heat content of the outflowing metal is controlled in accordance with their findings.

O.R.C. standards are among the highest in the copper industry and only perfect castings are accepted by the inspectors.

The type of wheel on which wire bars and cakes are cast is known as a Clarke casting wheel, and those in use at the Refinery are 40 feet in diameter and very sturdily built for smooth operation. The wheels have copper moulds attached to the periphery and these are subjected to an application of bone ash emulsion on each revolution before receiving their portion of molten copper. As the wheel revolves the copper sets and by the time the moulds reach the tipping device the cast copper has lost a considerable amount of its heat. The moulds are tipped and the castings drop into a water-filled cooling bosh. From the bosh they are elevated by means of an endless conveyor, after which they drop to one of the inspection conveyors. It is at this point that the high standard of O.R.C. copper is maintained, and castings falling below standard are rejected for refurnacing.

### STRETCHES OUT

About 60 per cent. of all the copper shipped from the Refinery is in the form of wire bars, for which shape there is the greatest demand. These are used in the manufacture of electrical wire and rod, and are cast with pointed ends to facilitate their rolling. Wire bars vary in weight from 135 pounds to 300 pounds, the most commonly used weighing 275 pounds. An indication of the amount of work done by the mills in producing wire from these forms can be pictured when the fact is considered that one 275-pound wire bar, about 54 inches long, and having a cross section approximately four inches square, when rolled and drawn, will make copper wire, suitable for house wiring, 13,915 feet, or over two and one-half miles long.

A very definite and accurate indication of wire bar purity is derived from the "conductivity tests." Three times during a cast, cross-sectional samples of wire bars are hammered and drawn to wire having a final diameter of .081 inches. The resistance of a portion of the wire is then measured by means of an electrical balance. The result reported as percentage of a universally accepted standard is a direct indication of the quality of the product. The speed with which the wires are prepared and the accuracy of the very delicate conductivity tests are features of plant control.

The other products of straight castings are ingots, ingot bars and vertically cast cakes. The former are used primarily by remelters who recast either special shapes or alloys, such as bronze, a mixture of copper and tin, or brass, a copper-zinc alloy. These ingots are of a shape easy to handle and adaptable to small furnaces. They are roughly 10 inches long and three inches square in cross-section with a two-inch notch near one end. They weigh approximately 22 pounds. An ingot bar may be considered as two ingots in one bar, and due to their two deep notches they can be easily broken apart. They are about 21 inches long and weigh 65 pounds.

Vertically cast cakes find their main application in the rolling of sheets. They vary greatly in size, the smallest type

weighing 185 pounds and the largest 1,000 pounds.

### SPECIAL ORDERS

Frequent orders are received by the Refinery for new "shapes" to fill special demands. These are developed and added to the present extensive list. All special shapes other than wire bars and ingots command a premium price. Some of these special shapes and all alloys are produced according to a special procedure known as "side-casting." This is a particularly useful device when the tonnage involved is relatively small. Holding furnaces with a capacity in the neighborhood of five tons are filled with copper, from the wire bar furnaces, and if for alloy purposes the copper is "conditioned" by adding the required alloying elements, brought up to heat and "poled" to the proper pitch for casting. The furnaces are then conveyed by a crane to a position over the various water-cooled moulds into which the copper is poured. This type of casting is very difficult and requires considerable skill and experience to obtain a good percentage of marketable production. Of these "special shapes" billets are probably the most important, and they are later "extruded," or "pierced," forming copper pipes, seamless tubes, rods, and other cylindrical shapes.

An innovation in the art of copper melting is being developed at the Ontario Refining Company with the installation of a three-phase direct arc electric furnace. This is the largest non-ferrous electric melting furnace ever installed, having a holding capacity of 30 tons, and casting capabilities of 10 tons per hour. Its application is being watched with great interest by all other copper refiners and it is undoubtedly the most forward step in the art in years.

### CREIGHTON WEDDING

Ernest H. Mosher, well-known Creighton hockey player, was wed at Creighton Mine on December 15 to Donzella C. Nettery, the ceremony taking place in the United Church.

## Petsamo

(Continued from Page 6)

frequent midnight meal, with cheese, hard-tack and a little smoked salmon.

### TIRELESS SUN

By the time the gangs arrived toward the middle of June, the sun was up to stay, and although it never got very high, it never went down, but chased itself above the horizon more or less at the same altitude. The first few nights were a little weird and everyone stayed up just to see what it was all about. The wild life had brains enough to get some sleep and a stillness settled over the country that was unmistakably night, but it was nearly as bright as any time during the day. The atmosphere seemed to clear just before the usual evening fog (Moriani) began to come in from the low lands and the Arctic Ocean, and at this time things stood out in peculiarly keen contrast. The best photographs were taken at this time, particularly the distant views.

Later in the season you became accustomed to the light, and although nearly everyone was on three shifts a day, the desirable shift was still the day shift and there was no trouble about sleeping on the off shift, no matter what it was, except when the drill happened to be set up with one tripod leg over the roof. By early August the sun began to get below the higher points in the west and north, and some of the most beautiful and spectacular sunsets with unbelievable colors were seen just before the fogs came in. Towards fall, cold rains were frequent and high winds from the north made it safer to tie things down. After the equinox the weather settled down again for a few weeks, before the first snows in October.

### KEEN STUDENTS

Language differences were no great difficulty, although it was thought they would be, and consequently interpreters were hired who later became drill runners, helpers, engineers and samplers, when it was found that most of the students who were hired were keen to learn English and had taken English in high and technical schools as well as in foreign universities. It was surprising how soon these men could converse in English and it was arranged that one of them was included in some capacity on each crew and on each shift. Most of the Lapps, besides their own peculiar languages, spoke either Finnish, Russian or Norwegian, and a few knew some German. Most of the Finns spoke Swedish and Norwegian, many or them Danish and German as well and they are learning English rapidly. English is now one of the required languages in the technical schools and universities.

There is, of course, more to tell and, no doubt, more will be told about this interesting country in future issues of The Triangle.

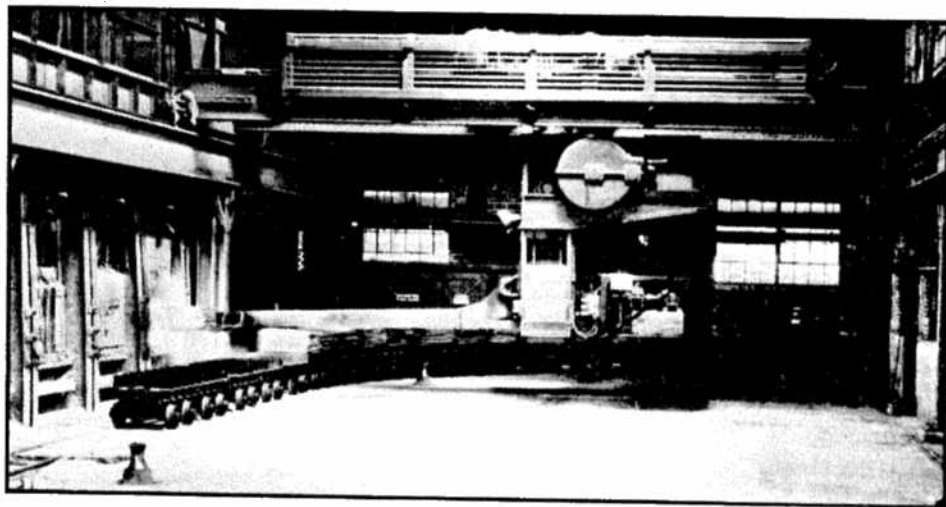
## Select Teams to Play Bridge Series

An INCO inter-plant bridge championship will be at stake for the first time when teams from Coniston, Creighton, Frood, Refinery and Copper Cliff play matches at Memorial Community Hall, Copper Cliff.

A series of three matches will be played, each two weeks apart, and the team amassing the most points will be declared champions. Prizes will be awarded to high scorers each evening, and a championship trophy will also be awarded.

Any INCO employee wishing to play on his plant's team should get in touch with these captains: Copper Cliff, C. E. Dorian; Frood, Thos. Fee; Creighton, V. Tremblay; Coniston, F. G. Murphy; Refinery, Wm. Stesco. Dates of the matches will be announced within the next week. There will be 16 players on each team.

Rules and regulations regarding the matches will be decided at a meeting of the captains, and will be in effect for all matches. If the event proves popular, it will probably be held twice a year in future.



## Cathodes Fed to Furnace

Similar to the way blister copper is charged to Ontario Refining Company's anode furnaces, as described in a previous Triangle article, is the manner in which pure copper cathodes are fed to the wire bar furnaces. Shown in this photograph is the crane charging a "lift" of 4,500 pounds of cathodes to a wire bar furnace, the normal total charge of 310 tons per furnace being effected in about two hours.

# Col. A. Hoffman Smith Named 'Grand Old Man'

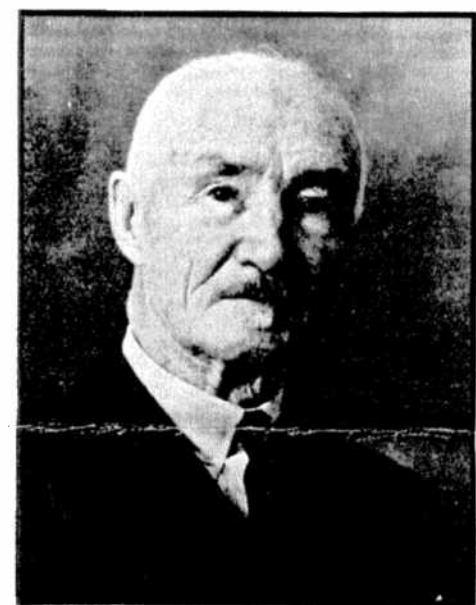
(By E. A. COLLINS, COPPER CLIFF)

The story of the growth and development of the Nickel industry in the Sudbury District, covering the period from the first discovery of the ores in August, 1883, to date, is a story replete with achievement and events which are bound to have a gripping, almost thrilling appeal to most readers.

**SAGA OF NICKEL**

It is a story mainly of hard, unremitting toil on the part of the pioneers in the industry, of steady progression in the science of mining and its handmaiden, metallurgy, and of chances taken and fortunes risked in keeping the good ship "Nickel" afloat. Many notable characters contributed to this development. Most of them have passed to their reward, and whilst they may not be so generally remembered as some of our great statesmen and political leaders, still it may be said that their names will live for evermore in the annals of the industry, and in the hearts and minds of those charged with the task of carrying on the work which they so nobly began.

It is fitting, therefore, that some space in the INCO Triangle should be devoted to a short sketch of the life of one of Sudbury's oldest and most respected citizens, and one who has been connected with the industry directly and otherwise for the past forty-eight years. One would be safe in saying that almost every resident of the district knows Col. Smith. Not so many, perhaps, know Col. A. Hoffman Smith, and very few are even acquainted with Col. Albert Hoffman Smith. Why the Colonel has so long



COL. A. HOFFMAN SMITH

hidden the identity of his first name is a mystery. Possibly he would not like to be called "Ab" by his numerous friends, but the Colonel is not exactly the type of man one would call by his first name, so this disclosure will be forgiven.

**BORN IN PORTNEUF**

The subject of our sketch was born November 29th, 1851, at Portneuf, Province of Quebec. His father, Peter Smith, came to Portneuf from Scotland in 1835, and his mother, Fredrica Maria Hoffman, was born in Somerset, England. That short sentence explains in toto the origin of those splendid traits of thrift, good citizenship and tenacity of purpose possessed by the Colonel. It explains more than that. His maternal grandfather and uncles were all officers, fighting with the British Army in the Continental Wars, which changed the map of Europe so frequently in those days, and from this side of the ancestral house he derived his love for things military. The virus developed at an early age, for shortly after his eighteenth birthday it is of record that he ran away from the splendid school in Quebec City where his father, with a Scotchman's love of learning, had placed him, and joined the 2nd Battalion, Quebec Rifles, which took a leading part in what is known in Canadian History as the Red River Expedition under Lord Wolseley.

The Battalion left Toronto for Fort Garry on May 7th, 1870, and returned to Toronto in September, 1871. It is interesting to note that after the rebellion had been suppressed the soldiers participating were given the option of joining the newly-formed Northwest Mounted Police, taking a complete discharge, or settling upon a grant of land in the West. Lance-Sgt. Smith, who had been promoted from private, was given charge of the military supplies at the Fort Garry post by the government, but this post was abolished shortly after, and he returned to Toronto.

**BECAME PAPERMAKER**

In the meantime his father, Peter Smith, had been appointed manager of a large paper mill near Philadelphia, and the son decided that as there were no wars, nor rumors of wars, in the offing he would follow in the footsteps of his paternal ancestors and learn the paper business. He accordingly joined his father in Philadelphia, and following the death there of his father in 1874, he returned to Windsor Mill, Ontario, where he remained until 1878. He was then offered and accepted a position in Montreal in his uncle's paper warehouse, later going to Trenton, Ontario, where in

partnership with two of his cousins, he built the Trent Valley Paper Mills, at Glen Miller, on the Trent River. On the completion of this enterprise in 1882, he joined his brother in Savannah, Georgia, where they jointly erected a large paper mill and where he remained until 1884, returning to Canada to join the Nile Expedition.

In this adventure young Smith was doomed to disappointment. The boat on which he travelled from Charleston, Va., missed the Halifax connection at New York, and the Nile Expedition sailed away without the young Lance-Sgt., who had already seen more of the world than most young men of his age. The paper business was all right as a means of making a living, but it didn't provide one half the excitement which soldiering did, so young Smith returned to Toronto, took a qualifying officer's course in C School of Infantry, received his Lieutenant's Commission in 1885, and promptly proceeded to the West with the Midland Battalion, destined to take a very active part against the enemies of Law and Order in the North West Rebellion.

## LONG MARCHES

His Battalion left Toronto in March, 1885, travelling on flat cars to Bisco, Ont., then the end of steel on the Lake Superior Division of the C.P.R. From Bisco they marched to Cross Lake, west of Port Arthur, at which point the Battalion again boarded flat cars and completed the trip to Winnipeg.

Lieut. Smith returned with his regiment to Toronto in August, 1885, and for the next four years he was employed at the Glen Miller Paper Mills. On August 27th, 1888, he arrived in Sudbury on his way to British Columbia, and stopped over to visit his old friend, Mr. John D. Evans, at Copper Cliff, then assistant to Dr. E. D. Peters, General Manager of the Canadian Copper Company. Mr. Evans induced him to enter the service of the Copper Company, and he became successively labor foreman, warehouse clerk, and assistant to Jas. McArthur, who was at that time Smelter Superintendent.

During this period Lieut. Smith built the first Macadam road in the North Country, a section of what is now known as Balsam Street, Copper Cliff. It is no reflection on the engineering ability of the Colonel to remark, that at this late date, January, 1937, this road is still in need of some repairs.

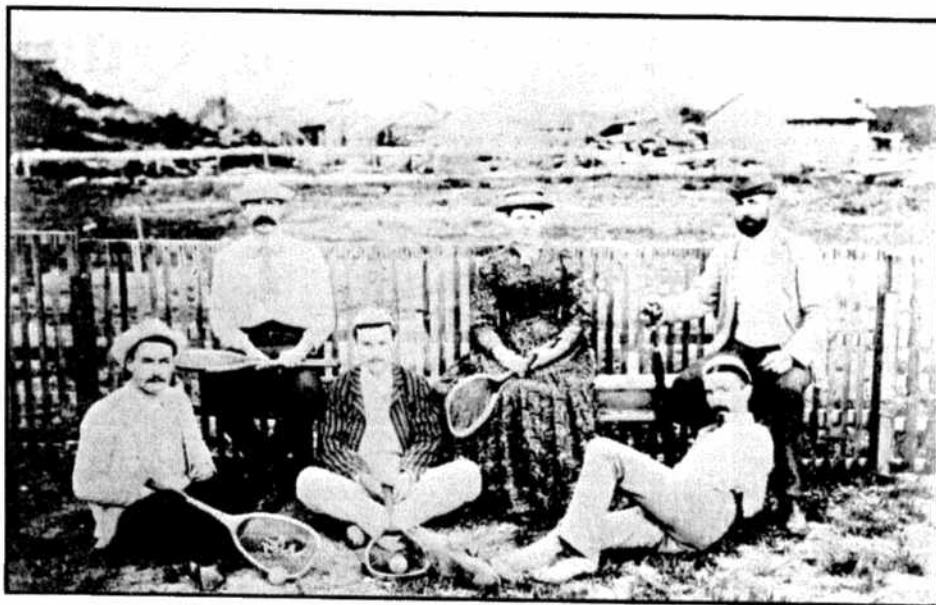
In 1891, Mr. Smith left the service of the Copper Company and engaged in surveying and prospecting, until his appointment as Customs Agent in Sudbury in 1895, a position which he filled to the complete satisfaction of succeeding Governments and all citizens of the district for twenty-six years. In 1921, he retired on pension, and has since devoted his time to the Insurance business which he founded some forty years ago.

In 1908, he was appointed Colonel of the 49th Hastings Rifles, a rank and connection which he still retains at the ripe old age of 82.

## ACTIVE IN SUDBURY

With his good wife, nee Alice Marlon Collier, of Manchester, England, the Colonel has taken an active part in the social and business life of Sudbury, and contributed in a large measure to every good movement for its advancement.

One wonders if any city in Canada has such a young Grand Old Man as Sudbury's Col. Smith, and one also wonders how many of our young men who meet him daily on Sudbury streets stop to think how best they may emulate the life of this distinguished citizen, trained soldier, sportsman, man of affairs, and above all, gentleman of the Old School.



## First Copper Cliff Tennis, 1888

A "live wire" when he arrived in Copper Cliff back in the early days, Colonel Smith was a member of the group which played the first game of tennis in the smelter settlement. What they fondly referred to as their "court" was a bumpy area where the Copper Cliff Hospital now stands. The net had not arrived in time for the official opening, so a slat fence was rigged up to take its place. This was in the fall of 1888, and the enthusiasts who posed for the photographer were: back row, left to right, R. E. Paul, chief accountant of the Canadian Copper Co.; Mrs. Thompson, housekeeper at the club house, located where the Bank of Toronto now stands; F. L. Sperry, chief assayer for the Company; front row, left to right, Walter Evans, son of the general manager of the Company at that time, and now engineer for two gold mines in the vicinity of Empire; Colonel Smith's assistant in the warehouse; Colonel Smith himself. The Davis Cup, blue-ribbon trophy of the tennis world, bears none of these names; they are of the unsung legion who carried the game to civilization's new frontiers and planted it there to grow and prosper.

## INCO's Transportation System Has 65 Miles of Standard Track

Transportation facilities are comparatively as important to link the plants of INCO as they are to weld the provinces into a Dominion of Canada, but employees probably seldom stop to think how elaborate and up-to-date are the system and equipment which the Company operates.

INCO owns and maintains more than 65 miles of standard gauge railway tracks in the network which ties mines, smelter, and refinery into an efficient smooth-working unit in the Sudbury district. Below ground in the mines, of course, are many more miles of narrow-gauge track, and a great deal of equipment, but for the moment we will look at the standard equipment of the Company's transportation department at Copper Cliff.

### WHAT IT HANDLES:

Here are a few of the responsibilities of this department:

Loading and unload all supplies; haul all raw materials, such as Frood ore to Copper Cliff, Creighton ore from Clarabelle transfer to Copper Cliff; Garson ore from Clarabelle to Copper Cliff; slag fill from Copper Cliff to Frood; coke and coal from Clarabelle; all Frood mine timber from Clarabelle to Frood, averaging seven cars a day; Bessemer matte, flue dust, nickel and copper scrap, tops, and bottoms from the smelter to the Orford bins; fuel to all Company buildings; shift slag dump tracks and maintain all tracks; transfer flux, reverts, and fill-rock between company plants.

So it's little wonder that the transportation department's telephone keeps up a pretty steady ringing throughout the day.

It takes a lot of equipment to maintain

service like that, and here are some of the items in the inventory:

Eleven electric locomotives, nine of them 55-ton and two of them 68-ton; two steam locomotives, one 78-ton and the other 30-ton; fifty 75-ton ore cars; two hundred and seventy-five 50-ton ore cars; twenty-five 50-ton steel underframe flat cars; four Brown hoists, or clam hoists; two Bay City hoists, the hook machine type; one 220-ton hot metal car which carries 70 tons of copper at a load to Ontario Refinery Co.; two jitney cars; three trucks; an ambulance and a pathological car; line cars for maintaining overhead service for electric locomotives, and three tool cars for wrecks; one standard steel snow plough.

Also, at Garson sand pit, the department has an electric shovel, a steam shovel, and a 65-ton steam locomotive.

Some idea of the total tonnage handled by INCO's above-ground transportation facilities is given by the department's figures for November, an average month, when 911,710 tons were moved. Quite a percentage of this was handled three times, however, so the actual weight moved for November was more than 1,300,000 tons. Which, in case you're interested, would require a freight train 235 miles long.

### NEW SCALE INSTALLED

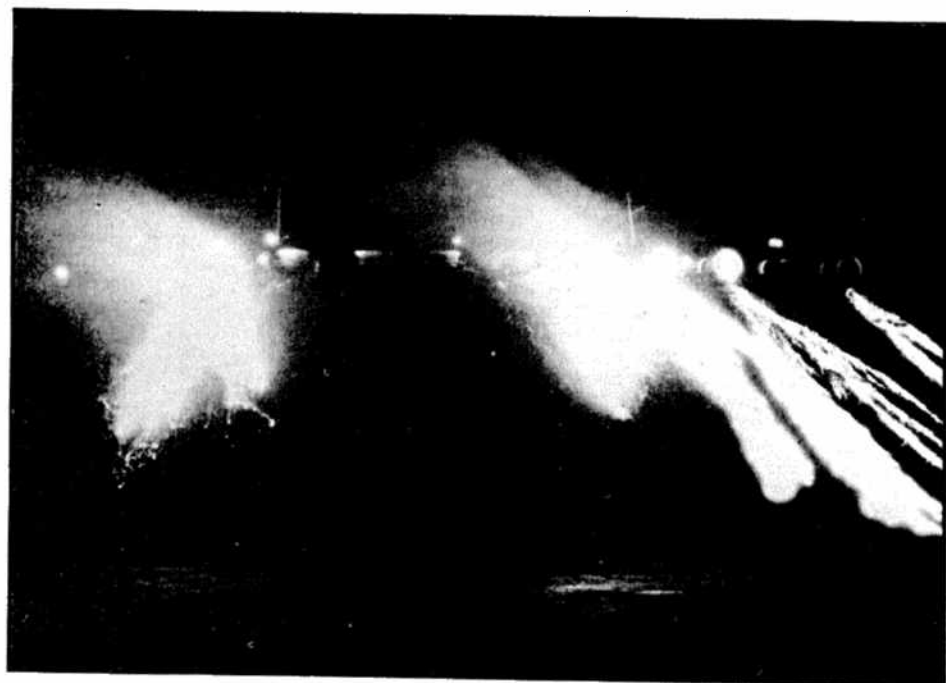
Other equipment coming under the classification of the transportation department are the weigh scales, one of which is an 80-ton Fairbanks Morse housed opposite Stanley Stadium. The other, recently installed in the upper yard at Copper Cliff, is a 200-ton Fairbanks Morse Plate Fulcrum scale, first of its kind in Canada, and one of only 102 in operation as yet in the world. The load on the scale is transmitted by a series of flexible steel plates to a series of levers, last of which is connected to the scale beam. The plates are made of high-grade chrome vanadium alloy steel, having a tensile strength of 200,000 pounds per square inch. Each plate is formed with a relatively thin central portion connecting two heavier portions or heads. The thin portion gives the necessary flexibility to allow the lever system to yield when the weighbridge is under load, although the flexure is so extremely slight that the stresses induced are well within the elastic limit of the metal, and permanent distortions cannot occur.

## Fatal Accident Averted by Miracle

It was little short of a miracle that a Frood timberman escaped with his life one June day last year as a result of erecting a structure which was entirely inadequate for his purpose.

He and his partner had to lower a fill-car truck down a chute, and as is usual constructed a timber structure over which to snub the ropes as they lowered the truck. But they did the job ineffectively. The timberman had the rope wrapped around his arm, and when the timber moved he was pulled into the chute and fell 70 feet straight down to solid rock.

But that's where the miracle came in. The edge of the falling truck caught in cleats on the side of the chute, the ropes tangled, and the timberman caught in the ropes. His partner found him dangling upside down in the bottom of the chute, his head less than six inches from solid rock. He got off with a fractured arm, a laceration over the eye, and a general body bruising, but carelessness had almost cost him his life.



## Thousands of Tons of Slag

One of the biggest transportation features at Copper Cliff is getting rid of the slag, or waste material, from the smelter furnaces. On the average, more than 400 pots of slag are hauled every day to the dump half a mile away. Each pot weighs about 25 tons, and holds about 20 tons of slag; a slag train usually is made up of 11 or 12 pots. A slag train dumping at night is a familiar and beautiful sight, and this is the scene Triangle's photographer has captured, as rivulets of fiery molten metal cascade from the overturned pots.