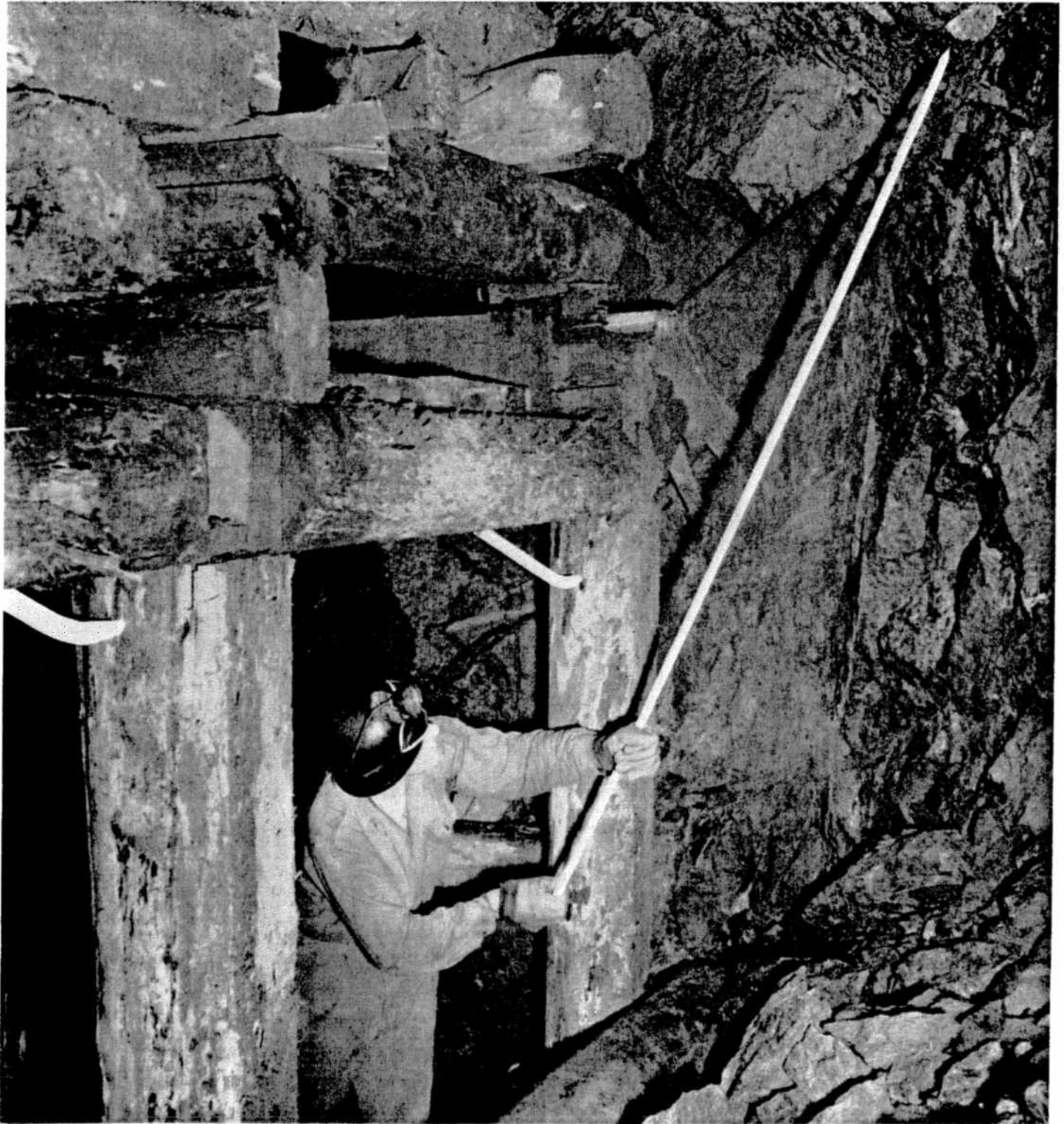




VOLUME 11

COPPER CLIFF, ONTARIO, FEBRUARY, 1952

NUMBER 11



Scale It Well!

(STORY ON PAGE 4)



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

Don M. Dunbar, Editor.

EDITORIAL OFFICE COPPER CLIFF, ONT

The King is Dead! Long Live the Queen!

Recent photographs of the King had shown the heavy toll of his illness, and few of us could escape the unhappy premonition that he was not long to be spared. Indeed Mr. Churchill has disclosed that during the last months the King walked with death, knowingly but unafraid.

Today, Friday, February 15, as this delayed issue of the Triangle goes to press, King George VI has been laid to rest in historic St. George's chapel at Windsor Castle. He is mourned by millions whose thoughts of sympathy must have greatly comforted his family in their sore bereavement.

The underlying simplicity and goodness of the King's life endeared him to all. He was a people's monarch. His adamant refusal to seek refuge, despite the urging of his ministers, when England hourly expected invasion, inspired a world reeling from the threat of Nazi conquest. The quiet dignity and courage with which he endured personal suffering to carry on his duties showed leadership of the most noble kind. As Mr. Churchill has said, his conduct on the throne may well be a model and guide to constitutional sovereigns throughout the world today and also in future generations.

In a time of deep sorrow, even more than in moments of great joy or triumph, people are drawn closer together. Now the nations of the British Commonwealth, in their loss, feel a quickening and strengthening of the ties which unite them. Contemplating the life of the dead king, and its heritage to humanity of thoughtfulness for others, goodness, courage, and trust in God, they face the future with renewed faith and conviction.

Elizabeth has been proclaimed Queen. That she is modest, gracious, and blessed with the quiet dignity of her father, we noted during her tour of Canada with her fine young husband last year. She has the same instinctive feeling for the people. And, for all her youth, she has a thorough knowledge and training in the great responsibility which now is hers alone.

God Save The Queen!

"Dad Made It for Me"



"Dad made it for me," said Raymond, aged 7, and there was a thrill in the pride of him. Then he proceeded to demonstrate the model of smelter operations which his father, Leo Chartrand, a puncher on the converters at Copper Cliff, made for him as a Christmas gift. Instead of matte, which is hard to get in a private home, Raymond uses popping corn. He is his own puncher, skimmer, craneman, baleman, and shift boss as he puts the remarkable model through its paces. Picture shows him with the fellow he would vote for as prime minister.

Fellowships Again Offered by Inco

Three academic fellowships valued at \$2,000 per year, with a possible tenure of three years, are again being offered to Canadian university students by The International Nickel Company of Canada, Limited.

The Graduate Research Fellowship awards were made for the first time in 1951 "to promote and encourage academic research in the technical fields serving Canadian metal industries."

Acceptable fields of research are geology (including geophysics), mining, ore dressing, metallurgy (both process and physical), chemistry (pertaining to metals) and physics (pertaining to metals).

Division of the \$2,000 per year is made as follows: \$1,500 payable to the student by the company and through the university, and \$500 at the disposal of the student's directing professor, to be used for materials and equipment necessary for the research. Half-yearly reports on the research are required from the student.

Winners of the \$6,000 in fellowships in 1951 were C. R. Cupp, University of Toronto,

G. V. Mueller, McGill University, and A. T. Casey, University of British Columbia.

Universities wishing to obtain one or more of the fellowships for graduates should send their applications to the secretary of the National Conference of Universities, Dr. C. H. Stearn, at McMaster University, Hamilton. Applications must be received in Dr. Stearn's office not later than February 28, the company announced, and will be considered from any university qualified to confer the master's or doctor's degree in the acceptable field.

The fellowships are awarded by the National Conference of Canadian Universities.

SANCTUARY

A young Canadian couple struck up a friendship with an Australian lady. On the arrival of her fourth child, they sent her a playpen as a gift.

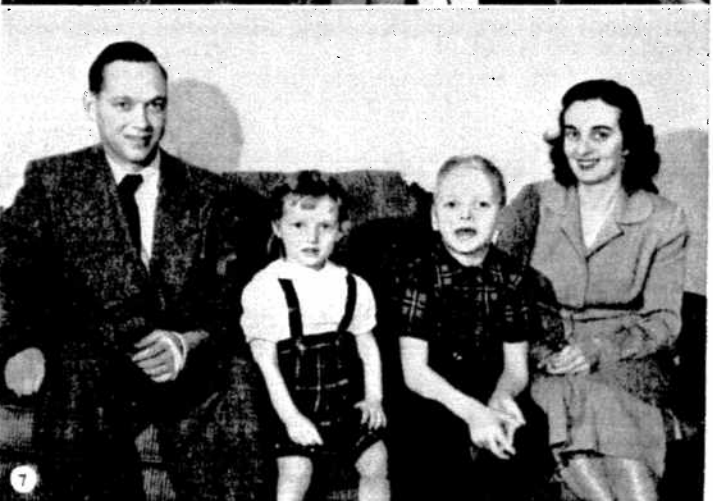
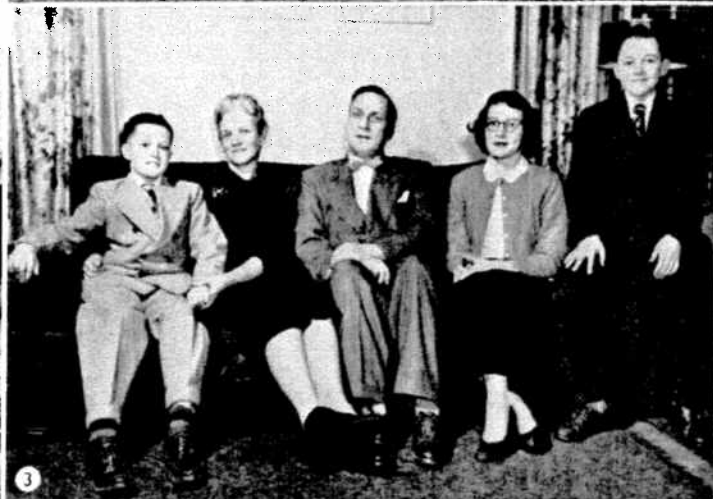
The thank-you note left them somewhat astonished: "Thank you so much for the pen. It is perfect godsend. I sit in it every afternoon and read and the children can't get near me."

"My friend," said the missionary, "are you travelling the straight and narrow path?"

In silence the man handed over his card. It read: "Signor Ballancio, Tightrope Walker."

INCO FAMILY ALBUM

We've often referred to the "good-looking" people who appear in the album. Just to keep the record straight, they're all much better looking than our pictures indicate. This month we've visited: (1) Mr. and Mrs. Bob Anderson (Port Colborne) with Bobby, 6, Jacquelyn, 4, and Bonnie, 2. (2) Mr. and Mrs. Jim McCue (Lawson Quarry) with Jimmy, 11. (3) Mr. and Mrs. Ken McNeill (Copper Cliff Accounting) with Scott, 11, Jean, 19, and John, 15. (4) Mr. and Mrs. Bill Homalainen (Garson) with Karen, 18 mos., and Gail, 10. (5) Mr. and Mrs. F. Durette (Frood-Stobie) with (back row) Sylvia, 13, Grace, 15, Yolande, 17, Marie Jeanne, 19, Joe, 23, (front row) Johnny, 6, Rachelle, 9, Louise, 4; (not shown) Lucille, 24, and Alphonse, 20. (6) Mr. and Mrs. Joe Craigen ((Creighton) with Hugh, 9. (7) Mr. and Mrs. John Peacock (Murray) with Judy, 3, and Jack, 7.



Bowlers Cop Special Prizes

With 78 entries in the singles and 65 in the doubles, the two special tournaments run off by Secretary Ab Stone for the Frood Bowling League at Inco Employees Club were a big success.

Bob Elliott picked off the big plum in the singles tourney with his 828, and "Perch" Grassam and Jack Watkins led the field in the doubles with 1477.

Bowlers who like these special events will be disappointed to learn that it's unlikely there'll be any more of them this season. With 35 teams in the league, highest in 12



BOB ELLIOTT

years, the schedule is so full that Secretary Stone doubts if it will be possible to sandwich in any more activity. But it's a cinch that if it can be done, Ab will do it.

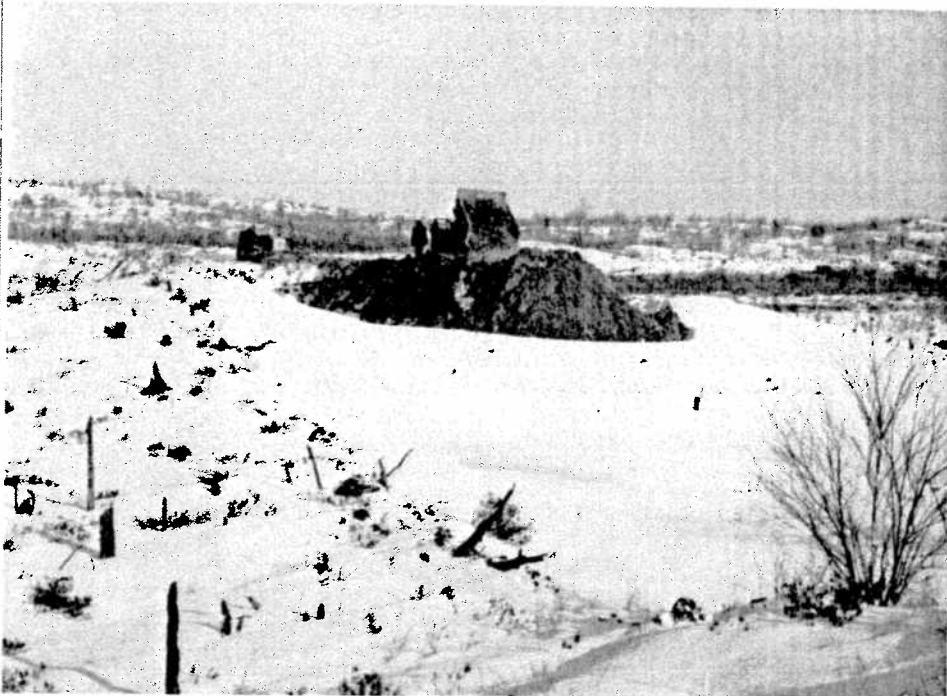
Results of the singles tourney: High triple, Bob Elliott, 828 (\$37.00); 2nd high triple, Morris Martin, 809 (\$20.00); high single, Fred Fiorotto, 348 (\$12.00); 2nd high single, Morris Martin, 331 (\$9.00).

Results of the doubles tourney: High triple, "Perch" Grassam and Jack Watkins, 1477 (\$50.00); 2nd high triple, Jack Romanow and Ed Belfrey, 1441 (\$25.00); high individual triple, Johnny Zimmány, 844 (\$11.00); 2nd high individual triple, Bobby Marsolais, 833 (\$9.00); high individual single, Jack Watkins, 391 (\$8.00); 2nd high individual single, Jack Romanow, 349 (\$7.00).



"PERCH" GRASSAM, JACK WATKINS

Relief for the Underground Pumps



To divert water which otherwise would find its way underground into the enlarged workings at Frood-Stobie, the Mines and Mechanical Engineering departments put their heads together on an unusual project. Besides contour ditches they built a dam across a stretch of the muskeg north of the Stobie pit, using rock and clay for fill. Before the fill was dumped the muskeg was loaded with powder at considerable depth. The blast pushed the swampy ground out to the sides and allowed the rock and clay core to settle to firm bottom, making a seal of the area. Come spring the width of the dam will be increased to 60 ft. Underground pumps will sweat their approval of this smart piece of work.

"Scale it Well" is Cover Message

Axil Lind, well-known stope boss at Creighton, is the "cover boy" on the front page of this month's issue. The photo was made in a series for one of the slide-picture demonstrations which the Safety Dept. is using to illustrate carefully considered practices, based on years of experience, which are standard in Inco's underground mines.

The very important precaution of scaling is featured in this particular shot.

After the breast has been blasted down, the first precaution is to check the timber structure to see that it is tight and in good condition. The next step is to clean up so that the danger of tripping over pieces of loose or miscellaneous material is eliminated. Then the back and pillars are scaled with a bar to dislodge any loose pieces, and this is the job Axil is doing in the picture. He placed a bulkhead timber in front of the two posts to prevent rolling pieces from injuring his feet or legs. He stands with the scaling bar held in a safe position so the end of it is not likely to strike him in case a piece of loose falls and hits the bar. He is properly equipped with safety boots, spats, and gloves.

It is safety routine that all ground is considered loose until proved by scaling or sounding to be tight.

SHORT-CHANGED

Edna: "You mustn't be discouraged. In this world there's a man for every girl and a girl for every man. You can't improve on an arrangement like that."

Pearl: "I don't want to improve on it. I just want to get in on it."



WORTHWHILE IDEA

A cheque for \$193.00 was the nice dividend picked up by James Roy Mallette for a little extra brain-work on the job. A member of the mechanical crew at the Concentrator, Copper Cliff, he figured out a method for salvaging tailing pipe, turned in his idea to the Employees' Suggestion Committee, and down came the jackpot. "Yippee!" said this young man. "That'll go a long way toward a home of my own!"

COPPER REFINERY SCORES

For the fifth time since the award was inaugurated, Copper Refinery has scored 100,000 consecutive shifts worked without a lost-time accident. At 8.00 p.m. of January 12 the plant went over the top and earned the plaudits of all Inco for another high achievement in the name of Safety.

The Refinery's mechanical department had, at year's end, completed 201,270 consecutive shifts without a lost-time accident, a mark for all departments of the Company's operations to shoot at.



Annual Banquet Of Scouts, Cubs

An annual treat for Boy Scouts and Wolf Cubs at Copper Cliff is the big dinner held in Memorial Community Hall with the mothers of the boys doing the catering.

The spread of good things to eat is, of course, the main feature of the evening as far as the "walking appetites" are concerned, but there's usually something a little special in the entertainment line too, Scoutmaster Jim Savage being a man with a great knowledge of what appeals to boys.

After briefly addressing the gathering Mayor W. T. Waterbury, honorary president of the Sudbury District Boy Scout Association, presented King's Scout badges to Gary Fletcher, Donald Harry, and John Sutherland. Principal A. G. Orr of Copper Cliff Public School also spoke to the boys.

Movies and a singsong were other features of the program.

First of the accompanying pictures shows the head table group: left to right, Rev. J. A. O. McKennitt, Mayor Waterbury, A. G. Orr, W. J. Ripley (vice-president of the District Scout Association), Principal Wm. Harrington of Copper Cliff High School, Rev. George Thompson, Chief of Police Runciman, and B. K. Seli, member of the Copper Cliff Scouts committee.

In the second picture are Scoutmaster Jim Savage, Eddie Saville (committee member), Frank Fielding (First-Aid instructor), Jimmy Davidson, Tom Wheatley, and Gordon Henry (Cub leaders), Don Saville (Asst. Scoutmaster).

In the other two pictures are some of the young fellows who helped do away with enough grub to keep a mother bear and her cubs going for a full winter.

HOPE FOR US ALL

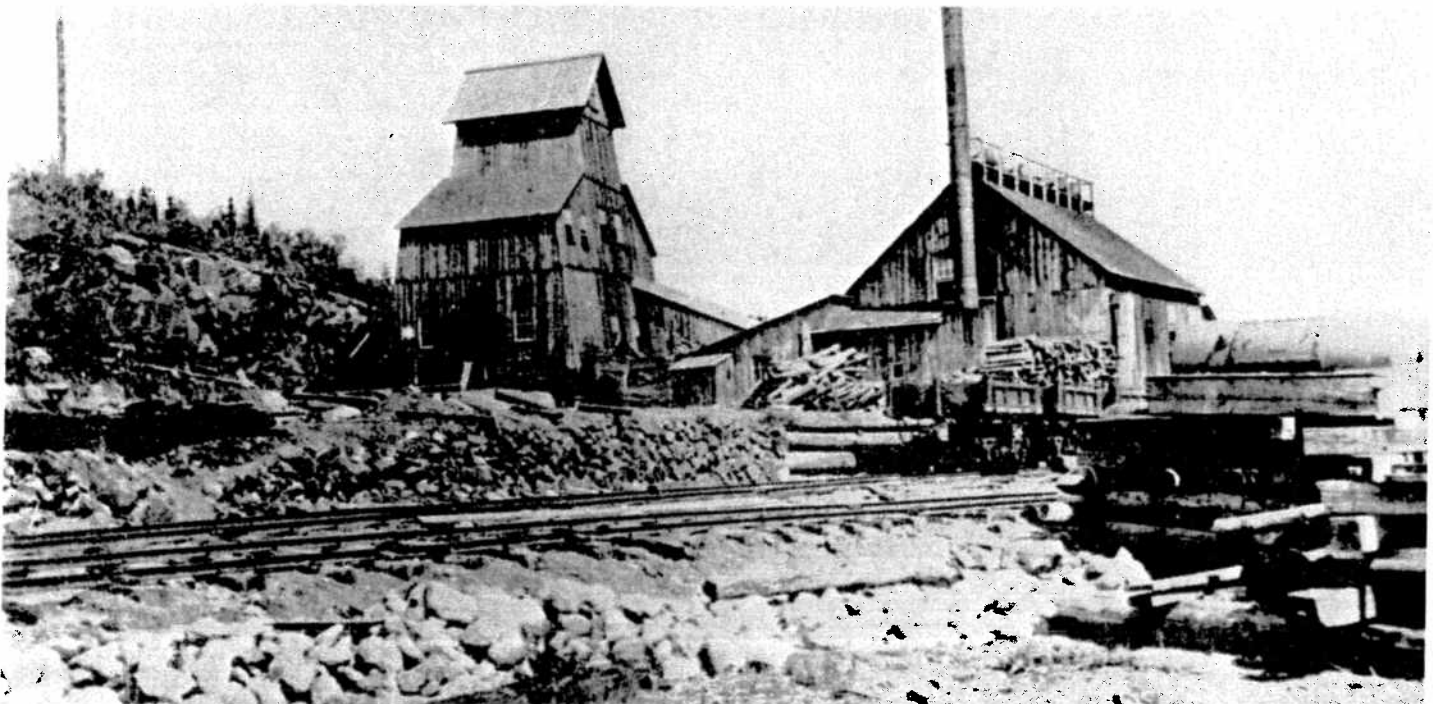
"I wish to make a complaint," said a man to a Post Office official. "For some time I have been receiving disagreeable and threatening letters. How can I stop it?"

"I think we can help you," replied the official. "That sort of thing is forbidden by law, you know. Have you any idea where these letters come from? Do you know who sends them?"

"Oh yes. They all come from the Income Tax Department."



They did it the hard way in the early days. These pictures were taken at the Copper Cliff Mine about 1888. The mine, located behind the site of the present Copper Cliff municipal building, was the first in the district from which shipments of ore were made, and it provided the site for the erection of the first smelter, which was blown in Dec. 24, 1888. Mining commenced at the Copper Cliff in 1886 and in its first stages was an open pit operation, establishing the pattern for all the district's mines opened in those days. The top picture shows the head of the pit. On inclined skids the skip hauled ore out of the pit to the bin and headframe on the left; the timber sheeting was to protect the miners from boulders rolling off the hill. The bottom picture shows on the right the boiler house, in which the hoist was located, and the headframe. The covered passage between the two buildings was the ropeway. The hoisting rope travelled around a bottom and a top sheave as it hauled the skip out of the pit.



A BRIEF REVIEW OF Mining Methods in Sudbury District

Early Mining Methods

Ore was first mined in the Sudbury District by the open pit method after trenching had been done to outline the extent and value of the ore body at surface. The surface material was stripped off; the gossan and overburden, the latter averaging up to 10 feet in depth, was removed, and the open pit, or "glory hole", method of mining followed. The ore was handled by derricks at first. Later a shaft was sunk adjacent to the open pit in the footwall, and connections were made with the open pit at different levels. The ore was trammed to the shaft and dumped directly into skips. The largest pit in the field was developed at the Creighton, 670 feet long, 180 feet wide, and 200 feet deep; 3,000,000 tons were taken from it.

When all the ore that could be safely mined by the open pit method was taken out, the shafts were sunk to a lower level and over-band stoping was adopted, a floor being left below the open pit. When the ore bodies were narrow the drifts were timbered over and ore broken on the timbers; in wide ore bodies dry wall drifts were used and circular pillars left where necessary. Most of the mines were at very shallow depth so that the operators encountered none of the problems connected with deeper mining such as pressure and the necessity of filling the mined areas. Nor was any thought given to conservation for the future; only those ores which yielded a considerable margin of profit were mined, and lower grade ores were usually left in the form of pillars or unmined in the stope walls.

Controlled Methods Introduced

By 1917 the advisability of a more orderly system of mining had become apparent, and the larger mines of the district had adopted a form of shrinkage mining, which with some modifications still continues in considerable use. In 1929 it was felt necessary to introduce controlled methods of mining which would permit complete recovery of ore bodies, and the cut and fill method along with the square set and fill method were introduced in both the Creighton and the Frood mines. Use of these methods has also been extended to the lower levels of both the Levack and Garson mines as well as to the mining of the pillars of ore left in these two mines during the period of shrinkage mining.

At Falconbridge, where mining did not commence until 1928, the shrinkage method was originally adopted but was largely replaced by cut and fill with some square set mining.

Modifications of the cut and fill, and square set and fill, methods have been found admirably suited to the conditions of deeper mining in the Sudbury District, allowing complete mining of an ore body while controlling subsidence and rock pressure.

As a result of important advances in milling and metallurgical practices large bodies of low grade ores in certain mines of the district are now economically attractive, and low cost bulk methods, such as diamond drill blast hole mining and caving, are being used to mine these lower grade ores. Their recovery will offset the loss in production from Frood-Stobie Open Pits, where operations commenced in 1938 are approaching completion.

(Continued on page 8)

Testimonial Banquet Honors W. E. Gillespie, Electrical Supt.



W. E. Gillespie (left) was the recipient of several gifts at the banquet in his honor but the best was the one presented by Barney Hamilton, on behalf of the men of the Electrical Dept., a certificate for the cost of electrifying his summer home on Lake Penage.

A testimonial dinner to Inco's electrical superintendent, W. E. Gillespie, held in the Italian Hall at Copper Cliff, drew a large gathering representative of all plants including far-off Lawson Quarry.

The occasion was his attainment (believe it or not) of retirement age, but there was little surprise when Vice-President R. L. Beattie announced that the perennial chief of the Company's "juice" division was being

retained in a consulting capacity on special projects. Not a man in the audience could have imagined Evered Gillespie inactive.

Credited service of just over 40 years is the record of this Incoite who seems to have discovered the secret of perpetual youth. He's away now on a holiday trip to the deep south, probably a ruse to cover up a private inspection of big power hook-ups.



Entertainers in the delightful program of "home-grown" talent presented at the party honoring W. E. Gillespie are seen here: Orville Cooney, Andy Shumanski, Evo Falcioni, Frank Shedler, Norman Johnson of Coniston, and Lloyd (Madame Fifi) Watson.

2nd Coniston Father and Son Banquet is Outstanding Success



Rev. Fr. Mulcahy of St. Charles College an outstanding authority on work among boys, was the special speaker at a splendidly staged Father-and-Son banquet held by 2nd Coniston boy scouts and wolf cubs.

Cubmaster Art Gobbo and scout master Bill Poirier, who are devoting themselves heart and soul to the youth movement, handled the arrangements for the successful

event. Sixty-nine bright-eyed young boys and their dads were in attendance. The mothers of the boys served the delicious dinner of turkey and all the trimmings.

Ed. Orendorff, president of the local Scout Association, acted as master of ceremonies. Distinguished guests included Robin Sharp, field commissioner, of North Bay, and Ainsley Roseborough, district commissioner, of Sudbury.



A BRIEF REVIEW OF Mining Methods in Sudbury District

(Continued from page 7)

Shrinkage Mining

In the shrinkage method of mining, actual stope work is done on the broken ore. Just enough ore is pulled or removed after each breast or stope cut is mined to provide room for the miners to work. The ore expands about 40 per cent in volume when broken from the solid, a factor which must be taken into consideration when ore is being pulled down to allow working room. Once a stope is silled out to the limits, as prescribed by the plans, and regular benching or mining is progressing, the shrinkage method is a succession of drilling, blasting, and pulling broken ore until the next higher level is reached. At this point the stope area is then full of broken ore.

During this mining cycle the preparation of levels below is usually in progress. This consists of driving crosscuts to the ore body from the shaft stations, excavating drifts at definite intervals in the ore, driving boxholes or openings from the ore body drifts to a predetermined height above the level, and then silling out or mining out the ore within the area planned for a stope to a height of about 7 feet.

In the operation of silling out, all the boxholes are intersected and widened out in the shape of an inverted cone at their tops. A raise or opening is also driven from the stope to the level above, to be used as an entrance to the stope during regular stoping and also as an opening for the circulation of air through the stope.

This then is the position of development for stoping when the stopes on the level above are completed. The stope miners are then moved down to the level where the stopes have been prepared, and regular stope benching proceeds on this lower level. Pulling of the ore from the completed stopes above continues, so that when regular stoping reaches the stoped-out level, the broken ore has all been removed.

Cut and Fill Mining

In the cut and fill method of mining, waste rock or other material is used to fill the excavated areas as stoping proceeds. The sequence of development and stoping is as follows:

First the ore body is outlined by diamond drilling in the same manner as for other methods. Drifts and openings from the shafts to the ore body are planned and excavated. The width of the ore body and its inclination from the horizontal determine the position and number of drifts required for the location of boxholes and manways essential in actual stoping. Drifts in the ore body are started from the crosscuts to the shafts, and after they are in place the boxholes to be used in stoping are commenced from the ore body drifts and driven to the height at which actual stoping will start, generally 30 feet above the level, measuring from the bottom of the drifts.

At the 30-foot elevation above the level the cut and fill stope is silled out by excavating an opening to the limits of the stope; the height of this opening is usually 7 to 8 feet to provide working room for the miners. The boxholes are uncovered in this operation of silling out.

Square Set Mining

The square set method of mining differs

from the cut and fill only in that the tops of the boxholes at the stope floor bottom are fitted with timber sills, placed in exact position to support chute timber or square sets, and the square set timber is placed in the sill opening as the opening is enlarged. A square set consists of four vertical members called posts and four horizontal members, two caps and two girts. All are shaped at their ends so that when they are joined together they form a snug fit which, when pressure is applied from any direction, becomes a tight cluster. Square sets, as the name implies, are square both horizontally and vertically.

Blast Hole Mining

In an ore body where conditions favour bulk mining, the blast hole method allows more economical powder distribution, with the added advantage of safer working conditions than in shrinkage mining since the miners are not exposed to open stope backs but do their drilling in small safe drift openings.

Drill holes for the blast hole method are usually drilled to a depth of from 40 to 100 feet, whereas in a shrinkage stope the holes are seldom drilled more than 9 feet for each blast. All the ore is pulled as it is blasted from the ore face, and the empty space allows the broken ore to fall freely to the boxholes; thus the ore is further broken up by falling and bounding down to the stope bottom.

Working space is always provided in the solid ore, from which the workmen drill each succeeding slice from the face of the stope. These working places are usually drifts driven through a block of ore from end to end and spaced both horizontally and vertically so that the long drill holes from each drift can reach and be interlaced with the holes from an adjacent drift. This system is called ring drilling. The drills are set up in the drilling drifts about six feet back from the face of the open stope and the holes are drilled in a 360-degree circle around the drift. After a round is drilled the drift can be likened to the hub of a wheel with the drill holes radiating from it as the spokes radiate from the hub of the wheel. It is possible to have several complete slices drilled in advance of the stope face, and blasting can then be done as ore is required.

Caving Mining

In the caving method, another scheme of bulk mining, the ore is completely undercut on the bottom of the stope area and the vertical sides of the stope block so weakened that the mass of ore gradually collapses of its own weight. As the ore collapses an internal crushing force is set up as well as the crushing of the ore on the bottom and interior of the stopping block by virtue of the weight of ore from above.

This method takes full advantage of the force of gravity, and when the characteristics of the ore are right for its application, it is one of the lowest cost mining methods known. The weight of the moving mass of ore is used as the breaking force instead of powder, thus eliminating drilling and blasting of the ore from the stope face.

Boxholes for the caving method are spaced close together under a block so that, as the bottom of the block crushes, this ore may be pulled out to provide room for ore about to move down and be crushed in turn. Accurate pulling of ore in a caving method, especially a block caving, is the key to success in this system of mining. If the ore is not pulled fast enough the broken ore at the bottom of the block will pack and not move freely down the boxholes; if the ore is pulled too fast, voids will be created which will allow large pieces to fall without benefit of the crushing force set up.

Mining Research

Thoroughly established as it is, the nickel industry is constantly seeking to improve its methods and processes. A program of re-

President and British Executives



Through the good offices of Jim Hockley of Nickel News we have this interesting group picture taken during the recent visit of Inco's president, Dr. John F. Thompson, to the Company's subsidiary plants in Great Britain. Left to right are: L. H. Cooper, chairman of Mond Nickel; T. G. Tanner, director of Birlec; A. P. Hague, director of Mond; Dr. Thompson; G. P. Tinker, managing director of Birlec; A. E. Pickles, manager, dryer division, Birlec.

search, dealing with mine problems at the International Nickel Company, has been in effect for some time. In the course of these studies most of the regular mining methods have been reviewed and modified, various types of equipment available for mechanization of stopping and development work have been investigated and practices standardized for their proper utilization, and methods and techniques evolved to deal with changing mine conditions such as rock pressure and ore body settlement, and recovery of low-grade ores.

An outstanding result of this mining research has been the installation at the Frood Mine of a system of packing and stabilizing the fill and ore pillars, in which a gradual settlement was occurring, with deslimed mill tailings from the concentrator at Copper Cliff, and also to use this material for regular fill in the mine.

Mining research has indicated the futility of attempting to predict rock bursts, but has also suggested methods to localize and minimize the effect in areas predisposed to bursting. These may be described in a general way as follows: the correct placement of mine openings with respect to other mine openings, involving careful study of geological and other factors before mining layouts are made; the use of a planned sequence of stopping to suit local conditions and production requirements; the most effective application of hangingwall support, whether it is in the form of ore pillars, rock fill with sand packing, or sand filling; planned mining sequences to eliminate strong pillars or remnants which may burst because of the concentration of doming stresses.

Many improvements in mining methods have been developed as a result of the mines research program. In square set stopping, for instance, larger scraping equipment for ore removal and fill placement, and a single footwall chute in place of timbered chutes spaced at 22-foot centres, have been found more efficient. The satisfactory costs and performance obtained with experimental concrete chutes have resulted in the adoption of concrete lining in place of conventional timber lining, and the standardization of forming, mixing, and pouring techniques. The trend of improvements in square set

stopping has been followed in cut and fill mining.

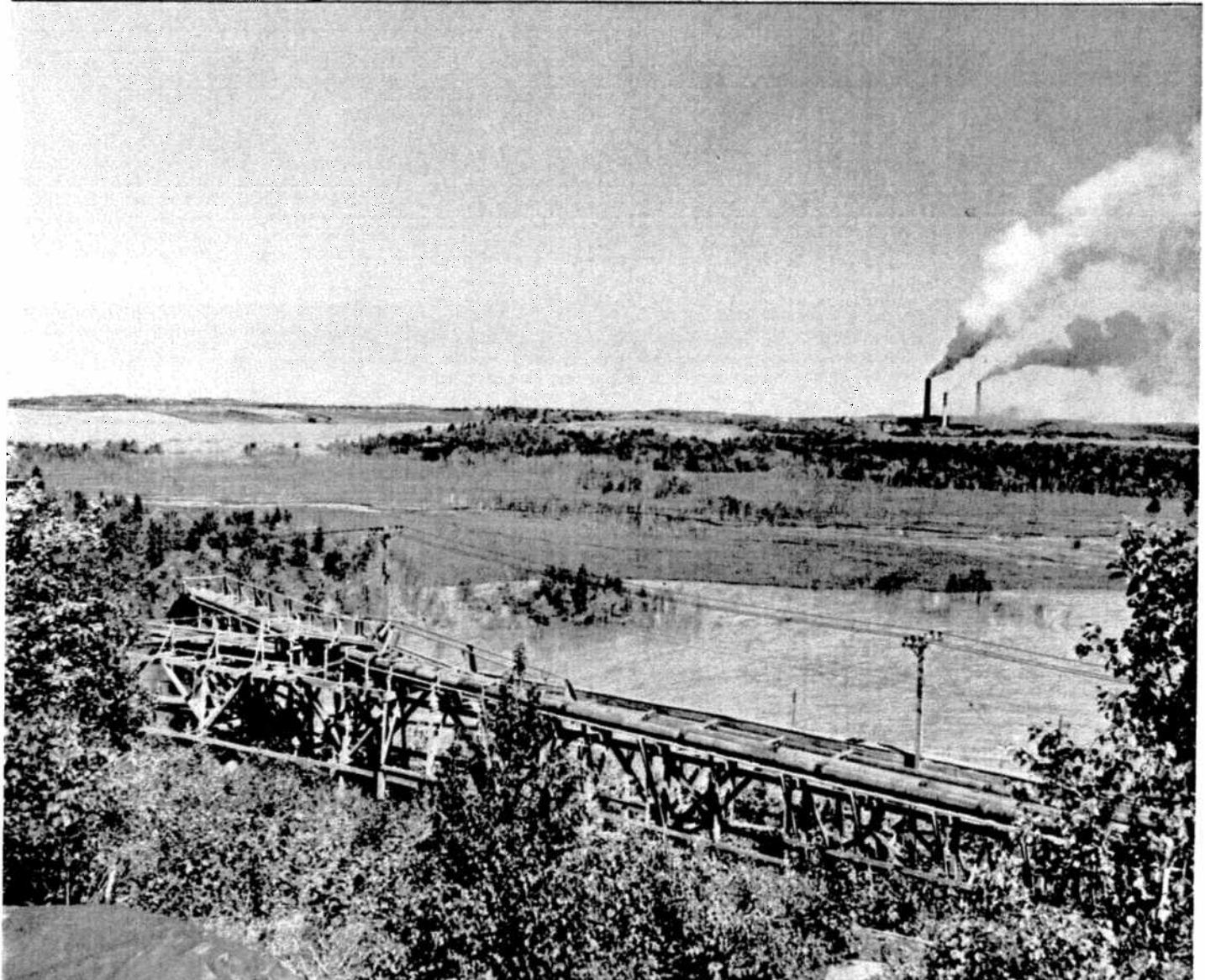
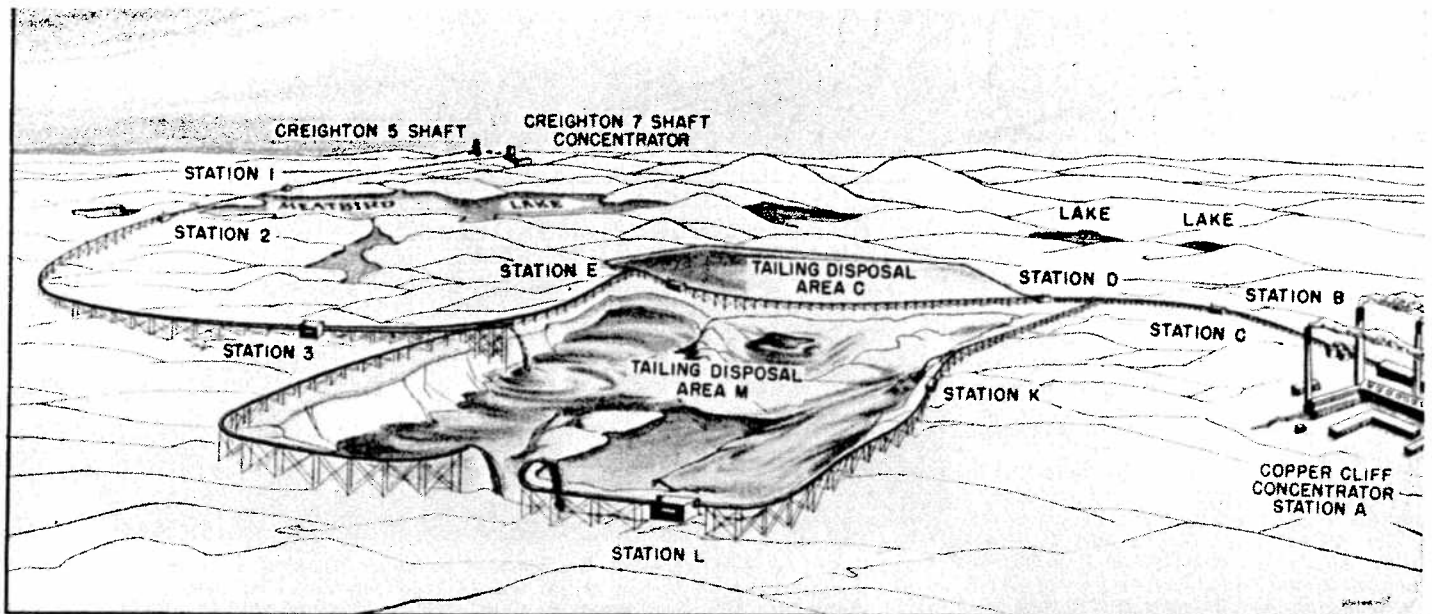
Several variations of the blast hole stopping method have been developed to suit the size and shape of the ore body and the section to be mined. As a result of investigation of shrinkage stopping practice, experimental work has been conducted at various sill elevations and on the installation of pillar fence to permit 100 per cent recovery methods in mining adjacent pillars. A variation of shrinkage has been developed for use in narrow, regular, steep-dipping ore bodies where weak wall rocks prohibit the use of conventional shrinkage methods.

Scale models were used to improve draw point spacing as well as ore drawing technique for the caving mining method, which is being used in the new program for the recovery of low-grade ore at Creighton Mine. The ore is drawn into regular scam drifts from draw points placed at 30-foot intervals, and 125-h.p. slusher units are used to scrape it to branch raises leading from main ore passes. The ore passes down through the main ore pass direct to a 66 x 48-inch jaw crusher, is crushed to 6 inches, and is then fed from the crushed ore bin to a 42-inch belt conveyor for delivery to the shaft ore bin. It is hoisted in 15-ton skips direct to the mill crushing plant, the hoist operating from the loading point by push button control.

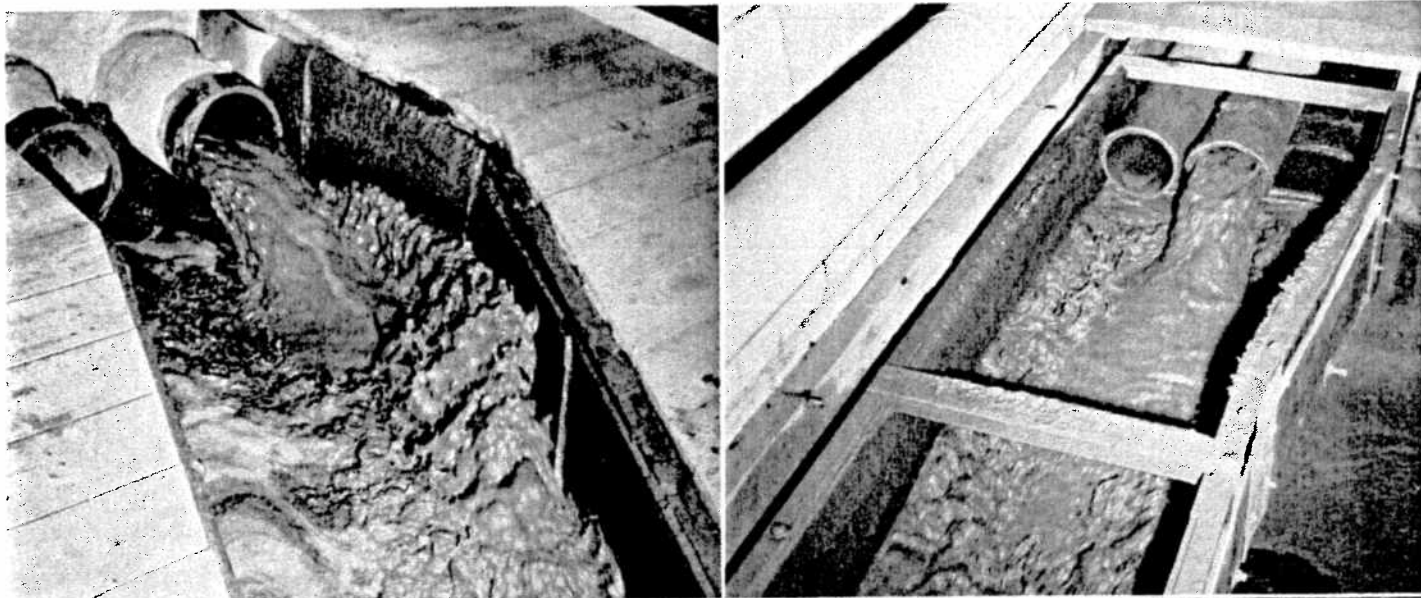
Slusher mucking in shaft sinking, different lengths of drift rounds and drilling patterns to improve efficiency in driving drift headings, elliptical stope fill raises and main ore and waste passes to reduce sloughing, storage bin construction to reduce wall, brow, and slide wear to a minimum, and many other projects for improving mining methods are continually being studied and developed under the broad mines research program.

Very satisfactory results have been achieved, after considerable experiment and testing, in developing cage safety dogs. Now in operation are safety dogs which will consistently arrest of fully loaded conveyance, weighing 23,000 lbs., and falling at a rate in excess of 1,500 feet per minute, at decelerations less than 1.5 G.

40 Miles of Wooden Pipe in Pumping System



Sketched above is the elaborate system by which bulk concentrate from the new Creighton concentrator is carried to the reduction plants at Copper Cliff, and tailing from both the Copper Cliff and Creighton mills is taken to the disposal area located midway between the two plants. The system has 12 miles of trestle and 40 miles of wooden pipe. A section of the 1,100-acre tailing disposal area is seen in the photograph, with the Copper Cliff plant in the distance. In the foreground is the end of the Creighton tailing line; veering off to the left, the Creighton concentrate line carries on toward Copper Cliff.



THE PICTURES

ABOVE: Tailing (left) and concentrate (right) pour from pipes in one of the relay pumping stations; the tailing is on its way to the disposal area, the concentrate is en route to Copper Cliff.

CENTRE: Battery of pumps in one of the concrete relay stations.

BELOW: A section of the new trestle added in 1951 to the 12-mile pumping system. It is 67 feet high at this point.

7-Mile Trestle Sets Record for Pumping Pulps

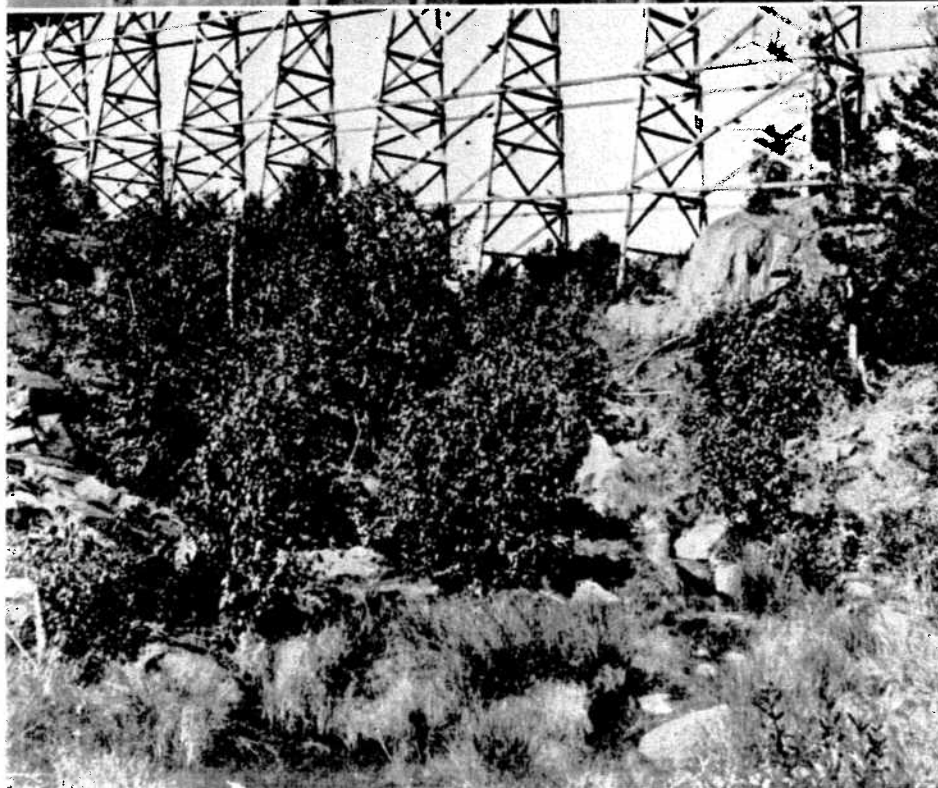
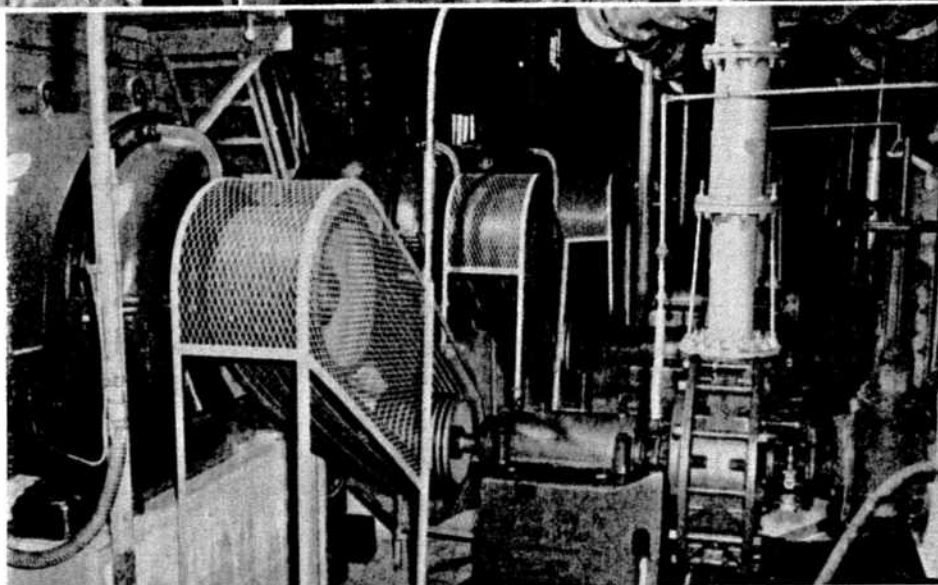
The tall stilts of a wooden trestle more than seven miles long, marching across the outcrops, bush and muskeg of typically rugged Northern Ontario country, carry the bulk concentrate produced at Inco's new 10,000-ton Creighton concentrator to the Company's reduction plants at Copper Cliff. It's believed to be the first time that concentrate pulps have been piped in such quantity over such a distance.

The aerial artery through which the Creighton concentrate is pumped to the heart of Inco's reduction operations becomes part of the elaborate system which also carries tailing, or waste material, from both Creighton and Copper Cliff mills to the 1,100-acre disposal area located midway between the two plants. The system has 12 miles of trestle, at some points 65 feet high, and contains three million board feet of lumber and 40 miles of wooden pipe. It now transports as much as 30,000 tons of material in one day.

Handling Creighton Concentrate and Tailing

When the decision was made to build the Creighton concentrator as part of Inco's \$130,000,000 program of conversion to all-underground mining, steps were immediately taken to investigate the possibility of pumping the concentrate to Copper Cliff. To simulate actual operating conditions, an 8-inch wood stave pipe line 4,000 feet long was installed at Copper Cliff and means provided for circulating through the line concentrate pulps of varying densities from the 30,000-ton Copper Cliff mill. Information obtained from these tests — pump capacities, head loss due to friction, maximum and minimum pulp velocities, etc. — demonstrated that concentrate could be pumped a

(Continued on page 12)



7-Mile Trestle Sets Record

(Continued from page 11)

pipe line distance of 7½ miles from Creighton to Copper Cliff with five relay pumping stations. Since three stations had to be built for Creighton tailing disposal, they were designed to allow for concentrate pumping also; two of the stations already in service to handle Copper Cliff tailing were enlarged to complete the facilities required for pumping the Creighton concentrate.

The four miles of new trestle from the Creighton plant carries two 8-inch concentrate pipe lines, two 13-inch tailing lines, a 6-inch water line enclosed in an insulated wooden box, and a walkway. The lines are all wood-stave pipe; those for concentrate and tailing are tested for 110 lbs. per square inch pressure and the one for water at 75 lbs. per square inch. From the point in the disposal area where Creighton tailing is dumped, the concentrate lines are installed on existing Copper Cliff tailing trestle for the remainder of the 7½ miles to the reduction plants. For fire protection on the new trestle corporation cocks for a 1½-inch fire hose are inserted in the water line every 600 feet, and fire hose is provided in boxes along the line. The complete system is patrolled four times every eight hours.

The trestle extending from Creighton was built with a minimum 0.75% slope to and from each pumping station so that the concentrate lines would be self-draining in case of power difficulties. All concentrate from drainage is collected at each station in a spill sump which will hold three complete drainages from the concentrate lines. From the spill sump the drainage is pumped into the concentrate sump for return to the pipe lines.

Drainage from the tailing lines is arranged through quick dumping valves situated a short distance on either side of the stations.

Of concrete, steel, and cement block construction, the pumping stations are completely fireproof. Sumps to receive tailing and concentrate pulps form one wall of the building. Three 8-inch by 6-inch pumps for concentrate and three 10-inch by 8-inch pumps for tailing, all rubber-lined, are installed in a straight line. Auxiliary gland water pumps and a vertical clean-up pump in the concentrate drain sump complete the installation.

The specific gravity of the concentrate and tailing pulps varies with the mill tonnage; pipe line velocity and volume handled must remain reasonably uniform. When milling 10,000 tons a day approximately 1,800 tons of concentrate and 8,200 tons of tailing are produced. Under these conditions the concentrate pulp has a specific gravity of 1.28 with a flow of 800 g.p.m. The 8-inch by 6-inch concentrate pumps are designed so one pump can handle this flow through one 8-inch line at a velocity of 5.11 feet per second. Original test work showed the line loss due to friction when pumping 600 to 800 g.p.m. to be 17.5 feet of head per 1,000 feet of pipe. The longest concentrate pumping stage is a distance of 9,700 feet where the static head is minus 49 feet. The tailing pulp has a specific gravity of 1.35 with a flow of 2,500 g.p.m. The 10-inch by 8-inch tailing pumps are designed so one pump will handle this flow through one 13-inch line with a velocity of six feet per second; the loss in head due to friction in the line approximates 10 feet of water or pulp per 1,000 feet of line.

The complete pumping system has been designed for trouble-free operation despite the rigorous northern winter weather. Several times the temperature has ranged to 30 degrees below zero with no operating difficulties.

Studying Employees' Ideas



Thorough consideration of every idea submitted under the Employees Suggestion Plan is promised the men of Inco plants, and the above photographs show how the promise is carried out.

In the top picture is the Mines Suggestion Plan Committee in session: clockwise around the table, R. F. Silver, head efficiency engineer; George Thorpe, chief mines engineer; Ralph Cleland, general safety engineer; R. H. Keast, asst. general supt. of mines; John Keast, secretary; W. E. Gillespie, electrical supt.; J. C. Ferguson, master mechanic of mines.

Second photo shows the Reduction Plants Suggestion Committee: A. A. Eldridge, secretary; W. J. Ripley, master mechanic of reduction plants; S. A. Crandall, chief engineer; I. Klassen, operating engineer; W. H. Soule, asst. electrical supt.; C. C. Coe, mill engineer; D. Finlayson, general supt. of smelters.

And in the third picture is the Copper Refinery Suggestion Plan Committee: Carl Wilson, secretary; F. Sheridan, asst. supt. of casting; R. Rodger, mechanical supt.; E. Rabeau, supt. casting and transportation; W. Koth, supt. tankhouse depts.

Disposal of Copper Cliff Tailing

Tailing from the main concentrator at Copper Cliff, amounting to more than 500,000 tons per month, is collected in a central sump and pumped 1,200 feet from the mill to five thickeners 110 feet in diameter and 12 feet deep. The pulp is thickened from 33% to 50% solids, the clear overflow water returning by gravity to the mill. The thickened pulp is then pumped 5,000 feet to C station of the disposal system, from where it is relayed through pumping stations located

around the perimeter of the disposal area. Four of these stations are expendable and must be relocated as the elevation of the disposal area is raised.

Between the rocky hills around the edge of the tailing area dams have been built with tailing sands spigotted from the bottom of the wood stave pipes. Clear water from the tailing disposal area overflows through a reinforced concrete chimney five feet square, located in the lower elevation of the tailing area, and, after passing through a

Television Set Was Gift to Retiring Works Auditor



If not the first, certainly one of the first television sets used as a presentation piece in Sudbury District was the handsome set given to E. C. Lambert, retiring works auditor, by members of the accounting department. Not a man for dallying about a drawing room with a teacup in his hands, or for seeking the spotlight in any way, Earle, nevertheless, found himself guest of honor at a party right in the offices where he wound up his 44 years of distinguished service to the Company.

The girls disconnected the comptometers and plugged in the coffee urns; the accounting department men who had gathered from all plants for the occasion went into a deep swoon at the sight of heaping trays of sandwiches and cakes served with the coffee.

Presentation of the television set was made by Alex Godfrey, who voiced the admiration and respect felt throughout the department for the man who had been its chief so many years, and hoped that the gift would bring

much enjoyment to Mr. and Mrs. Lambert in their home at Port Colborne. In the photograph, left to right, are A. Godfrey, Jean Bell, Dina Minardi, Eileen Ferguson, Jo Walmsley, Carole Kennedy, Carol Bruce, Pat Bell, Carolyn Wood, Maureen Brannigan, Gloria Calandra, Rosemary Owens, E. C. Lambert, Margaret McDougall, K. Savoie, Doris Wilkie, Ann Sullivan, Joyce Green, Doris Holmberg, Molly Fiss, D. McIntyre, Joyce Hodgins.

1,400-foot tunnel in a solid rock outcrop, travels to a storage area for use by Copper Cliff concentrator.

The tailing lines are 16-inch wood stave pipe. They are installed with a minimum .50% slope to allow for line drainage through quick dumping valves located at low points. Pumping stations are equipped with rubber-lined pumps where water is available for gland sealing, and with steel-lined pumps in other locations.

Specific gravity of the thickened tailing pulp from Copper Cliff is 1.48. When milling 30,000 tons per day approximately 4,500 g.p.m. is pumped through the line with a velocity of more than seven feet per second. The head loss due to friction in the pipe line is somewhat over 10 feet of pulp per 1,000 feet of pipe.

Another extensive pipeline project necessitated by the construction of the new mill at Creighton was the laying of a water line from the Vermilion River, six miles to the west. A pumping station was erected at the river and a 20-inch continuous wood stave pipe, built stave by stave in the field, was laid to a booster station built at Creighton. Pumping capacity is 3,500 g.p.m., 3,000 gallons for the new concentrator and 500 gallons to augment the existing supply for mine use. The water leaves the pump at the river at a pressure of 125 lbs. per square inch and arrives at the booster station at one or two pounds pressure; it is raised to 60 lbs. per square inch for use in the mill. The pumps at Vermilion River are operated by remote control from Creighton.

Good News of The Pensioners

Acknowledging the Company's Christmas bonus, which is sent to pensioners as well as to members of the active force, many letters of appreciation have been received from Inco veterans by I. J. Simcox, general asst. to the vice-president.

It's good to hear the news from these old-timers and to learn that they are still keenly interested in the Company's activities.

In a clear firm hand despite his almost 86 years, John O'Donnell wrote from Stirling, Ont., to say that both Mrs. O'Donnell and himself are in good health and wish everybody in the Inco family best wishes for 1952. "We wish to thank you all for the lovely Christmas bonus," he added.

From Garson Arthur Lye wrote, "Please convey to Dr. Thompson and Mr. Beattie my appreciation of their good wishes and my sincere thanks for the Christmas cheque. I am sure that such an action each year makes all the pensioners feel that they are still part of the Company, although retired from active duty. Please accept my best wishes for everything of the best in 1952."

Mrs. Frank J. Eager, from her home at 10 Choate Road, Belmont 78, Mass., sent this message: "During the past year someone called me 'a goodwill ambassador for Inco'.

Now that is exactly what the pensioners and their wives become. After many years' association with the Company, one develops an intense interest and loyalty which never lessens."

The boys at the Concentrator, and all his old friends for that matter, will be glad to hear that Evan Jones is enjoying good health. He wrote from Semiahmoo, B.C., about 30 miles from Vancouver, where he was basking in the sunshine between stints of gardening. He had visited friends and relatives in Montreal and Winnipeg during the past year and was planning a trip to California. His son Evan is with Dominion Rubber Co. at Montreal, has a son and a daughter; his daughter Mary is in Milwaukee, where her husband George Reid is doing export business with the Bucyrus Co. and has half the world as his sales beat; they have three sons. Evan says he is a faithful Triangle reader and feels a personal pride in the Company's development and progress.

THAT EXTRA TOUCH

Entering the kitchen one evening the mistress was amazed to see her cook, who was going home for the night, packing some empty grapefruit hulls into her black bag. Completely mystified, she asked:

"Mandy, why in the world do you take trouble to carry home those empty grapefruits?"

"Well, ma'am, Ah admit they ain't any use to me, but they sure does make my garbage look stylish."



Smoker Honors Four Froodians

To say farewell to four popular figures at the mine who have been transferred to other activities in the Company, a big Frood-Stobie gathering from both surface and underground packed the Polish Hall in Sudbury at a rousing Saturday Night smoker.

Special entertainment, including a pleasing variety show rounded up by Norm McGillivray, and some fancy whistling by Danny Parker that was strictly from the birds, was followed by a lunch.

Harry Towns, now surface foreman at Murray, Jack Cullen, now asst. superintendent at the Open Pit, Bert Meredith, now with the Industrial Relations Dept. at Copper Cliff, and Frank McAteer, now superintendent at Levack, were the four prominent former Froodians honored. They're seen in the first picture of the accompanying layout, from left to right in that order. In the evening's ceremonies each was warmly eulogized and presented with a steam iron.

It was a great night for the Frood-Stobie clan, and the Triangle camera caught several groups of familiar faces:

2. Fred Steele (front centre) and some of the gang from 1600 North.

3. Bob Wotton (Stobie First-Aid), George Holmes (Open Pit Engineering), and Cliff Roach (1200).

4. Harry Sudom (1800), Gene Siara (1400), and Bill Majeram (Surface).

5. Bob Bridges (Graveyard), Jack Patus (Mines Research), Supt. Cliff Stewart, Joe Serpell (Crean Hill), Ray Negus (Mechanical).

6. Supt. Harry Smith of Murray, Bill Rorison (2200), Joe Retzel (construction foreman), and Bill Ruff (No. 4 Shaft skiptender).

7. Raoul Sauve (1800), Paul Burtynk (1000), Lloyd Bass (2800) and Bernie Jodoin (2800).

8. Clyde Wendzel (1000), Bill Didow and Ed Shawera (3300), and John Merrick (Copper Cliff Concentrator).

Legionaires Fete Ladies

Just about as nice an evening as you could wish for is the annual Ladies' Night of Copper Cliff Branch of the Canadian Legion at the Italian Hall. To show their gals at least one memorable time a year the boys go all out with special decorations and table centres, corsages, an epicurean dinner, imported entertainment, and dancing to a smooth band. The result is night club atmosphere unexcelled this side of gay Paree.

Committee in charge of the 1952 do was headed up by the indefatigable "Red" Pianosi, who also acted as master of ceremonies. Others on the preparation lineup were Doug Gathercole, Omer Racicot, Len Turner, John Robertson, Gordon Telford, Bill MacKay, Roy Longfellow, Tom Smith and Waverly Tyers (who, with an artistic assist from Mrs. Tyers, was responsible for the smart decorative effects).

Songs by the young Winnipeg comedienne, Libby Morris, and mystifying magic by Toronto's smooth Ron Leonard, were the keenly enjoyed special attractions.

Pictures on the right show some of the people who thoroughly enjoyed the big night:

1. (Counter-clockwise) Legion Zone Commander Ray Fraser of Levack and Mrs. Fraser; Mrs. Walter Johnston and her curling husband; Legion President Arn Boyd and Mrs. Boyd; Mr. and Mrs. Ron MacNeill of Levack.

2. (Counter-clockwise) Mr. and Mrs. Johnny McCreedy, Mr. and Mrs. Lionel Roy, Mr. and Mrs. George Chartrand, Mr. and Mrs. Bob McAndrew.

3. (Counter-clockwise) Miss Eileen Van-Allen, Mr. and Mrs. Fraser Fields, Mr. and Mrs. Elwood Trezise, Miss Margaret Cameron, Roy Longfellow, Andy Greenwood. In the left foreground is Mrs. Tom Peters.

4. (Counter-clockwise) The hands belong to Harold Debel and after that we have Mr. and Mrs. Jack Dunn, Mr. and Mrs. Bud Feick, Mr. and Mrs. George Syer, and Mrs. Harold Debel.

THE RECKONING

He spilt his milk, he lost his cap,
He wakened Baby from her nap,
He fought with Billy, bled his nose,
He drenched the postman with the hose,
He's thoughtless, troublesome, and wild,
I'll have to punish such a child,
But in the glow of bedside lamp,
Fresh from his bath, his curls still damp,
He says his prayers, bids me goodnight,
And adds—a customary rite—
"Mummy, have I been good to-day?"
My hasty anger slips away,
Must I recount each small disgrace
And blight that dear familiar face?
I think of all the good things done,
The ready smiles, the errands run,
And answer, always, "Yes, my son."

E. B. Sinclair

APPOINTMENTS ANNOUNCED

Appointments have been announced at Copper Cliff as follows:

Effective December 16: Alex Godfrey, works auditor; Clarence A. Beach, asst. works auditor; Russell J. Henderson, assistant to the works auditor.

Effective January 1: C. M. Harrison, asst. superintendent of transportation.

Effective February 1: W. H. Soule, electrical superintendent; A. E. Prince, asst. electrical superintendent.

If a word spoken in its time is worth one piece of money, silence in its time is worth two.—Talmud.



At Opening of Large Addition to Coniston's Club



A handsome hall, suitable for dances, banquets, badminton, and other activities has been added to the attractive Community Club at Coniston, accommodation which will be a real asset to the town's activities. Picture shows a few of the big crowd which gathered at the dance marking the official opening of the hall. Its value to the community was demonstrated again when the 2nd Coniston Troop of the Boy Scouts Association staged a great Father-and-Son banquet in the new building.

Nominated to Hall of Fame

When the boys in the locomotive shop at Copper Cliff heard that one of their work-mates, Aubrey Ireland, had been nominated to the Canadian Amateur Athletic Union Hall of Fame, they couldn't have been more surprised. They knew Aubrey well as a cheerful, friendly sort of a guy who always



AUBREY IRELAND ON THE JOB



... AND AS A PADDLING CHAMP

held up his end of a job, but never had he given them an inkling that he was one of Canada's all-time paddling stars.

Three oarsmen and a speed skater were admitted to the Hall of Fame last month, and the names of 10 others were referred back for further detailed information or study. Among the 10 was Aubrey Ireland of Sudbury, who had been nominated by A. D. Fluker, president of the Canadian Canoe Association.

Aubrey won the Canadian senior singles paddling crown in 1939-40-41, and the United States singles in 1940-41 in regattas at Washington and New York. He won the Canadian Olympic trials in 1939 and was to have represented Canada at Helsinki in 1940, but was robbed of this distinction when the

war intervened and forced cancellation of the event.

A collection of more than 70 medals, as well as many cups, crests, and pieces of silverware, are among Aubrey's trophies of the days when he was without a paddling peer in Canada.

He joined the army in 1939, transferred to the air force in 1941, and was tail gunner in a plane which was shot down over Holland. Badly injured, he spent many months in hospital.

Invited to Sudbury by W. S. Beaton in 1947 to coach the Canoe Club, Aubrey joined Inco and has been with the Company since that time. He was married in May of 1950 to Miss Sylvia Wootton.

Hall of Fame recognition couldn't happen to a finer fellow than Aubrey Ireland.

"IT AIN'T THE GIFT"

It ain't the gift a feller gits, it ain't the shape nor size, that sets the heart to beatin' an' puts sunshine in yer eyes. It ain't the value of the thing, nor how it's wrapped nor tied; it's something else aside from this that makes you glad inside. It's knowin' that it represents a love both deep and true, that someone carries in his heart and wants to slip to you. It's knowin' that some folks love you, and tell you in this way . . . yes, sorter actin' out the things they really long to say. So 'tain't the gift a feller gits, nor how it's wrapped nor tied; it's knowin' that yer folks like you that makes you glad inside.

LEAST OF HER WORRIES

"We've got so much to do, Mother," the worried bride-to-be remarked, "and we mustn't overlook the most insignificant detail."

"Oh, don't worry about him," the mother replied soothingly, "he'll be there."

HARNESSED FURY

"I hope," said one wife to another, "that you never nag your husband."

"Only when he is beating the carpets," said the second one. "When he is thoroughly irritated he makes a much better job of it."