

Shaping the Destiny of Inco Metallurgy (Story on Page 4)



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

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## Sign Agreement At Thompson to **Cover 3 Years**

The early acceptance of a new three-year collective bargaining agreement by our hourly paid em-ployees at Thompson, Manitoba, is most gratifying in that it assures a long period of uninterrupted production and labor stability at International Nickel's Canadian facilities," said Inco chairman Henry S. Wingate.

His statement was made following ratification January 26 of the contract by members of Local 6166 United Steelworkers of of The America.

"This agreement, combined with last year's new contracts (which run to July 10, 1972) with em-ployees of the Ontario division also means the Company can confidently press forward with its plans to expand its annual Canadian nickel production capacity to 600,-000,000 pounds in 1972," Mr. Wingate said.

The rapidly expanding Mani-The rapidly expanding Mani-toba division accounts for about 25 per cent of International Nickel's annual production ca-pacity, with the Ontario division accounting for the remainder. International Nickel has plans to spend \$600,000,000 from 1970 through 1972 to expand its pro-duction capacity in Ontario and Manitoba by more than 30 per cent. cent

International Nickel's current labor agreement in Manitoba was not due to expire until February 28, but negotiations for a new contract began early last month and were successfully concluded on January 21, when the local's negotiating committee signed a memo-

randum of agreement. The new Manitoba contract runs until February 28, 1973. It provides for benefit increases in three one-year periods lasting from March 1 until the following Pebru-ary 28. The first year's wage increase is effective as of January 1. 1970.

Under the terms of the agreement, the hourly wage rate for surface employees in Thompson will increase from \$2.737 to \$3.155 retroactive to January 1, 1970, and to a top rate of \$3.535 in the third year; for underground employees from \$2.971 to \$3.404 retroactive to January 1, 1970, and to a top rate of \$3.820 in the third year. The top hourly wage scale will rise from \$3.985 to \$5.05 during the life of the contract. In addition, a



J. A. PIGOTT



D. D. RAMSTAD

national Nickel Company of Can-

The new vice-presidents are John A. Pigott, John McCreedy, Ashby McC. Sutherland, Dean D. Ram-

John A. Pigott, formerly an as-

sistant vice-president, will be dir-ectly responsible for all mine,

plant and construction operations, and community affairs, of the

Company's Ontario division. Mr. Pigott, who has been general man-

ager of the Ontario division since

1965, joined International Nickel's

mines engineering department at Copper Cliff in 1940. In 1967 he was named an assistant vice-presi-

compasses nine mines and the

cost-of-living bonus of up to five

cents an hour will take effect dur-

ing the third year of the contract.

Additional Benefits

creases, the contract also calls for: A \$30-a-week winter vacation

tal insurance plan with pre-miums to be paid by the Company, and the Company to assume the full cost of all the

health insurance plans now in

Establishment of a formal training program for appren-tices and tradesmen to upgrade

their skills, with tuition assist-ance by the Company. Wage rate protection for em-

ployees adversely affected by technological change,

A ninth paid holiday. An increase in the premium for working Sunday evening and

lieu of lost wages.

night shifts.

A three-stage increase in weeky accident insurance benefits in

bonus in the third year.

In addition to the wage in-

Establishment of a basic den-

dent.

effect.

The Ontario division en-

stad, and Stephen F. Byrd.



INCO TRIANGLE

J. McCREEDY



S. F. BYRD

FIVE NEW VICE-PRESIDENTS



A. McC. SUTHERLAND



N. H. WADGE

### February, 1970

engineer at the Frood-Stoble and Creighton mines in the Sudbury district. He has been general manuistrict. He has been general man-ager of the Manitoba division includes the large Thompson nickel mine and the Birchtree mine, related processing and re-fining plants, as well as the Soab and Pira mines which are under and Pipe mines which are under development.

Ashby McC. Sutherland, formerly assistant to the chairman, is responsible for the conduct of the overall legal affairs of Interna-tional Nickel. He continues to be responsible for concluding the basic arrangements with International Nickel's partners and the French government for the New Caledo-nian project and for the coordi-nation of all the company's activities involved in launching this project, which is expected to add 100 million pounds of nickel annually to the world's supply. Ininually to the world's supply. Ini-tial production is expected in 1974. Mr. Sutherland joined Interna-tional Nickel in 1953 and was named general solicitor of the parent company and its United States subsidiary. The Interna-tional Nickel Company, Inc., in 1957, Mr. Sutherland continues as vice-president of the U.S. subsidiary.

Dean D. Ramstad, formerly assistant to the president, will be the leader of an executive group responsible for making assessments and recommendations on the pursuit and development of resource opportunities outside of Canada and New Caledonia. He will also serve as liaison officer to the Company's foreign develop-mentment projects. Mr. Ramstad joined International Nickel in 1957. and has long been associated with the Company's foreign develop-ment activities. He continues as

(Continued on Page 14)

### **Congratulations from the President**

Congratulations and appreciation of the Company's executive officers on the speed and efficiency with which operations are being brought back to capacity following the long strike shutdown in the Ontorio division were expressed by president Albert P. Gagnebin on a recent visit to Copper Cliff. Here he is shown (left) shaking hands with J. R. Feick, superin-



tendent of smelters; centre is L. E. Cupp, superintendent of process technology, Port Colborne.



in discussion with the president at a lunchean at the Copper Cliff Club are 8. M. Forsythe, general purchasing agent, R. N. Brawne, superintendent. Copper Cliff mill; G. A. Dick, manager, copper refinery.

ELECTED BY INCO DIRECTORS complex of nickel and copper pro-Five executives of The Intercessing facilities in the Sudbury ada, Limited have been elected by District, the Company's nickel rethe Company's board of directors fining operations at Port Colborne. to the position of vice-president, and the mine and mill it is de-Henry S. Wingate, chairman, an-nounced Pebruary 11 at Toronto. veloping at Shebandowan.

John McCreedy, formerly an assistant vice-president, is directly responsible for all mine, plant and construction operations, and community affairs, of the Company's Manitoba division. He joined International Nickel in 1949 as an

Inco Family Album



A Copper Cliff boy who grew up in Powassan and Loring, Eddy Bradley came to Inco in 1960 as a sampler at Copper Cliff, and is now a 1st class maintenance mechanic at Clarabelle open pit. With him in this happy family picture are his wife Eila, and children Kari, 1, Kenny, 8, and Keith, 7. In 1966 Eddy moved a house from Long Lake to Kelly Lake, installed his family, and then proceeded to remodel the 30year-old structure in his spare time.



Both second generation Incoites, Russ Haas and his wife Bev are raising their family in the rural setting of the Oja subdivision near Simon Lake, where they've lived since 1963. Born in Bruno, Saskatchewan, Russ came East with his parents in 1942, started with the Company at the Creighton mill in 1957, and has worked underground at No. 6 shaft since 1965. Their smiling brood are Michael, 5, James, 3, and Cathy, 8. Hunting is Russ's favorite recreation.



It was in 1948 that Fraser Oakley left St. Ann's and the fishing boats of Cape Breton Island for Inco and the Copper Cliff smelter. He switched to underground operations in 1949 and has worked as a drill fitter on the mobile drill rigs at Stobie for the last four years. He and his wife Irene and their large happy family live near Hanmer. The youngsters are Peter, 8, Gary, 12, Debbie, 17, Mary, 8, Cindy, 11, and Barbara, 14.



Tom McGuigan and his wife, Beatrice, were born and brought up in Sydney Mines, Nova Scotia. Tom left the coal mines and came to the Niagara Peninsula in August, 1967, and is a floorman at the Port Colborne nickel refinery. With their four sons, George, 9, Roy, 6, Derrick, 3, Lloyd, 2, and daughter, Adeline, 8, they reside in Crystal Beach. Tom enjoys fishing and carpentry (he built his own boat), and is a Cub leader. Mrs. McGuigan is a Brownie leader.



The handsome family of Walter and Elsie Gabbert represent the Manitoba division in this month's Family Album. A labor boss at the Thompson smelter, Walter moved his family to Canada from Germany in 1954, worked as a dairy farmer and gold miner in Ontario, as a potash miner in Saskatchewan, then joined the Company at Thompson in 1965. The youngsters, who enjoy travelling and camping almost as much as their parents, are Hans, 13, Inge, 16, Reinhard, 15, Marianne, 12, and Barbara, 5.



Seen with their family of three boys, Bobby, 8, Danny 6, and Tommy, 9, are Copper Cliff warehouse storeman Lionel Bechard and his wife Liliane. Lionel's home town was Britt, Ontario, and he left there for Inco and the smelter in 1959. A keen sportsman, his recreational activities include bowling, umpiring baseball, and coaching the warehouse hockey team in the Copper Cliff shift league.



Tom Mossey (centre) assistant superintendent in charge of No. 1 station, confers with senior project engineers Dale Robinson and Leon Baltas on a flow sheet.





Shift leader Roger Agnew is taking a sample from a leach circuit in No. 3 station.



Ron Brooksbank, senior plant technologist, is shown compiling data on a test run in the TBRC in No. 2 station.

Former assistant superintendent in charge of No. I research station, Bill Hudgins has been assigned to the IPC project.

Dr. J. A. E. Bell (right), superintendent of the Port Colborne research complex, is shown in conference with the late Keith Fordy, instrumentation supervisor, on the programming of a new master control panel in No. 3 station designed by Mr. Fordy.

## Part of the Enthusiastic Team Sharing New Process Successes



Senior project engineer Frank Olano and project engineer Glen Sherk examine a No. 2 station flow sheet with assistant superintendent Louis Martel.



Formerly superintendent of the Port Colborne research stations, Michael Head is now stationed at Copper Cliff, in charge of the process engineering aspects of the entire IPC project.



Discussing an IPC residue treatment flowsheet are project engineer Ted Hodkin and Val Opratko, former assistant superintendent in charge of No. 3 station and now with the process development group at the Toronto office.



Emil Smyte, mechanical co-ordinator, and Kjeld Bech, project engineer, check out a new valve assembley. In No. I station alone there are more than 2,000 valves of various types.



At No. 2 station, engineer Luis Ponce takes readings from recorder chart.

In No. I station, shift leader Jack Borland adjusts speed of carbonyl pump while shift operator Bob Mc-Gowan checks carbonyl volume readings.



Scenically located on the shores of Lake Erie, the three stations of Inco's Port Colborne research complex appear in this photograph in the order of their construction. No. 1 station, on the right, was built in 1959, No. 2 (centre) in 1960, and No. 3 in 1967. To this unique scientific establishment come bulk samples of nickel ores from many parts of the world to be used in the development of new extraction processes on a pilot plant scale.



## Port Colborne's UNIQUELY VERSATILE **Research Complex**

OUR COVER PICTURE shows a section of the hydrometallurgical research station, a bewildering assembly of tanks, filters, piping and valves, where an intensive effort is being made to develop new more economic processes for the commercial treatment of nickelcontaining lateritic ares. To withstand the severe corrosion conditions in this plant, a large proportion of the leach circuit vessels and piping is constructed of fibre-glass reinforced plastic. In the centre of the picture is Gord Lissaman, senior research chemist, and in the foreground is Paul Feduck, shift operator. (George Hunter Fhoto)

SHAPING the destiny of International Nickel's metallurgical operations both at home and in many countries abroad, the Inco research station complex at Port Colborne has during the past 10 years been the proving ground for sweeping innovations in the nickel industry.

A new nickel refinery, to cost in excess of \$100 million, is now under construction at Copper Cliff and will go on stream in 1972 as a result of innovations in nickel smelting and carbonyl technology developed at the research stations. The more distant future will see International Nickel plants for the processing of nickel oxide ores in such places as Guatemala, New Caledonia, Australia and Inonesia. The processes will have been developed at the Port Colborne research station complex.

An earlier achievement was development of the process for producing a new form of primary nickel oxide sinter 90. nickel The highly adaptable research station facilities were operated on a

More of the Team: (left) Adjusting the speed of an autoclave, leaching IPC residues in No. 3 station, is shift leader Gary Wills; (centre) project engineer Peter Garritsen adjusts an on-stream a commercial scale. colorimetric analyzer in No. 3 station; (right) H. C. Garven, formerly assistant superintendent in charge of No. 1 station, is now in the process development group at the Toronto office.





semi-production basis of 5 million lbs./month to make shipments to customers throughout the world for test purposes, and the new product quickly won wide accep-tance. As well as developing the technique, Port Colborne research personnel participated in the design of the equipment for the big new plant completed at Copper Cliff in 1965 to put it to work on

Wide Variety of Equipment The three Port Colborne research stations were built to provide pilot scale facilities for process development in the three basic areas of metal extraction, namely pyrometallurgy, hydrometallurgy and vapometallurgy, nydrometallurgy and vapometallurgy. The wide variety of equipment thus made available permits assembly of almost any required sequence of unit operations for process development on either the sulphide ores as occur in Canada or the oxide (lateritic) ores of the tropics.

These permanent broad-purpose facilities, unique in the world, eliminate the necessity to design and build uni-purpose pilot plants for each major process development as it comes up, thus drasi-cally reducing the interval be-tween the birth of an idea in the research laboratory and its final translation into full plant production.

(Continued on Page 6)

#### TBRC Makes Direct Conversion of Nickel Sulphide to Metal

## Port Colborne's Research Complex

(Continued from Page 5) Manning the mase of technological hardware in the Port Colborne complex is a staff of about 150, some of whom are shown in accompanying photographs. Some 15 different nationalities are repre-sented in their ranks, which include several holders of doctorate degrees and many with highly specialized training in the sciences. A substantial number of local district boys with high school education have qualified as technicians or supervisors. Noticeable among the personnel is a strong esprit de corps, a sharing by all hands of the keen satisfaction in bringing a pilot project successfully through the often frustrating period of trial and adjustment to a practical and economical production basis.

#### Two-Fold Mission

The research complex's mission is not only to produce the process is not only to produce the process but also to provide people with technical expertise for plant de-sign and operation. The Port Col-borne stations will contribute a nucleus of key personnel for the new nickel refinery at Copper Control of the station of the Chiff.

The brilliant successes of the research complex have not been won at any cost to safety, which as at all Inco plants gets top priority, There's solid pride in the accident prevention record, which at mid-January showed No. 1 station with 1,861 days worked since its last lost-time accident, No. 2 station with 1,809 days, and No. 3 station (the newest) with 612 days.

It was in 1959, to implement its accelerating process research program, that International Nickel undertook construction of the three research stations at Port Colborne. First to go up was the vapometallurgy pilot plant, dedicated to expanding the scope of the carbonyl process in which crude metallic material is vaporized for the extraction of nickel and other values. No. 2 station was built in 1960 to pilot pyro-metallurgical processes involving high temperature chemical reactions such as reduction, oxidation, and smelting. No. 3 station, built in 1967, is the hydrometallurgy pilot; concerned with chemical reactions in water, it can undertake a wide variety of leaching, precipation and exchange reactions.

The Port Colborne complex works in close liaison with the scientists at Inco's J. Roy Gordon research laboratory at Toronto, where new process ideas are brought through the "test tube" Toronto, and mini-plant stage and then turned over to the research stations for development on a pilot plant scale. Many of the projects are of long term duration, and some, of course, do not turn out to be economically feasible. New Processes for Copper Cliff

Two new processes piloted at

here is the topblown rotary converter (TBRC) at No. 2 research station. This refractory-lined furnace is rotated at speeds up to 20 rpm during a heat. Not visible is the oxy-fuel lance which passes through the flue at one end of the furnace. A hydraulic retraction system, partly shown, moves the flue away from the converter for inspection of the bath, sampling, and tapping. Pivoted at the discharge end. the converter is tilted in a vertical plane by two hydraulic rams for tapping. Two 50-

Shown in operation

ton converters will be operated in the new nickel refinery at

Port Colborne will be used in the nickel refinery at Copper . The first involves the ap-Cliff. plication of the oxygen top-blown rotary converter (TBRC) to the direct conversion of nickel sul-phide to metal. The second is based on the treatment of crude nickel metal by a new vapometal-lurgical process, the Inco pressure carbonyl process (IPC), which operates at moderately elevated pressures.

The refinery will be concerned with the processing of all of Inco's precious metals-bearing intermediates from the matte separation operation at Copper Cliff and residues from the refineries at Port Colborne and Thompson. It will recover high purity nickel pellets and powders, cobalt, refined copper, and a precious metals concen-trate for refining at the Com-pany's facility at Acton, England. The design capacity of the new plant is 100 million lb./yr. of nickel pellets, 25 million lb./yr. of nickel powder, and 27 million lb./yr. of copper cathodes.

Long-Sought Method Inco had long sought a practical method for the direct conversion of molten nickel sulphide to metal. Early trials in conventional equipment failed because of the formation of refractory nickel oxide during the conversion step, and the consequent slagging of much of the nickel. By 1959 a practical method had been devised and pilot scale tests were conducted in an experimental ton-blown rotary converter at the Domnarvet Steel Works of Stora Kopparbegs, in Sweden. Subsequently at Inco's pyrometallurgical research station at Port Colborne, tests were conducted in a 7-ton TBRC for the development of a commercial scale operation.

The key to the operation is temperature control by a combination of surface blowing with oxygen



Copper Cliff, With an output of 275 tons per day each will be

and mechanically induced turbulence. After charging, the vessel is rotated and the sulphide melted

capable of providing almost all

the feed for the IPC plant.

with an oxy-fuel lance. When the

Action During a Pilot Run of TBRC



A typical scene during pilot runs of the TBRC shows Garry Ashenden (left) intermediate shift operator, recording temperature readings; Zoli Barnai (centre), senior shift operator, rabbling slag from the surface of the metal in the furnace; Bernie Portolesi, intermediate shift operator, measuring bath temperature with an optical pyrometer.

INCO TRIANGLE

Guidance Teachers See Stobie Mine on CIMM Tour

2,500"P the oxygen blast is turned on and continued until the sulphur content of the bath is decreased to the desired level. For the IPC process a residual sulphur content of about 4% is desired - a relatively easy task for the TBRC. As a result of burning sulphur As a result of burning supnur with oxygen the melt temperature rises to over 2,900°P by the end of the cycle. The molten product is granulated by water quenching and the granules dried for treat-ment by the IPC process.

melt temperature reaches around

Carbonyl refining of nickel, long in operation at Inco's Clydach works in Wales, is based on the discovery by Carl Langer and Ludwig Mond that carbon monoxide at atmospheric pressure and tem-peratures between 100 and 200"P reacts with "active" nickel to form nickel-carbonyl gas. At atmos-pheric pressure the carbonyl-forming impurities in crude nickel do not enter the gas phase, thus the process is highly selective. The reaction can be reversed by heating the nickel-carbonyl to tempera-tures in the range of 300 to 600"P. In contrast the newly developed IPC system, which involves reaction at elevated pressures, makes it possible to treat refractory materials such as metals and alloys produced by melting, not other-wise possible by the conventional carbonyl route.

#### 10 Years in Development

At No. 1 research station, over a 10-year period, the IPC process was successfully developed for a variety of refractory materials, such as roasted and reduced pentlandite-rich flotation concentrates, roasted and reduced mattes, matte separation metallics, and various crude nickel products and nickelcontaining residues. The heart of the vapometallurgical research station is the pressure reactor where the crude metals are contacted with carbon monoxide at pressures up to 70 atmospheres (1,000 psi) and temperatures up to 350"P. Specially designed seals, key to the success of this operation, were proven 100% effective on the pilot reactor at Port Colborne, Depending on operating conditions, nickel and iron are extracted as car-bonyls. These are separable be-cause of their markedly differing chemical and physical properties. The carbonyl vapors are con-densed, stored, and then pumped to a fractionation column where nickel and iron carbonyls are separated on the basis of the difference in their boiling points. Nickel carbonyl vapors from the top of the fractionation column are decomposed by heat to pure nickel pellets or powder. The iron-rich bottoms product is vaporized and decomposed to yield ferro-nickel powder.

The residue from the Copper Cliff nickel refinery process will be subjected to several hydrometallurgical treatments to recover con-tained copper, cobalt and residual nickel, and to produce an alloy rich in precious metals. The hydrometallurgical process, also extensively piloted at the research stations, selectively dissolves nickel, cobalt and copper by leaching at superatmospheric pressure. The nickel-cobalt leach liquor is subjected to further purification to separate and recover these metals, while copper is recovered as cathodes by electrowinning. The nickel-containing lateritic

Continuing a planned program to establish closer liaison between industry and the schools, Sudbury branch of the Canadian Institute of Mining and Metallurgy organized a tour of Stoble mine underground operations and the Inco data processing centre at Copper Cliff for a large group of guidance teachers from district secondary schools.

Other teacher groups and ad-ministrators will tour the mining industry in the area, and CIMM speakers will visit both secondary and public schools to show mining films and describe career oppor-tunities in the industry.

The guidance teachers were en-

ores comprise the largest known reserves of nickel in the world. reserves of nicket in the work. The ores of Cuba, Guatemala, New Caledonia and Indonesia are of this type. While the Sudbury sul-phide ores may be processed by well established techniques such as flotation and magnetic separation, the oxide ores are not amenable to such treatment because of the manner in which their nickel content is chemically disseminated. Commercially, hydro-metallurgical and pyrometallurgical techniques are used to extract nickel from this type of ore. At the Port Colborne research stations an intensive effort is being made to develop new, more eco-nomical processes for the treat-ment of nickel-containing lateritic ores which are certain to play an important part in the future of the nickel industry.

#### NOT A CHANCE

Tourist: I clearly had the right of way when this man ran into me, but you say I was to blame.

Local Officer: You certainly were.

Tourist: How come?

Officer: Because his father is mayor, his brother is chief of police, and I go with his sister.

#### Ultrasonic Washers

Ultrasonic waterless washers for cleaning glassware and intricate instrument parts use intense highfrequency sound waves, generated by vibrating nickel or nickel alloy parts to replace the usual water agitator or pump.

tertained by Inco at luncheon at the Copper Cliff Club, where they were addressed briefly by the CIMM branch president, Charles Hews, Inco superintendent of safety, and Jeff Dunthorne, Palcon-bridge Nickel Mines Ltd. representative on the CIMM executive.

Photograph shows those on the Stoble mine tour January 16: left to right, front row, assistant mine superintendent Ted Flanagan, Bob Tyler (Sheridan Tech), Gary Orasi (Lockerby Composite), Rene Trottier (Lively High), P. Zeppa (Sudbury High), L. Jones (Capreol High), Len Kitchener of Inco mines research, CIMM branch secretary.

Middle row, Georges Paradis (Sheridan Tech), E. Pollesel (Con-federation); Orv Lyttle (Lockerby Composite); Bob Vitali (Lo-Ellen Park); Joe Drago (La Salle); Pern Haula (Confederation); Pern Houle (Confederation); R. Fraser (Garson-Palconbridge); Jeff Dun-(Garson-Palconbridge); Jeff Dun-thorne (Superintendent of Palcon-bridge East mine); Stu Winter (chairman of mining and geology department, Cambrian College); Back row, Bob Gawalko (Sheri-dan Tech); J. C. Stolte (La Salle); We Backgroup (Mickel District);

Vic Bardeggin (Nickel District); Len Yauk (principal, Garson-Fal-conbridge); Dave Graham (CESO news editor); G. A. Hebert (Cheimaford); Joe Sintie (Sudbury High); Tom Parry (Copper Cliff High).

**Two Cliff Curling Club Rinks NOCA Victors** 



Two Copper Cliff Curling Club entries made it to the winner's circle in the annual NOCA banspiel, held January 15-18 with a full draw of 128 rinks and the handsome new idylwylde curling facility as host club. Art Romaniuk, former winner of the first event Inco trophy, skipped his crew of Moe Palmaro, "Chick" MacDonald and "Super" Bertuzzi to victory in the Algoma Steel event. They're shown here with the trophy and (centre) Sault Ste. Marie skip Harvey Snell, this year's winner of the inco trophy, who made the presentation.



Steve Kuzmaski, whose rink represented Northern Ontario in the Macdonald Brier in 1956, is still a big contender in any 'spiel. He's seen above with his men and the George Tate trophy: left to right, Jim Blackport, skip Kuzmaski, George Burns (who made the presentation), Bob Tate and Walter Dydyk. Two other Copper Cliff skips, George Stephens and "Moose" McQuarrie, came within a whisker of entering the curling fame hall of both scaring 7-enders in 'spiel matches. Another 'spiel highlight was the terrific comeback of Art Silver's rink, which was down 9-1 after four ends of an early game but hung in there to win it 10.9.

## **Retired Senior** Supervisors to Aid New Nations

Exciting new opportunities for experience abroad beckon to Inco penaloners with senior supervisory or managerial background in any phase of the Company's operations.

Canadian Executive Service Overseas is the organization that wants to hear from retired people with management and technical knowhow who will volunteer to spend up to six months assisting developing countries to achieve economic growth.

Pirst from Inco's Sudbury area operations to answer this challenge



is Archie Massey who retired last year as area superintendent of Copper Cliff North and Copper Cliff South mines, after 40 years of mining with the Company. Accom-panied by his wife he left Toronto by air January 16. bound for Lagos.

I. A. Massey Nigeria, to give expert advice to the government there in developing mining projects.

Mr. and Mrs. Massey travelled to Nigeria with two other retired couples, one from Winnipeg, the other from Burlington, embarking on similar volunteer missions. They expect to be gone from four to six months.

#### "Meaningful Contribution"

Canadian Executive Service Overseas is a non-profit organization operated by a group of about 100 Canadian business leaders, among them P. Poster Todd, executive vice-president of Inco. Its objectives are to amist developing coun-tries in crucial tasks of achieving economic growth by helping them strengthen their own organizations and institutions; to provide opportunities for Canadians of retirement age to make a meaningful contribution by utilizing their know-how and experience in the developing countries; and to in-crease friendly relations between the people of Canada and the people of other countries of the world. It has the support of the Canadian government through the



C. O. Dalton, CESO vice-president, confers with R. G. Lake, manager recruiting and employment, Inco Toronto on potential volunteers for expert aid to developing countries.

Off to an auspicious start for a big safety year in 1970 was Frood-Stoble mine, which on January 13 completed one million man hours without a lost-time accident, a run that started on November 21.

Prood-Stoble has compiled . 8 remarkable record of special safety awards, this being the 25th s milar achievement since 1944. The highlight, of course, was the completion in December, 1965, of 3.047,774 safe man hours, believed to be a world record for an underground mine.

Inco safety superintendent C. F.

Canadian International Development Agency.

Countries to which CESO has sent volunteers include India, Ethiopia, Turkey, Greece, the Phillipines, Jamaica, Trinidad, Barbados, St. Lucie.

Transportation costs and living expenses, and a car for local transport, are provided for the volunteer and his wife, but he receives no salary.

#### Attitude Important

In its booklet for prospective volunteers CESO has the following to say under the heading of 'Attitude'

"It is important for both the man and his wife to be understanding about the politics, traditions and religious practices existing in the country. They are not better or worse than ours -- merely different from ours and usually much older.

'Good physical condition for the man and his wife and a healthy mental outlook are prerequisites, as well as the ability to live in warm climates. Patience and adaptability are essential personal characteristics

"No amount of goodwill and material aid are adequate substitutes for understanding and sensitiveness to the values that another Hews had this to say about the most recent achievement;

Thats one giant Safety step for Frood-Stobie

Frood-Stobie Opens Year with a Million-Man-Hour Bang

S.M.H ...

SCOOPY

FRoop+

STOBIE

"All members of the Frood-Stoble work force are to be sincerely congratulated for this co-operative effort in safety while at the same time maintaining a high standard of pro-duction. This effort will serve as an example and will give impetus to the yearly program at all mines and plants. "A suitably inscribed award

will be presented to the Frood-Stobie personnel."

A representative group of Prood-

country holds dear. Our very efficiency, purposefulness and en-thusiasm for material success can be misunderstood in developing countries.

"A measure of sacrifice is to be expected and some of the comforts of home may be missing. These assignments involve work and are not picnics. Our executives should not expect that people will make much fuss over them. The key word is 'adaptability.'

"We realize that Canadian techniques cannot be completely transplanted. In almost every case modifications will be required if the assignment is to progress satisfactorily.

"Reward comes from a feeling of accomplishment at having helped, through the use of one's skills, people and countries in need of assistance and through making friends of people abroad and thus helping to strengthen relations with Canada."

Inco retirees wishing full information about this program should address their enquiries to Mr. C. O. Dalton, vice-president (Ontario), Canadian Executive Service Overseas, Suite 1005, 7 King Street East, Toronto 210, and should include a summary of their managerial or technical experience.

Stoble men, including a pair of the youngest and four of the veterana in service at the mine, posed for the above Triangle picture in recognition of the million-manhours achievement:

Kneeling: Dave Volpel (2% yiars), chute blaster at Stoble, and Andy Yasinowski (26 years), pil-lar leader at Frood, holding an appropriate poster from the mine safety department's effective Scoopy Sez series;

Standing: J. E. Planagan, assistant mine superintendent, Stoble; W. Collis, assistant mine superin-tendent, Prood; Ben Urbanavicius (1 year), jumbo driller, Prood; Mike Yuswak (22 years), school stope instructor, Stoble; Jim Hatch, safety supervisor: Joe Luptak (28 years), electrician, Stoble; Leo Lefebvre (23 years), welder, Prood; Dave Simon, maintenance superintendent, Frood-Stoble, S. J. Sheehan, area superintendent, Prood-Stoble and Little Stoble mines.

#### STILL & LIVELY BOOSTER

Although she is very happy living in Thompson, to which she and her husband moved about 10 years ago, Mrs. Herb Blais still has a warm spot in her heart for Lively, their former home

Subject of a feature story in the Thompson Citizen, Mrs. Blais is hailed as an expert at crochet, and has donated many beautiful examples of her work as prizes for draws supporting community enterprises.

Referring nostalgically to her former home town of Lively, Mrs. Blais colled it "the nicest small town in Ontario".

Too often travel, instead of broadening the mind, merely lengthens the conversation.



Vaughn Kalenuik

With a quartet like this to give it the old bazazz, Sudbury Jaycees annual Winter Carnival couldn't miss. There were dazens of other attractions during the week-long event starting February 1, but none could top the Carnival Queen contest. Seated is the charming winner, 17-year-old Francine Persoult, about to be crawned by last year's carnival queen, Marcia Veccia, daughter of Copper Cliff reverb department's Joe Veccia. No. 1 Princess, standing at the left, is 17-year-old Jennifer Roy, daughter of general safety supervisor Lionel Roy of Copper Cliff, and on the right is No. 2 Princess, 17-year-old Joy LaPierre, daughter of Garson mine's Bill LaPierre.

Taking a break between the snowmobile races that drew a huge crowd were Garry Cancallen (centre) of Copper Cliff utilities, and John Droper and Mel Bray of Frood - Stable min e engineering department.





Grace of Mike Frood-Stoble engi-neering, and his daughter Kelly, had a good friend in Mike Prouls, a of Sudmember bury Snowmobile Club, who took them for a thrilling spin around the loke. Guesstimotes of the carnival crowd ran as high as 20,000 people.



After the Storm

## Inco-Australia Sinks Exploration Shaft

International Nickel Australia Limited, a subsidiary of The International Nickel Company of Canada, Limited and the Broken Hill Proprietary Company Limited, issued the following statement January 22.

"Exploratory work in the Widglemooltha area of Western Australia, as previously reported, has located a number of nickel sulphide occurrences. In order to further evaluate their potential, an exploration shaft will be sunk in one of the locations. Additional investigations, necessary for full evaluation, will be carried out from this shaft.

The shaft will be sunk to approximately 1,000 feet and lateral workings will be driven from it into the mineral zones to check the continuity and nickel content of the mineralization, to obtain samples for mill and metallurgical testing, and to assess ground con-ditions. Diamond drilling will be carried out from the underground workings to explore the downward and lateral extensions of the mineral zones. Preliminary engineer-ing has been underway for some time, and site preparation for the new shaft will commence immediately. Shaft sinking is planned to begin in April. It is anticipated that the program will be completed early in 1971."

She won't mend his socks because he won't buy her a new mink coat. If he doesn't give a wrap, she doesn't give a darn.

### Wasted Days

So soon the Summers go, And come

And go And sadness, not

- That Winters come and Summers go,
- But that we leave behind Remembered days of joy, of love,
- Of hope, and strength to fight whatever foe disturbed our little life.
- Love and strife.
- We face the Winter of long sleep.
- Will it be quiet, undisturbed? Or will the yearning soul writhe in memory of lost
  - days,
  - wasted days
- When God's green earth was ours and
  - we saw it not?
  - -Marguerite Eve McGill.

(Mrs. McGill and her husband, E. R. McGill, member for Brandon in the Manitoba legislature, are former residents of Copper Cliff.)

#### Longer Engine Life

A complex nickel chemical in motor oil increases the life of certain automobile engine parts by decomposing and producing nickel oxide which is plated out at points of load, thus reducing the rate of wear.

## Ontario Division 1969 Safety Championships Announced



The All Mines Trophy is presented to Garson mine superintendent Milt Jowsey and safety supervisor Jim Pettigrew by M. E. Young, manager of mines.

## Garson Mine and Iron Ore Plant Are Triumphant

This may be the Age of Aquarius, if the star-gazers and soothmayers are on the beam, but 1969 was the Year of Garson as far as Inco all-mines safety and mine rescue trophies are concerned.

Garson won the John McCreedy trophy for Inco mine rescue teams in the Ontario division, repeating their 1968 triumph in this competition, and then topped off their big year by capturing the All Mines safety trophy, representing an all-out accomplishment shared by every man on the payroll.

Final standings in both the allmines and all-plants competitions are based on three factors, fre-guency of all injuries, frequency of lost-time injuries, and injury severky, so that just about every-thing with a safety connotation counts when the scores for the year are being added up. Oarson, which finished in fourth

spot in 1968, surged to the top at the end of last year by cutting its total injury severity by 80%, a tremendous achievement reflecting close co-operation and alertness by men and supervision alike.

Murray mine, which in 1968 shared first place in the All Mines award with Levack, finished sec-ond in the 1969 standings, fol-lowed by Levack, Frood-Stoble, Crean Hill and Creighton, in that order.

#### Worthy First Winners

Iron Ore Plant were worthy first winners of the new All Plants safety trophy, having put forth a great united effort by men and supervision that resulted in a 50% improvement over their 1968 figures for both total injury fre-

quency and total injury severity. Port Colborne nickel refinery placed second in this competition, and vow they'll make it to the top of the heap in 1970. In view of the drive and determination they displayed in improving their first aid competition performances until they emerged triumphant over the

best the North had to offer in the Ontario division championship showdown for the Ralph D. Parker trophy last spring, nobody but nobody is taking them lightly in their intentions concerning allplants safety laurels this year.

Reduction section placed third in the all-plants race for 1969, and copper refinery placed fourth. Trophies were formally presented

to representatives of victorious Garson and iron ore plant at a luncheon at the Copper Cliff Club, hosted by G. O. Machum, assistant general manager (processing) and G. R. Green, assistant general manager (mining).

The massive handsome trophies, realistically carved by Creighton mine's sculptor-in-residence, Karl Paxy, depict typical scenes in Inco's mining and processing ope-rations. They will occupy promi-nent positions at Garson and the IORP until new winners are anboth winners are firmly deter-mined that they'll stay right where they are for at least another year.

### New Inco Process Makes Superalloys

A unique new alloying process that could make possible the production of superalloys with a markedly superior combination of intermediate and elevated temperature properties has been in-vented at the Paul D. Merica Re-search Laboratory of The Inter-national Nickel Company, Inc., at Sterling Forest, N.Y.

The new metallurgical process, known as "mechanical alloying," is currently under development at Inco's research facility. Mechani-cal alloying is a high-energy process that produces homogeneous composite particles with an intimately dispersed, uniform structure.

Laboratory experiments indicate that the new process achieves for the first time the long - sought combination in a single superalloy of two metallurgical strengthening phenomena - dispersion hardening and precipitation hardening. Precipitation hardening, which goes back to the early part of this century, is a strengthening



G. O. Machum, assistant general manager (processing), presents the All Plants Trophy to E. G. Stoneman, manager of the iron are plant, and Dan Ferguson, safety supervisor.

mechanism resulting from the formation of inter-metallic compounds in an alloy structure. Dispersion hardening, which was discovered more recently, results from the introduction of nonmetallic compounds that restrict dislocation movements in the crystal lattice of a metal.

Inco's discovery of a means of combining the two strengthening mechanisms is expected to open the way for the manufacture of advanced superalloys to withstand the higher temperatures essential to improve economy and performance in power generation and in propulsion turbines. The super-alloys currently in use are pre-cipitation-hardened only and are used at temperatures up to about 1.800°P.



NO FOOLING WITH THESE BEGINNERS Jim Dowdall and Ron Bedard, like so many other "first-time" curlers in the Refinery 'spiel, were studies in total concentration.

## Dunc White Again Wins Refinery 'Spiel

Skip Dune White successfully defended his copper refinery curiing championship when he led his team of Frank MacKinnon, Tom Whiteside and Jim Dowdall to victory in the annual wire-bar classic at Copper Cliff Curling Club on January 10,

To cop the first event for the second year in a row, the redoubtable Dunc had to outfox another wiley refinery master of the besom an' stane, Wes Hart, who was stoutly supported by Dave Scott, Norm Dever, and Ted Armstrong.

Larry Martel, skipping Randy Steel, Dennis Tucker and Don Brickett, took the second event final over Jack McInnes (skip), George Trimmer, Stan Mitchell, and Mike Stencil, while in the third event it was Bill Brown

(skip), Fred Wilke, Ray Michaud, and Ron Bedard winning the final from Leo Pevato (skip), Jim Loney, Ben Moxam, and Ernie Mulse.

There were 29 rinks entered, a

fine showing of curlers. Bud Eles, the modest Copper Refinery Athletic Association secretary, says full credit for the highly successful 'spiel should go to Larry Martel, Dunc White, and Wes Hart.

Whether or not they were responsible, one of the event's most attractive features was the participation of three young refinery stenos, Linda Prantala, Linda Gibson, and Sharon Boyd, who may not have won any prizes but cer-tainly scored high in the popu-larity ratings.



Orest Andrews

## Did Mighty Meteorite Blast Sudbury Basin?

The origin and unique concentration of the Sudbury nickelcopper ores is a riddle that has fascinated geologists ever since the discovery days over 80 years ago. Now a new theory is rapidly gaining support — a theory strongly supported by evidence in both the field and the laboratory — that the Sudbury Basin is what is left of a crater blasted out of the earth's crust by an enormous meteorite perhaps two or three miles in diameter with an impact 200,000 times as powerful as the Hiroshima bomb.

Melted rock from the earth's mantle is thought to have carried concentrations of nickel and copper sulphides up into the shattered crust around the impact area, forming the so-called nickel irruptive on which the Sudbury mining industry is based.

The new meteorite theory, which might with modern irreverence be termed the Big Zap, was graphically described by Dr. Guy



SUDBURY BASIN ONCE LOOKED LIKE THIS????

The terraced mean crater Langrenus, which is some 85 miles across and probably about five miles deep, photographed last Christmas Eve from an altitude of about 150 miles by Apollo 8. There's strong evidence that Sudbury Basin looked like this, two thousand million years ago.

Bray, Inco superintendent of geological research at Copper Cliff, during a television interview skilfully conducted by CKSO newsman Ray Pichaud on the program "Pile Fivo":

Ray Fichand: The Sudbury Basin holds a unique geological position in the world. Dr. Bray, why is Sudbury so unique?

Guy Bray: Because it has probably the greatest concentration of nickel and copper and precious metals of any place in the world.

**R.F.:** I understand there is a rather interesting theory to explain why Sudbury has all this nickel and that it involves possibly a meteorite.

G.B.: Yes. A fascinating theory. One that has come up only in the last five or six years. We have been asking ourselves for many years what exactly is the reason for the many strange geological features here. Now it has been suggested that a meteorite hit the ground here about two thousand million years ago and as a result there was a tremendous explosion. A crater, perhaps 50 or 100 miles the across, was blasted out of earth's crust and this triggered off of the rock in the mantle became molten and carried concentrations of nickel and copper sulphide up into the crust. We don't think the nickel came from the meteorite, (Continued on Page 14)

#### ONCE 75 MILES WIDE AND ABOUT FIVE MILES DEEP??

The Sudbury Basin as it appears today, a pleasant forming and residen tial area about 17 miles wide by 37 miles long, surrounded by the rocky hills of the nickel irruptive dotted with mining plants, very likely was once the root zone of a more or less circular croter 50 to 100 miles wide and possibly five miles deep. At least that's what many geologists are now saying. During two thousand million years the sides of the crater were worn down to its present dimensions by the natural forces of erosion, leaving smashed rocks, shatter cones, and other evidence of a tremendous meteoritic impact and explosion. later (millions of years) massive upheaval in the earth's crust caused a front of younger rock to move in from the south east (see map), exerting enormous pressure and squeezing the Basin into its present elliptical shape, and also accounting for innumerable folds and faults found in the rocks of the Basin area.



#### INCO TRIANGLE

when they were married in Fort William in 1939, has been an invalid for many years.

Andy is looking forward to a

trip to the old country, and a reunion with his brothers whom

LORENZO PICHE

A copper refinery casting build-ing shift boss for the last 10 years, Lorenzo Piche had completed 34

Mr. and Mrs. Piche

years at the plant when he retired on early service pension.

in 1929, one year after his mar-

riage to French teacher Ida Pa-

quette, and started at the refinery

in 1935. Of their family of four,

Mary is the wife of iron ore plant dewaterman Livin Lanteigne, and

Gerry a locomotive engineer at

Copper Cliff. Their grandchildren total 16.

EINO MAENPAA

Eino Maenpaa retired on disability

pension after 32 years with Inco.

for Canada in 1930, joined the

Company at Frood in 1937, moved

to Stoble in 1947, and worked there

as a timberman for his final five

'lived happily ever after".

Eino was married to Sofia Tormala in 1952, and in his own words,

years.

A native of Finland, he headed

Now relaxing in Victoria, B.C.

Born in Espanola, he left there

he hasn't seen in 43 years.

#### ERIC MUNSTERHJELM

A colorful career that included trapping, prospecting, and geologi-cal exploration during the 1930s in the rugged Lake Athabasca area in northern Alberta and Saskatchewan, and Great Slave Lake in the Northwest Territories, has ended with the retirement on service pension of Eric Munsterhjelm.

An assistant area field geologist with Inco at Copper Cliff, Eric worked for the Company for 22 years.

Born in Finland, he came to Canada shortly after graduating from military college in 1927, roamed the northlands as a trapper-prospector, and had completed a study of geology in British Columbia before he returned to fight for his native land in 1939. as leader of a group of Finnish-Canadian volunteers. He returned to Canada in 1947, and joined the Company in 1948.

He and his bride of 1942, the former Mrs. Anne-Marie Hellstrom, have a family of four.

A prolific writer, Eric has au-thored eight books describing his early experiences, the best known of which are "The Wind and the Caribou" and "Fool's Gold", both strong favorites among people who enjoy tales of adventure in the nomadic life of the prospector in the Canadian wilds,

Pollowing a three-month holiday in Mexico, Eric and his wife will make their home on the peaceful shores of Lake Manitou on Manitoulin Island.



his long experience. New mining techniques sophisticated equipment new have revolutionized



Roy Kerenevich

At the Foot & Hangingwall Society banquet hanaring Eric Munsterhjelm on his retirement, the popular big exploration geologist is seen receiving a presentation from the society president, Dick Agar. On the left are G. W. Thrall of Inco Taranto, manager of mines exploration, and Bill Aronec; on the right is H. F. Vuori, staff geologist, Toronto. About 80 members attended.

MIKE PILJA



It's 40 years since Mike Pilja left Yugoslavia for Canada, and he's never been back. But now, with 32 Inco years behind him, the special early service pensioner has time on his hands and will be visiting the old country. A carpenter, Mike joined Inco at Frood in 1929, broke his service in 1936.

Mike Pilla returned in 1937, and has worked in the carpenter shop there since 1957.

He and his wife, Mary Morash when they were married in 1940, are considering seeking the comforts of a warmer climate, and are considering Canada's west coast as a place to enjoy their retirement years.

#### NIILO SIPPOLA

A skiptender at Garson for the last 20 of his 36 Inco years, Nillo Sippola also saw service as a driller in the stopes, drifts, and raises at Frood and Creighton mines. He



Mr. and Mrs. Spools

and his bride of 1934. Ellen Annala, have a family of two daughters, and one grandson. Daughter Alice is the wife of Copper Cliff welder Ray Laakso. The special early service pensioner plans to do a lot of healthful walking, and skiing when the weather permits.

#### KAARLO TOIKKA

A move to a new home on Long Lake has followed Kaarlo Toikka's retirement on early service penfrom the copper refinery sion



Mr. and Mrs. Tolkka

after 27 years with Inco. He has worked in the tankhouse there since 1942, and as an assistant chief inspector for the last two years.

He and Bertha Morin were wed in 1932, and one of their family of three sons, Rolph, a plateworker at the copper refinery, will be able to keep his dad up to date with the latest happenings at the plant. Sixteen grandchildren and great-grandchild will keep one Kaarlo and his wife busy visiting.

#### JOHN VALIAHO

Forty-one years have ticked by since John Valiaho joined Inco at Garson in 1928, and figuring that was a fair enough total for anybody, John has taken a special



Mr. and Mrs. Valiaho

early service pension. Most of his time was spent at Creighton where he has worked as a tool fitter since 1966. He and his wife, Bertha Nast when they exchanged vows in 1932, have one son and two grandchildren. A new house in Waters township and a summer home on Black Lake will provide enough work to keep the pensioner happy during what is hoped will be many years of happy and contented retirement.

#### EDDIE ALBERT

After a partnership with Inco that started back in 1927, Coniston sinter plant foreman Eddie Albert has retired on early service pen-tion after almost 42 years of service.

He left Grand Anse, New Brunswick, in 1920, landed in Sudbury in 1923, and married Cecile Boudreau, the daughter of a Romford



#### Mr. and Mrs. Albert

Junction dairy farmer, in 1927. Their family of three all have connections with Inco. Jane is the wife of Garson stope leader Bill Kyryluk, and their sons both work at Copper Cliff, Cyril as a locomotive engineer, and Maurice in the carpenter shop. A grand total of 11 grandchildren are already on the scene.

#### ANDY FINK

Andy Fink has spotted his last the reverb building

Company in 1942, and has been expertly positioning the pots for the last 12 years.

His wife, Stephanie Michaluk

backtrack at Cop-

Andy Fink

EINO TIGERT Retiring as chief engineer of mines at Copper Cliff after over 35 years with In-ternational Nickel, most interesting and challenging of

Eino Tigert



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slag pot on





the production picture in many areas almost beyond recognition to an "old-timer" of as little as 10 years' service. "It has been a time of challenge for all of us, I think, and personally it's a great satisfaction to have been on the team making the transition," said the retiring mine engineering expert.

He has taken up residence in Markham, near Toronto, and will keep his hand in as a mining consultant whose judgment and experience will continue to benefit

the industry. Born in Toronto, he graduated from the University of Toronto in 1932 in mining engineering, and two years later joined Inco at Prood mine. Transferred to Levack in 1937 to re-open the mine after its shutdown due to the rockhouse fire, he became mine engineer in 1941. Brought in to Copper Cliff headquarters in 1947, he became assistant chief mines engineer in 1950, and succeeded George Thorpe as chief in 1965. Since that time, in response to Inco's mining expansion, the personnel of the department has increased from 110 to some 250.

His marriage to Almira Moore took place at Sudbury in 1938. He has two daughters.

#### "SCOTTY" RICHARDSON

A familiar figure at the Murray mine warehouse, where he had been storekeeper since 1947, Andrew Richardson - better known "Scotty" - has retired on early 85



Mr. and Mrs. Richardson

service pension after completing nearly 38 years with Inco.

Born at Victoria mine, he worked at the O'Donnell roast yard before joining the Company at Copper Cliff in 1930, and transferred to Murray in 1947.

His marriage to Elste Yackman took place in Sudbury in 1939. A long winter holiday in the Florida sunshine will start what all his friends and associates hope will be many years of peaceful and contented retirement for "Scotty".

#### JOHNNY CECCHETTO

Comfortably settled on 90 acres of peaceful countryside Desiz Johnny Wahnapitae, Cecchetto has retired on disability pension



Mr. and Mrs. Cetchetto

following nearly 36 years with Inco at the Copper Cliff smelter. An operator at the No. 1 cot-trell plant for the last 18 years,

Johnny joined the Company in 1933, was married to Irene Maki in Copper Cliff in 1939, and has a family of one son and three grandchildren who live in Sudbury.

#### J. C. BISCHOFF

Joe Bischoff originally came to Copper Cliff in September, 1930, on a five-week's loan from the U.S. Metals Refining Company at Cartaret, New Jersey, to assist in ironing out production problems in the new Ontario Refining Company, which had started copper refining operations the previous June,

That five-week's stint grew longer and longer, and it was only last month that it finally came to an end when Joe retired on early service pension.

He was named chief chemist in 1931, and in 1940, five years after Ontario Refining Company be-came the copper refining division of International Nickel, was apwas appointed works metallurgist. The unexcelled reputation for high unexcelled reputation quality enjoyed by "ORC Brand" copper throughout the fabricating industry is due in a large measure to the rigid inspection and control methods he has supervised over the years.

He collaborated with the late R. H. Waddington in writing a paper on the first large-scale application of direct arc melting of cathode copper, a distinction of the Inco copper refinery, and has contributed various other technical writings for the advancement of the industry. He is a past district vice-president of the CIMM.

Born at Ridgeport, Conn., he received a degree in industrial chemical engineering in 1927 from the Pratt Institute, Brooklyn.

Active in the community work of the Kiwanis Club, of which he is a past president, he was chairman of the Sudbury District Music Pestival. Photography and fishing are his hobbies.

He was married at Sudbury in 1938 to Kay Pollock, daughter of one of the Sudbury area's pioneer miners. He has two sons and two grandchildren. The family sum-mer camp is on the West Arm of Lake Nipissing.

Mr. and Mrs. Bischoff will con-

tinue to reside in Sudbury, and will travel extensively.

Several old associates of Joe Bischoff in the Toronto and New York offices were among the large gathering

ot the dinner held in his honor at the Sheraton Caswell Motor Inn, Sudbury, on his retirement from the

duties of superintendent of process technology at the copper refinery. In the group above are, seated,

G. O. Machum, assistant general manager (processing), and Mrs. Machum; Mrs. Bischoff; and the guest

of honor; Mrs. Dick and G. A. Dick, manager of the copper refinery; standing, Grant MacDougall, refinery

chief chemist, and Mrs. MacDougall; refinery pensioner George Furchner; S. V. Kilbourn, product

manager - copper, New York general sales department; Austin Smith, assistant to the vice-president,

#### "GEORGE" BLAIS

A Sudbury baker before he came to Inco and the copper refinery in 1935, Prudent Blais, better known as George, has retired on



Mr. and Mrs. Blais

special early service pension after more than 34 years with the Company. He has been a refinery maintenance mechanic since 1942.

A native of Chelmsford, George married a Sturgeon Falls girl, Luce Gatien, in 1930. Two of their family of seven are Inco men: Rene is a garage mechanic at Stoble, and Andre is with the mechanical department at Prood. With 19 grandchildren divided between Edmonton, Sudbury and Toronto, George's retirement years will be highlighted by trips around the family circuit, and pleasant hours in his well-equipped basement workshop.

#### ALF CORELLI

Alf Corelli's Inco career, which started in 1925, has ended with the



Mr. and Mrs. Corelli

retirement of the converter building shift boss on early service pension after a grand total of 43

Company years. A tot of two when his parents came to Canada from Italy in 1911. Alf grew up in Copper Cliff, started at the smelter as a baleman, worked as craneman. puncher and skimmer, and has been a shift boss since 1959.

He and his wife, Inez Simionato, whom he married in Copper Cliff in 1934, have a family of four sons and three grandsons.

In excellent health, Alf plans to continue to live in Oatchell, and spend his well-earned retirement years near his many old friends.

#### CLIFFORD LOGAN

A move to Golden Lake, near Pembroke, Ontario, has followed the retirement on special early service pension of Clifford Logan.



Mr. and Mrs. Logar

who, for the last 13 of his 35 years was a machinist 85 Inco Creighton.

A native of Niagara Palls, Cliff joined the Company in 1934, work-ed at Copper Cliff and Garson, and was at Frood when he was promoted to mechanical foreman in 1951. He moved to Murray as assistant master mechanic in 1952, and to Creighton as mechanical foreman in 1956.

He and his wife, the former Mildred Hogan, still have good representation at Inco through their son Mason, a senior clerk with the accounting department at Copper Cliff, and their daughter who is the wife of Copper Cliff transportation department clerk Oino Flevoli. The couple have four grandchildren of whom they are very proud.

# Copper Refinery's Joe Bischoff Dined and Wined at Sheraton Caswell



Toronto; Mrs. Lipscombe and Ron Lipscombe, refinery chief accountant.



## MIGHTY METEORITE

(Continued from Page 11) but we do think the meteorite acted as a trigger for emplacement of the nickel deposits.

R.F.: To a layman this would seem to be a rather way-out theory. You must have a great deal of evidence to support it.

G.B.; It does seem way-out, even to a lot of geologists who are not familiar with the evidence, but the evidence is very good I think, and increasingly is being accepted by geologists and by others. There are four main points. Firstly, as a result of studies for the U.S. space program and by the Dominion Observatory in Canada, among others, many meteorite impacts are now known around the world there are nearly a score in Canada and they are all characterized by a circular symmetry of the rock formations. On a geological map of the Sudbury Basin you will see several rings. So the Sudbury geological structure has the sort of bullseye form that meteorite impacts have. It is not a perfect circle by any means, more of an ellipse, but we think this may in part be due to later deformation or squeezing. Natural forces have bent the thing out of shape.

Secondly, something you always find at meteorite impact craters, because of the enormous forces involved, and the very great explosion, is a lot of smashed rocks — what a geologist calls breccia. Breccia is very characteristic of Sudbury, and Sudbury breccia is guite a famous rock — you can have a belt of breccia half a mile wide with blocks in it the size of a house. I think this is pretty persuasive evidence of a very big bang.

A third kind of evidence is the way that rocks break when a meteorite explodes — an enormous shock wave goes through the rocks. It forms what are called shatter cones. They are a peculiar conical form of rock fracture. They were discovered only a few years ago at Sudbury, but we have since found that the Sudbury Basin is entirely surrounded by rocks containing shatter cones, and in fact Sudbury has more shatter-coned rock than any other place on earth. Shatter cones seem to be characteristic of meteorite impact sites.

R.F.: This is really unique then. G.B.: Yes it is very unusual and it tells you right away that you are very probably dealing with a meteorite impact. There is still another kind of evidence, that to my mind anyway is even more convincing. Something happens to the minerals of the rock during such an explosion. The shock wave from an impact big enough to produce a crater the size of the Sudbury Basin is very intense. We are talking of the equivalent of perhaps several million megatons of TNT, and with an explosion this size the shock wave is so strong that it will do funny things to the minerals. It will break them; it will melt them; it will turn them to glass.

The mineral quarts under microscope normally looks clear - you can see right through it. When you get quartz from a meteorite impact you will find that it has a great number of very fine cracks in it, called planar features. They are very conspicuous under a microscope and the only way in which these unusual cracks are known to form is by meteorite impact. Quartz showing these features has never been found anywhere else in nature. Although people have looked at other rocks that have been involved in explosions or volcanic eruptions, they have never been able to find this kind of quartz. However, it is very widespread at Sudbury, and we really can find no way to explain it other than by meteorite impact.

**R.F.**: Well such a meteorite would have a tremendous force. You spoke of several million megatons. How much is that in layman's terms?

G.B.: I thought that was a layman's term. I could give it to you in ergs of energy released.

R.F.: Compared to the first atomic bomb.

G.B.: The first atomic bomb was equivalent to 20 thousand tons of TNT. Well, we are talking about millions of megatons, and a megaton is a million tons.

**R.F.**: How big would the meteorite have to be?

G.B.: Probably about two or three miles across. That is a very big

meteorite, but remember that it is not a very big asteroid. There are a lot of chunks floating around the solar system that are much bigger than that. Occasionally some must collide with the earth.

R.F.: We are under the impression that the vast majority of meteorites burn up before they reach the earth; they never do become meteorites, but end up as meteors. Why didn't this one burn up?

G.B.: Because of its size. Most of the ones you see are no bigger than a pea, whereas we are talking about one several miles across. Obviously it burned up a little but it didn't lose any significant proportion of its mass travelling through the atmosphere. It still had tremendous mass and tremendous velocity when it hit the earth's crust with an enormous bang.

**R.F.:** Nowadays there is quite a lot of talk about meteorites and how they might have affected the surface of the moon: the pockmarking effect. Is there any relationship between that and the Sudbury formation?

G.B.: We think that initially the Sudbury crater was rather like some of the craters on the moon. The one that we see here now is different. Most of the large ones on the moon have a central hill, as shown for example in Apollo photographs: we don't have that here. It is quite the reverse: we have a depression. I don't mean the topographic Sudbury Basin you see as you drive towards Levack, because the original crater has long since been eroded away, but geologically the structure is like a basin or funnel. The rocks dip downward into the earth instead of sticking upwards, and this is different from most other big craters.

R.F.: Would the meteorite have imbedded itself into the earth after it hit, or what would have happened to it?

G.B.: A big meteorite has so much energy when it comes in that instead of just making a hole and lying in it, it explodes. Its tremendous kinetic energy is transformed into heat energy and it blows itself up, so that in fact if you go to any new meteorite crater, for example the Barringer crater in Arizona, all you can find are quite small pieces of meteorite. R.F.: Now, I first heard of this theory from a geologist but I understand that ironically it was an oceanographer who first came up with it. G.B.: That's right, an oceanogra-

pher who, like many oceanogra-phers is a geologist - Dr. Robert Dietz, who works for the U.S. Government. He studies the ocean here on earth; he was looking for similar structures on the moon, and knowing that the lunar "seas" are probably impact craters he started looking back on the earth for very large impact craters. He then came up with the idea that Sudbury might be one because although he had never been to Sudbury - he looked at the map as we have done and saw that it was circular; and he knew that there was breccia here; and he put all of this together and in quite a brilliant intellectual feat he concluded that this could be a meteorite impact site and said so pub-licly before he had ever been to

February, 1970

Sudbury. He published a scientific paper suggesting this — he really stuck his neck out. Then, after doing this, he came to Sudbury and found the critical evidence which at that time was the shatter cones.

**R.F.:** I know from experience a lot of scientists are as skeptical as newsmen are. How much validity does this theory have? Do scientists today really believe that this is what happened?

G.B.: Well, scientists are supposed to be skeptical. That's our business. My own experience is that if you just try this theory on a geologist cold, he will say it is ridiculous to propose a catastrophe like this — it sounds wild. It dees sound wild. But if you sit down with the same geologist, show him the evidence, discuss it with him in detail and put it to him as a scientific theory to be evaluated on the available facts, my experience is that the majority of geologists will admit that we've really got something here. In fact, most of the geologists in the Sudbury District have already come around.

R.F.: There aren't too many Sudburys in the world today and the theory that we were talking about is a rather unusual one and it couldn't happen too many times. Could that mean that Sudbury is probably unique and there is no other place like it?

G.B.: All of us who are working on it are increasingly coming to believe that because it is such a strange place geologically. Sudbury must be truly unique. Even for a meteorite crater it is strange in several ways, most significantly because no other crater has nickel deposits.

**R.F.**: The reason we are probably all here is because of these nickel deposits. Could you give us an idea finally of how much nickel there might be in the area?

G.B. I don't think I could tell you the tonnage, but one could say that there is more nickel here than anywhere else on earth, and that there is a great deal more nickel here than we have found or mined yet: enough to keep me and a lot of other geologists working for many years to find the rest of it.

## Vice-Presidents

(Continued from Page 2)

a vice-president of the Company's United States subsidiary.

Stephen F. Byrd, as vice-president — industrial relations and personnel, has direct responsibility for all industrial relations and personnel matters in Canada. Mr. Byrd joined International Nickel in 1968 as an assistant vice-president of the parent company and a vice-president of its U.S. subsidiary. He will be located in the Toronto office.

Norman H. Wadge, assistant vice-president, who has long handled the Company's industrial relations in Canada, will serve as senior adviser on administrative matters, industrial relations and personnel matters to F. Foster Todd, executive vice-president. Mr. Wadge joined International Nickel in 1936, holding various positions including mine superintendent and manager of industrial relations.

#### INCO TRIANGLE

At Maintenance Staff Club's Annual Dinner Dance



Over 200 members and their wives of the Maintenance Staff Club at Copper Cliff thoroughly enjoyed themselves at their 10th annual dinner dance. A scrumptious Italian Club feast was followed by a skit on the preventive maintenance system by Gerry Mahan and an evening of dancing to Beaver Condotta's Commodares. In one of the happy table groups shown abave are, clockwise: Bob and Luella Kelly, Lila Toivonen, Rae King, Sylvia Savage, Martin Lemke, Sid and Darothy Stone, Ruth Lemke, Ted Savage, Lloyd King, John Toivonen and Florence and Bab McIntyre. Club afficers are: Bob Kelly, president; Gerry Mahon, vice-president; George MacDonald, secretary, and Jack Musico, treasurer. Representatives from the various areas are: Morris Hucal (smelter), Peter Hickey (shops), Red Porter (mill), Bill Brown (FBR), John Robinson (axygen plant), Vic Riutta (iron are plant) and "Sliver" Marcon, Coniston smelter.

#### -: APPOINTMENTS:-ONTARIO DIVISION

G. O. Machum, assistant general manager (processing) announced the appointment effective January 13 of G. A. Frame as technical assistant to general superintendent.

process technology. G. R. Green, assistant general manager (mining) announced the following appointments effective October 1, 1969:

J. M. O'Shaughnessy, assistant to the chief mines engineer;

M. H. Dickout, area engineer, Murray, Clarabelle open pit, Cop-per Cliff North and Copper Cliff South mines;

G. M. Smith, area engineer, Prood-Stoble and Little Stoble mines;

J. K. Conibear, area engineer, Garson and Kirkwood mines;

G. W. Johnston, mine engineer, Stoble mine.

### MANITOBA DIVISION

J. McCreedy, general manager, announced the appointment effec-tive January 9 of W. J. Thorpe as superintendent, material control.

#### G. A. FRAME

Archie Prame commenced his long career in the ore dressing section of the Cop-



per Cliff research laboratory in 1938, shortly after the department was open-ed with J. Roy Gordon as superintendent and about seven men on the staff.

Born in Shubenacadie, Nova Scotia, he was the only pupil in his class during his last

G. A. Frame three years in high school -\*\*\* always came first in the exams, and also last"

He graduated from Dalhousie University in 1932 with a B.Sc. degree, and later received a mining engineering degree from Nova Scotia Technical College. He joined International Nickel in June of 1936.

His marriage to Madeline Awalt took place at Boutlier's Point, Nova Scotia, in 1938. He has two daughters.

Contract bridge and fishing are his favorite recreations.

#### J. M. O'SHAUGHNESSY

Following graduation from Queen's University in 1943 with his mining engi-



He was employed at Timmins, then joined International Nickel at Levack in 1948 but left the

J. O'Shaughnesty Company in 1955 to work for Consolidated Sudbury Basin.

Returning to the Inco mines department at Copper Cliff two years later, he was transferred to Clarabelle open pit in 1960, and became mine engineer of Copper Cliff North in 1965. He was appointed area engineer of Murray, Copper Cliff North, Clarabelle and Copper Cliff South mines in 1967.

A native of Cobalt, he was married to Mildred Bennett of Oshawa in 1945, and has three children.

#### M. H. DICKOUT

Dunnville, Ontario, was the birthplace of Merv Dickout, who graduated in 1948 in mining engineering at the University of Toronto.

He joined International Nickel in the mine engineering office at Creighton, and in 1956 was transferred to the mines department at Copper Cliff where he became



M. H. Dickauf Phyllis Hefferman, a nursing graduate of Kingston General Hospital, took place in 1948. He has three children.

planning engineer

#### G. M. SMITH

Born in Edmonton, Gerry Smith graduated from the University of Alberta in 1935 in



He came to International Nickel in the fall of 1935, spent a few months as an underground miner, then trans-ferred to the engineering department.

6. M. Smith He was mine engi-neer at Prood and then in January, 1968, became mine engineer at Stoble.

He was married in 1940 to Orvilletta Trezise of New York, and has a family of three.

#### J. K. CONIBEAR

Mine engineer at Garson since mid-1967, Ken Conibear joined In-

ternational Nickel at Creighton mine in 1952, spent 10 years there, then transferred to the mines engineering department at Copper Cliff for three years before moving to Garson.

Graduating from the University of Toronto in 1951 with a B.Sc. degree J. K. Conibear

garet Dickout at Ingersoll, Ontarlo, and has two sons.

He was married in 1952 to Mar-

in mining geology, he then spent a year with a Toronto firm of

consulting engineers on geological

#### G. W. JOHNSTON

Appointed mine engineer at Little Stoble



exploration.

mine in January, 1968, George Johnston had been on the engineering staff at Stoble mine since 1952.



G. W. Johnston with a mining engineering degree.

On joining International Nickel he spent a year in the mines engineering department at Copper Cliff

His marriage to Betty Howse took place in Toronto in 1951. He has three children.

#### W. J. THORPE

Born in Pembroke, Ontario, Bill Thorpe started his career with Inco in the stores



department at Copper Cliff in 1940 after holding administrative posts in the superintend-ent's office, CPR, Sudbury.

He served for five years in the Royal Canadian Navy in World War II. WASdischarged with the rank of lieutenant,

W. J. Thorpe and returned to Inco in 1946 as secretary to the general purchas-ing agent at Copper Cliff. He became a buyer and expediter in the purchasing department in 1953, and in January, 1957, was transferred to the Manitoba division as purchasing agent.

His marriage to Marie Anne Charbonneau took place at Sud-bury in 1949. He has three sons and one daughter.

A dedicated outdoorsman, he was active in conservation work in the Sudbury area, and was the charter president of the Thompson Fish and Game Association. He is a director of the Thompson Rotary Club.

#### EARL'S MAYORALTY SERVICE

The unfortunate omission of the word "between", in the account of E. W. Gilchrist's retirement in the January Triangle may have left some readers under the impression that he was mayor of Levack only in the years 1945 and 1964, whereas the grateful citizens of that town well know, he was their chief magistrate for the full 19 years between those dates.

#### Easier Ironing

To make ironing easier, a new ironing board cover which is im-pregnated with nickel stainless steel has been developed. Smooth and scorch-free, the cover reflects heat so that fabrics can be pressed at lower iron temperatures.



## "Getting There Is Half the Fun" For Power Department's Pole-Toppers

As they say in the cruise ship ads. "Getting There is Half the Fun."

Inco's power department now



Putting the finishing touches to a dead end strain corner on a new transmission line, line foreman Aldo Orosi and Jack Hunter easily reach the tops of the poles from the buckets of the power department's newly acquired Pitman heavy duty "Hotsk".



send their men aloft in mobile aerial booms and bucket trucks that not only eliminate the need for climbing, but also remove the dangers of body contact with high voltage conductors.

The latest additions to their fleet are a Pitman heavy duty "Hotstik" which can hoist a pair of linemen 50 feet into the air in its twin fibreglass buckets, and a Pitman "Pelican" that, when fully extended, puts 32 vertical feet between the ground and the bottom of the bucket.

Additional speed, efficiency, and safety, are not the only benefits enjoyed through the use of these versatile vehicles.

"As well as greatly improving working conditions for all line personnel," observed department superintendent T. C. Robertson, "they also extend the pole-top availability of valuable and experienced linemen beyond the stage schen they would normally be grounded." Before the boom and bucket trucks, the never-ending job of replacing heavy power line insulstors involved crawling out along crossarms, armed with tools, or the time-consuming necessity of planting a pole and climbing up to make the change.

Any lineman who has worked from a messenger cable buggy on a between-the-poles line repair, or who has had cold feet from wearing climbing spurs, will confirm that working from a boom bucket is faster, rafer, and more bucket is faster, rafer, and more comfortable by a long shot. Tools travel in the bucket with the man, as do the items to be installed or replaced, thereby reducing the hazard of falling objects.

High in the air, with good footing and complete insulation from the ground by a boom section fabricated from epoxiglas that has been tested under a load of 150,000 volts, the linemen can now adopt a "bare hand" technique and handle the Company's 69,000 volt "hot" lines with complete safety, with no need to throw the switch and cause a power interruption while a repair is being made.

Drilling a 20-inch pole hole 10 feet deep in three to four minutes is the performance of another of the power department's new machines, the versatile cornermount Pitman "Polecat". A digger-derrick truck, it is also used for setting poles in place, eliminating the hazards of manual pole raising.

As transmitted voltages rise higher and higher, so do the regulation minimum power line clearances, necessitating longer booms to reach them. "Pretty soon," speculated one tanned and weathered lineman with a grin, "we're going to have to put flashing red lights on the buckets to warn lowflying aircraft."

Servicing one of Copper Cliff's mercury vopor light standards is a breeze for lineman George Smith as he stands comfortably and safely in the fibreglass bucket of a Pitman "Pelican". With controls at the top as well as at the bottom of the boom, George can aperate as a one-man repair crew.



Spare goalie Rondy Thibavit of Converter Hornets was having it hat and heavy when this action shat was snapped. He had just kicked out a drive by Creighton winger Dennis Tucker ("A"), and Bernie Bouchard (nearest comera) is reaching for the rebound to test him with a backhander. Hornet captain Dale Brown is at left rear.

![](_page_15_Picture_20.jpeg)

Hornet coach Ron Kunto and defenceman Mike Laroque list the team's lineup: goalie Randy Thibault gets some "help" from Ron Miron and Yvan Denis is girding himself for the fray with Creighton Miners.

## MORE FUN THAN FURY BUT SHIFT LEAGUE GOING BIG

Copper Cliff Athletic Association's shift hockey league, with the indefatigable Gerry Renaud doing his usual superb job as chairman, is again in high gear at Stanley Stadium. Copper Cliff.

There are eight teams in the race for the Parklane trophy, four on shift and four on steady days. A welcome addition to the loop are Creighton Miners, who with the addition of two or three unattached sharpshooters from other Inco plants, are shaping up as strong contenders. Another welcome newcomer is the Transportation Department lineup, which is operating at full throttle. Converter Combines, which led the regular schedule standing last year, is not entered, but many of its players are blostering other teams in the loop.

Teams and coaches in the schedule are: Concentrators dast year's trophy winner', coached by Frank O'Grady; Canapini Otlers, Ralph Condotta; Warehouse, Llonel Bechard; Transportation, Furando Biaconi; Converter Hornets, Ron Kunto; Iron Ore Braves, Ken Sellen; Creighton Miners, Gordon Vignault; Mill Orphans, Ray Smythe.

About 140 players are taking part in this popular CCAA activity. They're in there more for the fun than the fury, playing international rules with no body contact to provide the enjoyment without the wear and tear, but that doesn't mean there isn't lots of red-hot rivalry along with flashes of excellent hockey when some of the stars cut loose with a burst of their jets and some flashy stickhandling.

Essential to the success of the league is the staff of referees to enforce the rules and keep enthusiasm from getting out of hand. Mention should be made of the following who are doing a fine job in this respect: Jack Newell (referee-in-chief). Bill Luciw, Neil Bray, Andy Akey, Bob Hall, Daryl Bolton, Jack Revel.

Games are scheduled at Stanley Stadium on Turesday, Wednesday, and Thursdays, either from 10:30 to 12:30 in the mornings or from 10:30 to 11:30 in the evenings. Stadium manager Rolly Wing is giving his usual cheery co-operation in keeping the league rolling.