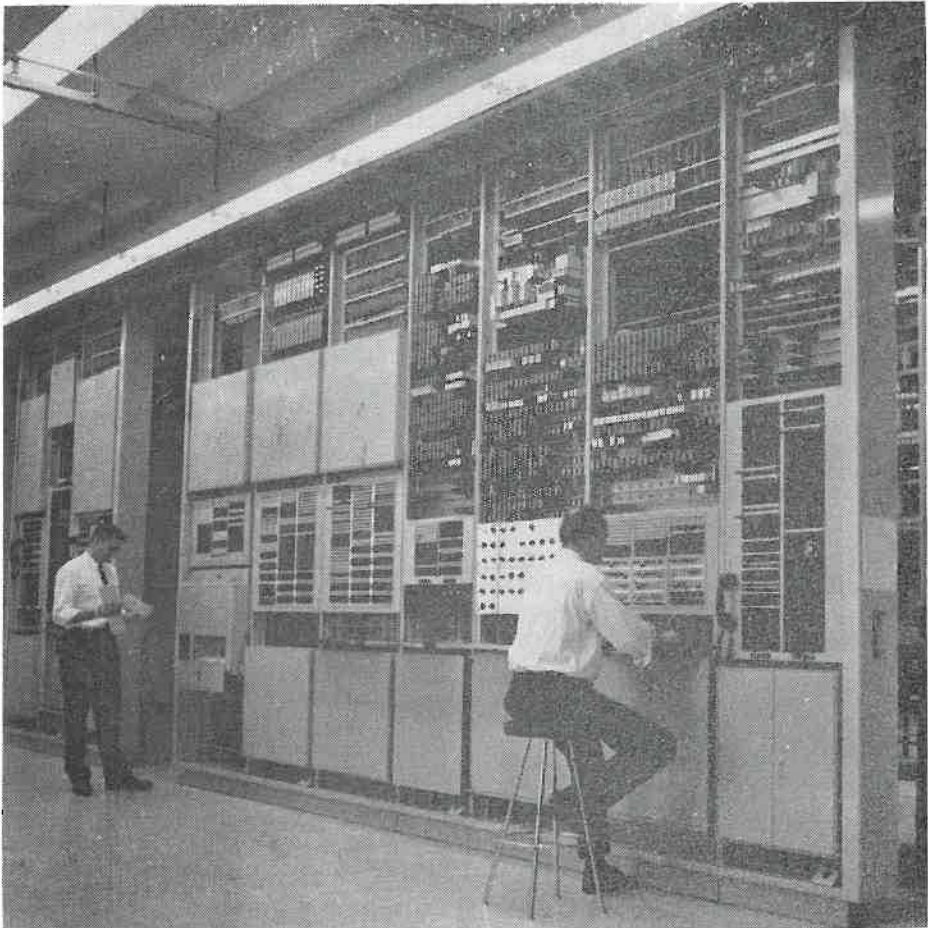


THE MANITOBA PROFESSIONAL ENGINEER

March, 1965

Bulletin of the Association of Professional Engineers of the
Province of Manitoba



4-A CROSS BAR MAINTENANCE AND TEST CENTRE

ANNUAL DANCE *Friday, March 5th, 1965*

ROYAL ALEXANDRA HOTEL - 6.30 p.m. to 1.00 a.m.

Entertainment: Indian Ceremonial Dances

Published by the Association of Professional Engineers of the Province of Manitoba
418 — 265 Portage Avenue, Winnipeg 2, Manitoba

President—S. J. Borgford, P. Eng.

Vice-President—R. T. Harland, P. Eng.

Secretary and Registrar — T. E. Weber, P. Eng.

The Manitoba Professional Engineer is published under the direction of the Bulletin Committee

Honorary Editor: C. R. McBain, P. Eng.

Editor: G. R. Kirk, P. Eng.

Managing Editor: B. Whitfield, P. Eng.

Associate Editors: T. G. H. McKibbin, P. Eng.; R. M. Stokes, P. Eng.

Special Effects Editor: G. A. Tough, P. Eng.

Flin Flon Correspondent: M. N. Collison, P. Eng.

Reporters: E. A. Speers, P. Eng.; R. H. Schilling, P. Eng.; J. N. Warrenner, P. Eng.

Cartoonist: B. R. Hryhorczuk, P. Eng.

MR. SKAPTI BORGFORD, P. Eng.

Mr. Borgford, the 38th president of the Manitoba Association of Professional Engineers is well qualified to act as spokesman for Manitoba's 1350 practicing engineers. He combines professional competence and an active interest in association and community affairs to a degree that is sought by many but equalled by few.

Following graduation in 1942 from the University of Manitoba he became a member of its Civil Engineering Department. In 1957 he left the University to accept his present position of chief structural engineer with Green, Blankstein, Russell Associates. Every teacher employs his own technique in presenting a lesson, and "Scottie's" method became obvious after the very first lecture. He was a master at presenting his information concisely, and completely. His presentation reflected a mind that respected orderliness and brevity and rejected ambiguity and verbosity.

While at the University his main interests were thin shell structures and timber design.

Prior to his election as Association president he served as a member of the Night School Class Committee, the Consulting Engineers' Committee and was secretary of the Board of Examiners. He was elected councillor in 1962.

Mr. Borgford is Past Chairman of the Indian and Metis Conference, a Director of the Credit Union Financial Service, a Director of



S. J. BORGFORD, P. Eng.

the Manitoba Mortuary Society, and the President of the COOP Housing Association of Manitoba. He has provided imaginative leadership in the development of Canada's first cooperative housing development. Willow Park is a modern 200 unit housing development in North West Winnipeg that is designed to serve the housing needs of families in the moderate income range.

He is also an enthusiastic swimmer and the proud father of three daughters and one son.

Annual Meeting

One hundred and seventy-three engineers attended the Forty-fifth Annual General Meeting of the Association held at the Fort Garry Hotel, Thursday, November 26, 1964. President Ben Chappell opened the meeting shortly after 2 p.m.

The head table included representatives from other Associations, namely Mr. Charlie Ripley representing B.C., Prof. Paul Riemer from Saskatchewan, Mr. Tom Keefer, Registrar of the Ontario Association and Mr. J. F. McDougall representing both Canadian Council and the Alberta Association.

Following the President's address and the Registrar's report all committees reported on their activities. A new procedure was instituted whereby all committee reports were read and discussed before any motions were made. Then only one motion was required to cover all reports. Several committee chairmen saved considerable time by referring to their reports printed in the Bulletin and commenting only on the highlights, thus avoiding needless repetition.

Discussion on the reports ranged from none at all to about 45 minutes on the Engineering Technicians Committee report. The problems of student liaison in Manitoba were compared to those of other Associations. Similarly the report on Engineering Technicians was received with a great deal of interest and the views of the other Provincial Associations as outlined by their representatives were discussed and compared.

Discussion on the Advisory Committee report resulted in an attempt to have a motion from the floor accepted. Despite a ruling by the President that the motion was out of order according to the by-laws and "Bourinot's Rules of Order," to which the Association must conform, considerable time was wasted in debating this point. The matter was seemingly resolved when the Chairman of the Advisory Committee stated that he would include the suggestions contained in the motion as part of his report. However, another filibuster developed on the same point of order following the Auditors' Report and more time was wasted. Before adjourning for coffee the following councillors were declared elected: J. R. Rettie, R. C. Somerville, F. M. Fowler, R. T. Harland, L. R. McGinnis and S. J. Borgford.

After recess a panel discussion was held on the subject of the Association's responsibility toward promoting professional and technical development of the individual member. Moderator was Jabbar Khan, panelists were S. Barkwell, N. S. Bubbis, R. E. Chant, E. M. Scott, J. E. Whenham and H. B. Young. Due to the length of time consumed in discussing committee reports and Bourinot's Rules of Order, the panel discussion was limited to the six individual well-prepared presentations and about five minutes for questions from the audience. This was very unfortunate as the views of the panelists were controversial and an interesting debate could have resulted. The moderator handled the situation very well and the Social Committee is to be commended for their efforts to arouse more interest in the Annual Meeting.

Officers elected for the 1965 season were: President, S. J. Borgford; Vice-President, R. T. Harland, and Secretary-Registrar, T. E. Weber (temporarily, until a permanent Registrar is hired).

Following the reception and dinner, certificates of life membership were presented to J. L. Charles and J. W. Sanger, both of whom have contributed distinguished service to the Association. Hon. S. R. Lyon, Minister of Mines and Natural Resources then gave an interesting and informative talk on Parks for the Future. The meeting closed with the Ceremony of Turning over the Gavel to S. J. Borgford.—G.R.K.



President Ben Chappell presenting a certificate of Honorary Life Membership to J. W. Sanger at the Annual Meeting.

FROM MICROWAVE TO BULLETIN

Our present editor comes to us with considerable experience in the field of communication. G. Robert Kirk has been engaged with the Manitoba Telephone System since graduation in 1957, in addition to five years' experience on the Bulletin Committee.

The present leader of the Opposition in the senior government (as at Press time) has the distinction of having been born in the same northern Saskatchewan community as our editor.

Bob is married and has an infant son. In order to accommodate their family addition, the Kirks recently moved into a brand new home in St. James on Nightingale Road. Before you conceive of visions of peace and serenity in the springtime, accompanied by the strains of birdland melodies, it might be added —with some compassion — that Nightingale Road is an unimproved street. Our editor has been prevailed upon to write an article for the summer issue on "The Effects of Gumbo on the Constitution of an Aspiring Engineer".

Bob is very warm and friendly and has demonstrated his ability in response to his many assignments on the Bulletin Committee. We are very fortunate that he has accepted the appointment as editor of the Bulletin.—J.N.W.



INTERNATIONAL COMMISSION ON LARGE DAMS

The Canadian National Committee of the International Commission on Large Dams met in Winnipeg on December 10, 1964. The Commission is an autonomous affiliate of the World Power Conference and membership consists of national committees in 53 countries. Their objectives are to improve the design, construction, maintenance and operation of large dams by bringing together information and studying related problems. Members of the A.P.E.M. who attended this meeting were F. W. Patterson, C. F. Ripley and J. R. Rettie.

The Canadian National Committee is interested in enlarging its membership. Three types are available:

- (1) Collective for companies, consulting engineers, government boards, commissions, or departments at \$50.00 per year.
- (2) Individual at \$10.00 per year.
- (3) Institutional (Universities, etc.) at \$5.00 per year.

Further information may be obtained from J. R. Rettie, P. Eng.

It is with extreme regret that we record the death of N. S. Bubbis. Mr. Bubbis contributed many years of faithful service to the Association on Committees, on Council and as President in 1957.

PRESIDENT'S MESSAGE

By S. J. BORGFORD, P. Eng.

Engineers across Canada are concerned with all facets of the profession. Their problems, their aims, their aspirations are similar to ours in Manitoba.

In this rapidly changing world, the engineer is seeking to upgrade his profession. He is setting high standards for education and for performance. He wants recognition from the public, from the client, from the employer. He is concerned about his image. He wants full utilization of his capacity and his training. He wants an equitable return for his labour.

It is Council's duty to provide the proper climate that such problems and solutions can be discussed either in committee or in a general meeting and to keep the membership informed by letter or the press of the findings. Council must not restrict itself to only administering the Act, for after all the Act is man-made and may be revised.

We have a tremendous job to do in establishing better two-way communications. It is the lack of communication that is the major cause of the lack of understanding. Co-operation of all members is sought in bringing to light those things that will help in the development of our Association. You are urged to write or discuss these matters with a Council member.

There are two meetings of the Association to keep in mind. The first will be held on March 22, at 8:00 p.m. at the Manitoba Hydro Building, to consider changes in the Schedule of Fees, as recommended by the Consulting Engineers Committee. At this same meeting be prepared to discuss the Code of Ethics.

The second meeting will be held in the Fall. The Membership Committee has recommended that a meeting be held to discuss the problems of the employee engineer and to determine if there is a need for a committee to look after their interests. Committees of employee-engineers are active in B.C. and Ontario. They serve a useful vehicle for employee-employer communications.

New Regulations Made Under The Construction Safety Act

By O. D. HAMILTON

Chief Inspector, Employment Standards
Division, Department of Labour

On November 16th, 1964, new regulations under the Construction Safety Act were brought into effect.

These regulations govern the safety in all phases of construction and have been sub-divided into six parts as follows, viz.,

Part 1—General—applicable to all phases of construction.

Part 2—Design construction and use of scaffolding, staging, hoisting and other similar equipment.

Part 3—Excavations.

Part 4—Erection of skeleton frame buildings and construction of bridges.

Part 5—Explosives.

Part 6—Operation of machinery or equipment in the vicinity of overhead electrical power lines.

The Construction Safety Act and the regulations are administered by the Employment Standards Division, Department of Labour, 608 Norquay Building, Winnipeg 1. The Chief Inspector of this Division is Mr. O. D. Hamilton.

The new regulations were developed by officials of the Department of Labour and the Construction Safety Board. In addition to members of the Department, the Board consists of two persons representing the contractors in the Province and two persons representing the employees in the construction industry.

The new regulations took several months to prepare during which time series of meetings were held with approximately 30 representatives of firms and organizations who are directly connected with the construction industry.

Included in this group was the Association of Professional Engineers, Province of Manitoba, who were asked to submit comments on a proposed draft of the regulations.

In this connection Mr. W. H. Milley, P. Eng., and Mr. E. Lexier, P. Eng., representing the Association, met with the Board to comment and make suggested changes to the proposed regulations.

The new regulations contain extensive revisions to the requirements governing work involving excavations.

For instance, when an excavation of the "semi-vee" type is used (where a combination

of sloped and vertical trench walls is involved) it is mandatory that a trench cage of an approved design be used.

Before the Department will approve the design of a trench cage, calculations verified by a registered professional engineer must be submitted indicating that the cage will successfully withstand pressures of up to 100 pounds per sq. ft. for each ft. of depth of the cage.

An extensive study of soil conditions was made for the Department of Labour by Professor A. Baracos, P. Eng., and as a result, minimum trench cage design requirements were developed.

The new regulations have also been revised to provide for more stringent requirements when wooden shoring is used in excavations.

The Department is presently developing a handbook which will interpret by means of sketches, the requirements of the new regulations insofar as safe excavation methods are concerned.

Due to the numerous unfortunate accidents involving the boom of cranes and other similar equipment touching overhead power lines, the new regulations require contractors who may be required to carry out work within ten feet of overhead transmission lines, to contact the power utility and obtain clearance from them before the work is carried out.

If the overhead power lines are of 2300 volts or more, before cranes or other similar equipment can work within ten feet of such lines, the lines must either be de-energized, effectively guarded against or re-routed or displaced from the work area. If none of these three safety precautions can be taken, it is necessary for a signal man to be assigned to warn the machine operator if it appears likely that the boom of the equipment may come into contact with the overhead lines.



NEW MEMBERS

The following new members have been registered: R. C. Aitken, M. Babich, D. E. Barchyn, W. Gouldsborough, B. P. Grover, N. Huq, P. M. Kavanagh, J. W. Libby, R. C. McMordie, M. S. Magas, H. Carswell, D. W. Charleson, R. O. MacTavish, P. Rubin, A. C. Trupp.

The following have been registered on transfer from other Associations: J. J. Harris, R. A. Marvin, K. A. Millions, P. C. Nicolle, J. R.

Plummer, J. R. M. Rockingham, I. B. Gillmore, D. J. Grant, G. H. Hunt, J. D. G. Wallbridge, A. J. Smith.

The following have been enrolled as Engineers in Training: R. C. Mills, T. L. McDougal, E. J. Rewucki, D. B. Chalcraft, S. T. Balke, T. C. Thom, K. S. Chow, O. T. Djamgouz, G. W. Runolfson, D. G. MacLennan, V. S. Lamba.

✦ ✦ ✦

NEW A.P.E.M. COUNCIL MEMBER



F. M. FOWLER, P. Eng.

The Association is fortunate indeed in having as a new Council Member a distinguished representative of the Canadian Construction Industry. F. M. Fowler, P. Eng., President and General Manager of Nelson River Construction Ltd., will be a valuable addition to Council.

Mr. Fowler graduated from McGill in 1942 prior to three years in the Royal Canadian Navy. Upon discharge he was ten years with Scott Jackson Construction, Toronto. In 1955 he joined Nelson River Construction, rising to his present position. Mr. Fowler is also President and a Director of Supercrete Ltd., a concrete products manufacturer.

Among offices held was that of President of the Manitoba Road Builders for four years. He is currently Vice-President of the Prairie Road Builders Association.

We welcome F. M. Fowler to Council.

COUNCIL MEETING

January 20, 1965

A meeting of Council was held in the Association office on January 20th, 1965. Present were: President Borgford; Councillors Chappell, Russell, Sommerville, Fowler, Finnbogason, Rettie. Vice-President Harland was unable to attend as he was representing the Association at the Annual Meeting of the Manitoba Land Surveyors.

Nine licences were issued, ten Engineers in Training were enrolled, six members were registered on transfer and ten registrations were approved. Three members who had earlier transferred to other provinces were reinstated to membership, having returned to Manitoba.

It was decided to defer a decision on the advisability of hiring Management Consultants to assist in securing a Registrar, until it could be determined what response a second letter to the APEM membership would bring.

It was agreed that the President would attend the Annual Meetings of the Ontario and Alberta Associations and that the Vice-President would attend the Annual Meeting of the Saskatchewan Association. Representatives will also be sent to the Annual Meeting of Canadian Council in Charlottetown.

The Budget for 1965 was approved showing revenue of \$36,850.00 as opposed to \$24,579.74. A reduction in new members registered for 1965 is anticipated. In the matter of Expenditures, the question of how much salary will be required for a Registrar for 1965 is still in doubt. Because of serious overcrowding of existing space, it was decided to rent the adjoining office which is vacant at a cost of an additional \$800.00. A Committee was set up to consider alternative space for the future. There were slight increases in most other Expenditures, except for Seals and Certificates which will be lower because of the anticipated lower registration. The expected excess of Revenue over Expenditure for the year is \$320.00.

It is intended to hold a General Meeting in March to consider the proposed changes to the Schedule of Minimum Fees. A copy of the recommended Schedule will be sent to all members prior to the meeting, along with information on the Code of Ethics.

At 2:45 Councillors heaved a sigh of relief over the announcement that the meeting was adjourned.—J.N.W.

Direct Distance Dialing

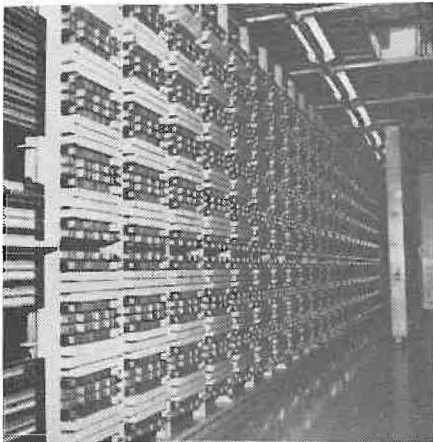
By G. R. KIRK, P. Eng.

As of February 21 each telephone subscriber in Metro Winnipeg can dial his own long distance call without receiving the aid of a telephone operator. In order to accomplish this the Manitoba Telephone System has installed a vast array of new complex machinery, rearranged existing equipment and added 52,000 sq. ft. of floor space to their Fort Rouge Toll Office. Engineering work on this project started in 1961 and has taken four years to complete.

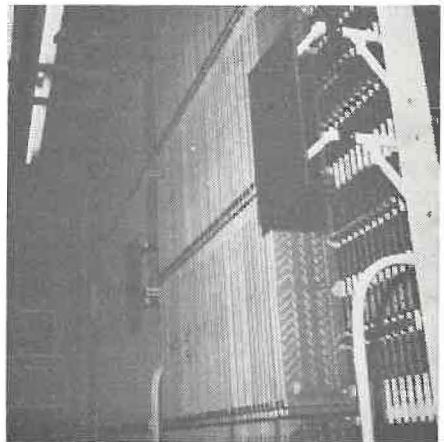
In order to better understand the operation of the equipment let us briefly examine the problem. There are approximately 85 million telephones in use on the North American continent. To make it possible to connect any two together you first must have a vast network of inter-connectable circuits spanning the continent. Secondly you must have some method to identify each individual phone and be able to connect a circuit between them. Some 13 years ago the major telephone companies of North America agreed on a master plan to solve these problems. For the purpose of identification the continent was divided into areas, usually corresponding to a state or province, each of which was given a three digit number — for example 204 for Manitoba. This "Area Code" plus the normal seven digit telephone number then became a unique address not repeated anywhere in North America. In order to avoid confusion with local calls an access code "1" was added ahead of the area code to route the call out of the local equipment into the long distance equipment.

For the purpose of routing calls a nationwide switching plan was developed. Basically the continent was divided into twelve major telephone areas each with a "capitol" called a Regional Centre. These regions were further subdivided into Sections; the Sections into Primary Centres; the Primary Centres into Toll Centre Areas and finally the Toll Centre Areas into end offices. Each Class of Office was then connected to (or "homed on") one higher ranking office by long distance telephone circuits engineered quantitatively to have a very low occurrence of "all trunks busy" condition. Generally all Regional Centres were similarly interconnected. Supplementing this chain of "final route" circuits other long distance circuit groups were established between offices in different "chains" but with high rates of telephone traffic between them. These "high usage" circuit groups always route traffic from an office in one chain to an office of equal or higher order in another chain. They are engineered quantitatively to have a higher occurrence of "all trunks busy" than final groups. When a connection is desired between two end offices in separate regions the switching machine first tries to connect via high usage groups and automatically alternate routes until a connection is made or all final groups are tried.

The installations in Winnipeg consist of a new 4A Crossbar Toll Switching Machine with Centralized Automatic Message Accounting (CAMA), Automatic Number Identification

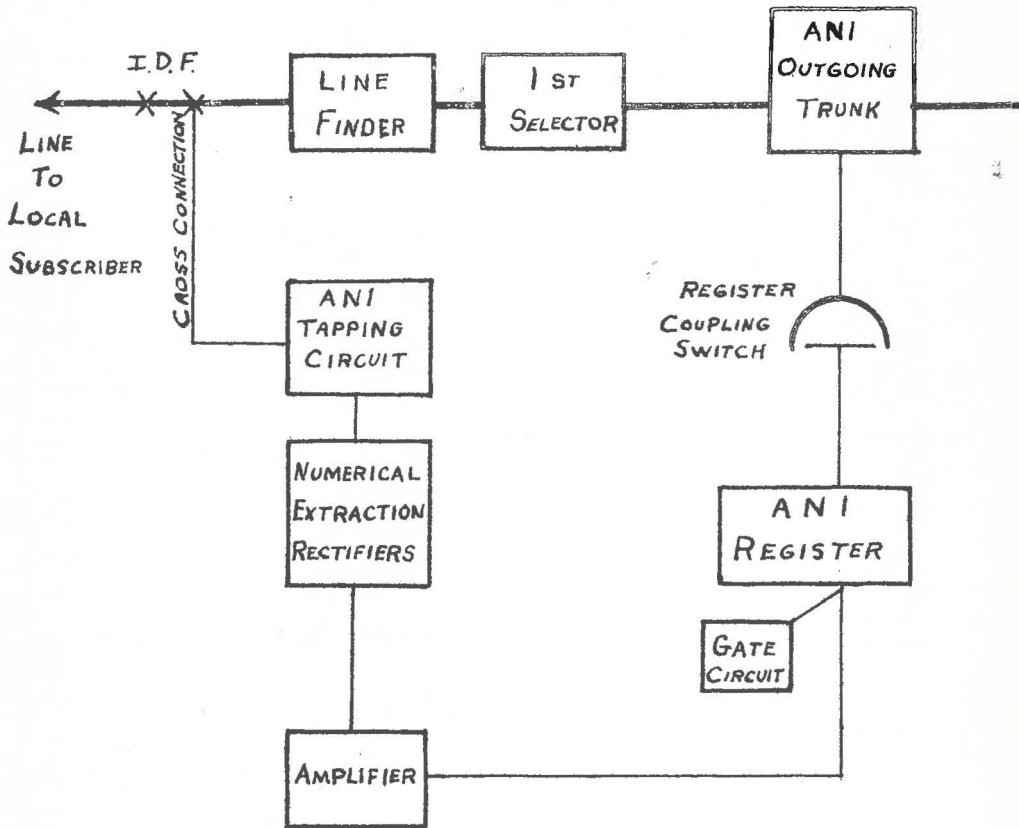


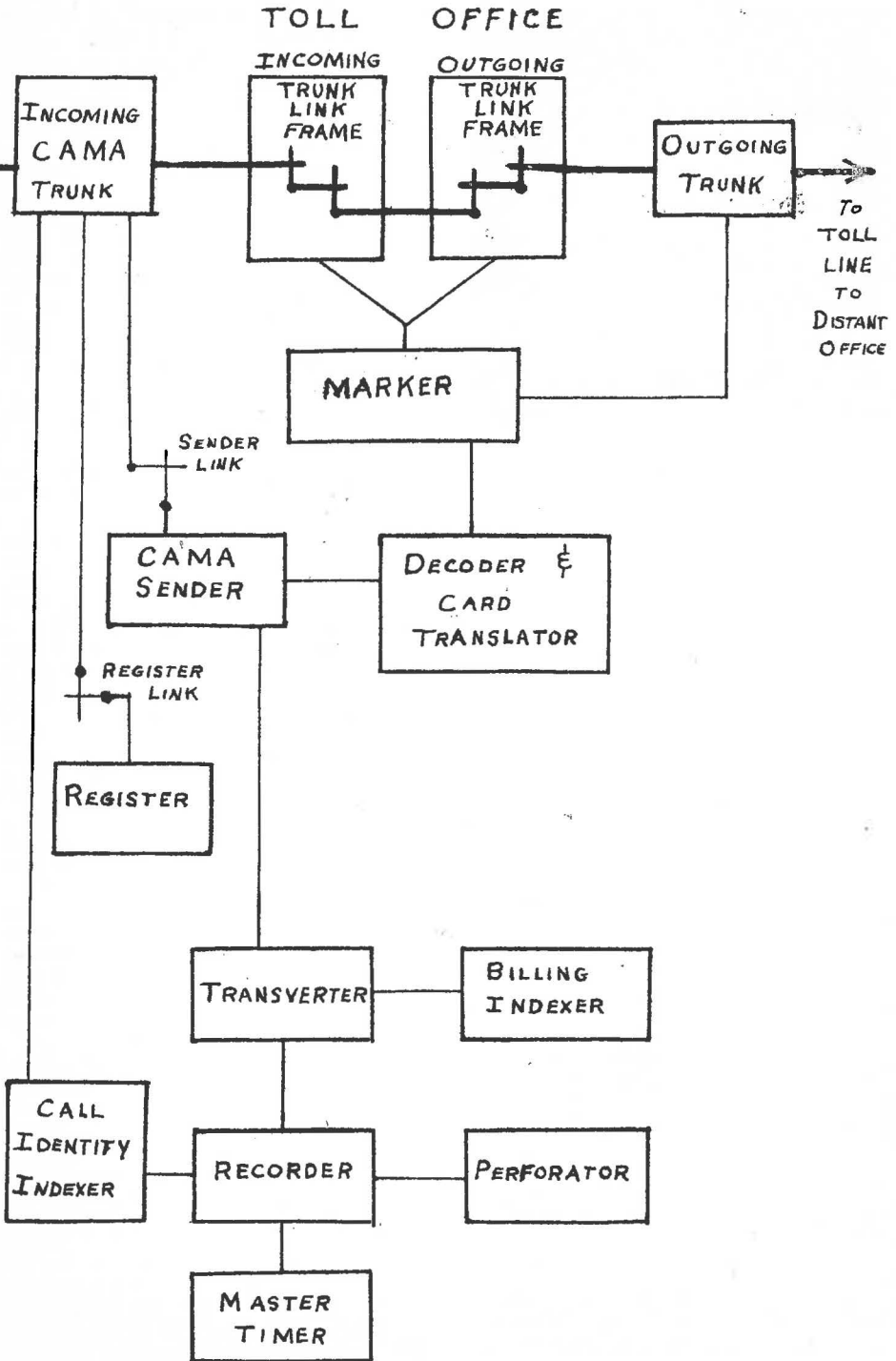
Trunk Circuits



A.N.I. Equipment

LOCAL OFFICE







Cross Bar Switches on 4-A Trunk Line Frames

(A.N.I.) equipment in the local exchanges, machine accounting equipment in the Administration Building, and extensive additions and rearrangements to the existing toll switching machine. These combined installations represent the largest single project ever undertaken by the Manitoba Telephone System.

The largest individual installation is that of the 4A Toll Switching machine with C.A.M.A. Two hundred and six frames of equipment were installed in the New Corydon Ave. Building. This job alone took ten months to complete.

The basic switching element of the 4A consists of the crossbar switch which is an electrically operated relay mechanism consisting of ten horizontal paths and ten or twenty vertical paths. Any horizontal path can be connected to any vertical path by the operation of magnets. The two basic switching frames of the 4A are the incoming trunk link frames (ITLF) and the outgoing trunk link frames (OTLF). In Winnipeg there are over 1,000 incoming trunk circuits connected to the ITLF and over 1,200 outgoing trunks circuits connected to the OTLF. Any incoming trunk can be switched to any outgoing trunk through the operation of the crossbar switches. The connection is set up by the operation of the common control equipment consisting mainly of Registers, Senders, Decoder, Translator and Marker. The purpose and operation of these pieces of equipment can be best explained by following the path of a call through the office with the aid of the block diagram.

When the subscriber lifts his phone off the hook the Line Finder in the local exchange operates connecting its associated 1st selector to that subscriber's Line Circuit and Dial Tone is sent to the subscriber. The Subscriber now

dials "1" the 1st Selector steps to the 1st level and an ANI outgoing Trunk is seized.

At the Toll Office an incoming CAMA Trunk is seized. A free Register is coupled to the I/C CAMA trunk via the Register Link Circuit. The Register is built to receive the seven or ten digits that the Subscriber now dials. (Seven if called party is within subscriber's own Area, ten if call is to another Area). It converts the slow speed dial pulses into high speed multi frequency (MF) two out of five codes. When all seven or ten digits have been received the I/C Trunk is connected to a CAMA Sender via the Sender Link Circuit. The Register then transfers the 7 or 10 digit address to the Sender using MF signaling. The Register is now released to serve another call.

The CAMA Sender stores the 7 or 10 digits and determines from the I/C CAMA Trunk that the calling party number can be automatically identified. The Trunk now signals the ANI Outgoing Trunk in the local office to identify the caller.

At the local office the ANI Trunk is connected to an ANI Register via the register coupling switch. This Register then requests the use of the ANI equipment and if free the gate circuit allows the register to couple. A short (2-3 millisecond) burst of high voltage is connected to the ANI trunk. This burst travels through the ANI Trunk Circuit, the First Selector, the Line Finder, down the cross-connection (this is the regular cross-connection from that particular number to the assigned Line Circuit) into the ANI tapping circuit where it operates the Numerical Extraction Rectifiers. The calling number is now in the form of 1 out of 10 signals i.e. a DC signal on one out of ten leads representing the numbers 0 to 9 for each digit. In the next step these are converted to seven two out of five multifrequency bursts. These are amplified to operate storage registers in the ANI Register. This Register then transmits the calling party number to the CAMA Sender where it is stored temporarily. The ANI Register is then released for another call.

On receipt of the first of the calling number digits the Sender seizes a decoder and translator. The decoder "reads" the first six or first three digits of the called number being held in the Sender. The number of digits read depends on whether the call is to a different Area Code or the call is to an office within the 204 Area. The decoder now seizes a marker and receives routing information from the card translator which it passes to the marker. The marker finds an idle O/G Trunk, sets up a path through the I/C Trunk Link Frame and Outgoing Trunk Link Frame to the Outgoing Trunk.

The Card Translator with the Decoder and Marker represent the "brains" of the 4A Switching Machine. Together they determine what I/C trunk call should be connected to what O/G Trunk and they set up a connection between them. In cases where all trunks in the desired high usage trunk group are busy they pick out an alternate route. The card translator, of which there are two in the office, contains about 900 metal cards which provide the switching information. It selects one card from information supplied by the Decoder, reads it, and passes the information back to the Decoder and Marker. Cards are read by means of a common light source, a phototransistor, a transistor amplifier and a reed relay.

The Marker, of which there are only three, locates an idle O/G trunk in the desired group, identifies the incoming trunk, and sets up a path between them by operating the crossbar switches.

Returning to the call, a transmission path has now been set up through the office, the Marker and Decoder release, and the Sender out-pulses all called party digits except the last one. This digit is held until completion of Calling Number registration.

While the call was being routed the Sender had seized a transverter. This converts the information received from the Sender into data suitable for recording. The transverter seizes a Billing Indexer from which comes a portion of the billing information. The transverter then seizes a recorder. The recorder and associated perforator combine to make an "initial entry" in the CAMA Tape. The Call Identify Indexer provides a trunk index number for the particular CAMA trunk involved.

The transverter and associated equipment release allowing the Sender to outpulse the last digit of the called number. The Sender then releases.

When the called number answers, the CAMA trunk, Call Identify Indexer, Recorder Perforator, and Master Timer act to perforate the "Answer Entry" on the CAMA tape. Similarly, following completion of the call a "Disconnect Entry" is perforated on the CAMA tape. The three tape entries although physically separated on the CAMA tape can be co-related by the Trunk Identity Index appearing on all three entries.

The CAMA tapes are regularly taken from the perforator to the Machine Accounting equipment at the Administration Building. There the CAMA paper tape information is transferred to a magnetic tape. This tape is fed into the IBM 1401 Magnetic Tape Computer where the three entries are co-related, the call is identified as in province or out of



Perforator

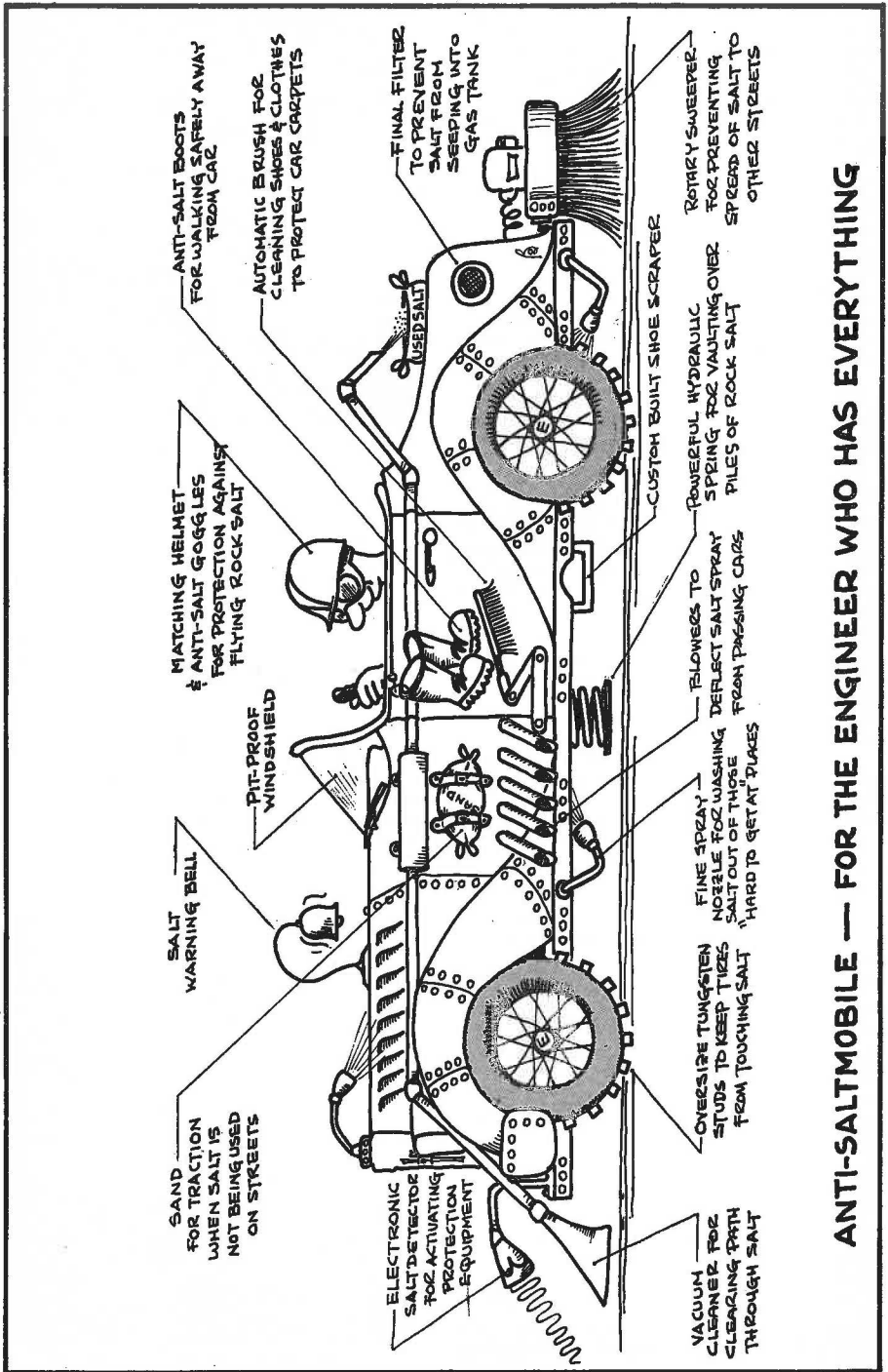
province, rated, and a customer's bill is automatically produced.

Although a great number of machine operations are required to set up a direct dialed long distance call, assuming that the calling party did not hesitate during dialing, that the Toll Trunks were free, and that the Called Party answered promptly, the entire sequence could be covered in approximately 35 seconds.

This article has dealt very briefly with the operations behind one station to station direct distance dialed call from an ANI Subscriber. There are several other types of calls which pass through the 4A Switch and there are other pieces of equipment involved which have not been mentioned here. Taken as a whole they still only represent a small part of one of the greatest Engineering stories ever enacted.



Conversion to Magnetic Tape



SAND FOR TRACTION WHEN SALT IS NOT BEING USED ON STREETS

SALT WARNING BELL

MATCHING HELMET & ANTI-SALT GOGGLES FOR PROTECTION AGAINST FLYING ROCK-SALT

PIT-PROOF WINDSHIELD

ANTI-SALT BOOTS FOR WALKING SAFELY AWAY FROM CAR

AUTOMATIC BRUSH FOR CLEANING SHOES & CLOTHES TO PROTECT CAR CARPETS

ELECTRONIC SALT DETECTOR FOR ACTUATING PROTECTION EQUIPMENT

USED SALT

FINAL FILTER TO PREVENT SALT FROM SEEPING INTO GAS TANK

OVERSIZE TUNGSTEN STUDS TO KEEP TIRES FROM TOUCHING SALT

CUSTOM BUILT SHOE SCRAPER

BLOWERS TO POWERFUL HYDRAULIC SPRING FOR VAULTING OVER PILES OF ROCK SALT

FINE SPRAY NOZZLE FOR WASHING DEFLECT SALT SPRAY FROM PRESSING CARZ

ROTARY SWEEPER FOR PREVENTING SPREAD OF SALT TO OTHER STREETS

VACUUM CLEANER FOR CLEANING PATH THROUGH SALT

ANTI-SALTMOBILE — FOR THE ENGINEER WHO HAS EVERYTHING

De-Icing Salt Corrosion Investigation

By D. W. CRAIK, P. Eng.

The practice of applying sodium chloride (rock salt) and calcium chloride to streets and roads of Eastern Canada and the United States dates back several decades. Rock salt, because of its lower price, has been used most extensively; when dissolved in water it produces an eutectic temperature of -6°F . Calcium chloride produces an eutectic temperature of -60°F . Thus the application of these chemicals to road surfaces ensures that any precipitation of sleet or snow on the roads that occurs below 32°F . down to the eutectic temperature will either form a liquid or heterogeneous slush, depending primarily on the resultant concentration of the salt in water. The reduction of the freezing point temperature is sufficient in most eastern climates to ensure melt conditions through most of the winter season and thus expedites the movement of vehicular traffic under otherwise nearly impossible conditions.

In Winnipeg, with its different conditions of temperatures and precipitation, it has been found that additions of sodium chloride and calcium chloride to sand which is spread on streets during the colder periods of the winter produces a better driving condition. In the more moderate periods of fall and spring, straight applications of sodium chloride have more recently been used when precipitation and temperature conditions warrant such.

The severe corrosion condition imposed primarily on vehicles has been experienced in Eastern Canada for many years. Cost benefit and other studies have been made, chemical inhibitors have been tested, judgments have been made, street and road salting seems to have emerged as a fact of life in Eastern Canada.

The Metropolitan Corporation of Greater Winnipeg, after examining the question with regards to local conditions, decided to undertake a factual study of corrosion conditions and the University of Manitoba was engaged to assist. A preliminary examination of published literature from Canada and the United States revealed that the most authoritative testing had been done by the Ontario Research Foundation for the City of Toronto, and had established a standard corrosion test for auto body steel. No reliable information was available which could be interpreted in terms of

Winnipeg's conditions of temperature, humidity, precipitation, salt application and sand application.

The prime contribution of most of the published information other than the Toronto work was the evidence that the greatest costs of corrosion damage are imposed on the vehicle owner. Damage to other materials involved in clothing, streets, etc., are overshadowed in the cost sense by steel in vehicles.

The University program which emerged involved actual tests of standard automobile body steel exposed to different artificial and actual road and environmental conditions. Further investigation via published information relative to materials other than steel is also being pursued.

The steel samples utilized are fabricated into two standard shapes, "vees" and "flats", of a predetermined size and masked to expose a specified area to corrosive conditions. The "vee" simulates a crevice type corrosion condition, and the "flat" an air exposed condition. These samples totalling over 3,000 in number, are mounted on racks which are subsequently placed inside a simulated fender or under the right rear fender of an actual automobile. The artificial conditions are created in each of four circular test tracks located at the University. In the test tracks are created conditions which correspond to streets typical of:

- (a) Winnipeg actual conditions;
- (b) Winnipeg conditions involving only sand-salt application;
- (c) Snow only;
- (d) Toronto street conditions (as determined from published information).

The latter (d) condition allows correlation of our data with that already collected at Toronto.

In addition, the standard samples are mounted on a number of automobiles as mentioned previously. These are located in Winnipeg, Brandon, rural Manitoba, Edmonton, and Saskatoon. The road conditions of these locations are being recorded. In Saskatchewan and Alberta, the records and sample changes are being expedited by the respective Universities. Representative samples are removed, replaced, and tested on a regular basis.

Atmospheric corrosion samples are located at three sites in Winnipeg such that the effects of different environments, industrial and residential, can be correlated. Corrosion tests are also being run for four different mixtures of salt, sand and snow, the primary difference of course being that of the concentration of the salt in the snow or water, whichever the case may be. To complete the picture, four different conditions of sand-salt application are being maintained on actual roads to observe the effects on road surface conditions. Automobile braking tests are being performed on these four different road conditions as a measure of the safety factor produced by the surface condition.

If the above details at this point are blurred, the tests objectives may be summarized as follows:

- (a) Corrosion rate determination of vehicles under controlled conditions;
- (b) Corrosion rate determination of vehicles under actual conditions in Winnipeg and other locations;
- (c) Atmospheric corrosion rate determinations;
- (d) Road surface evaluations under controlled conditions of sand-salt applications.

To summarize more concisely, we are after facts — the Engineer's language.



COUNCIL MEETINGS

The first meeting of the new council was held on November 30th, 1964 and was attended by President Borgford, Vice-President Harland, Registrar Weber and Councillors Rettie, Russell, Sommerville, Finnbogason, Fowler, McGinnis and Past President Chappell.

The association committees for 1965 was the first item on the agenda. There was some discussion concerning the length of time being spent by members on specific committees. It was suggested that membership on a committee should be for a specific length of time so as to make service on committees more revolving. No decision was arrived at on this question.

It was then decided to arrange a meeting with council and the committee chairmen to discuss the formation of the committees for 1965.

Applications for the position of permanent registrar were then reviewed. The matter was deferred pending further information on the applicants.

The second meeting of the new Council was held on December 16th, with President Borgford in the Chair. Also attending were Councillors F. M. Fowler, L. R. McGinnis, R. T. Harland, B. Chappell, W. H. Finnbogason, R. C. Sommerville, Registrar Weber and A. G. Moffatt, Chairman of the Consulting Engineers Committee.

Mr. Moffatt presented a comprehensive report on the proposed revisions to the fee schedule.

It was decided to send another letter to the members advertising the position of Registrar.

J. R. Rettie was appointed Chairman of the Budget Committee for 1965, with B. Chappell and T. E. Weber being on the Committee.

It was decided that the President would represent the A.P.E.M. at a meeting of engineers being arranged by the EIC at Pinawa.

—R.M.S.



COUNCIL MEETING

Present at the council meeting on February 10th, 1965, were President Borgford, Past President Chappell, Registrar Weber, Vice-President Harland and Councillors Rettie, Finnbogason, McGinnis, Fowler and Sommerville.

Council approved the accounts for the previous month, granted one new licence, accepted three engineers in training, five transfers, five registrations and one reinstatement.

There was then some discussion concerning a violation of the engineers code of ethics.

Council approved the 1965 budget which had been prepared by a committee of council. Another committee of council was then granted authority to spend up to \$1000 for furniture for the new office space which has been rented by the association. It was decided that the surplus from last year would be invested in Manitoba Hydro bonds. During discussion on the budget it was decided that standing committees be instructed to have all expenditures approved by council.

The next matter under consideration was the recommendation of the consulting engineers committee regarding revisions to the fee schedule. The recommendations of the committee were endorsed with one dissenting vote. In accordance with the by-laws of the Association a general meeting will be held to ask for approval of the fee change. This meeting will be held March 22nd.

The minutes of the Board of Examiners were then considered. All of the Board's recommendations regarding applicants and syllabus changes were approved. Recommendations

concerning amendments to the Act were tabled. Waterloo University was accepted as an approved university in accordance with the Board's suggestion.

The Chairman was delegated to appoint a representative to attend a meeting of the Alberta Engineering Technicians in March.

The meeting was then adjourned.—R.M.S.



Flin Flon News

By M. N. COLLISON, P. Eng.

Although E. S. Austin, P. Eng., is no longer a Flin Flon resident, we here still call him a Flin Floner and as such, it is to be noted that he recently assumed the presidency of the Zinc Oxide Company (Canada) Limited of Montreal. As an outcome of this development, I recently spent three days in Montreal studying the manufacture of zinc oxide. It is a most interesting operation.

H. A. McKenzie, P. Eng., is now in Toronto on an extended tour of duty.

R. L. Price, P. Eng., is once again putting what spare time he has into being the co-producer of the Flin Flon Glee Club's spring production, "My Fair Lady". This, of course, is in addition to his already numerous commitments as a barroom baritone.

Tony de Vette, P. Eng., accompanied by his wife, has returned from his seven-week tour of Europe, having spent the first three weeks in Amsterdam, Rotterdam (where he visited a few relatives), The Hague, Prague, Nurnberg, Antwerp, and with Christmas spent in Brussels. During the last four weeks of his tour, in addition to his wife, he bravely took his mother-in-law along. This time was spent visiting London, the night life of Paris, Geneva, Rome, Venice, Zurich, Dortmund, Rotterdam, and New York. He reports a most interesting and enjoyable trip, having made all of his own travel arrangements, with the use of sight-seeing tours being restricted to the cities they visited. He has over two hundred colour slides plus souvenir spoons as mementos, and also reports having purchased many useful articles for his wife and himself which were peculiar to the cities visited. He found very little difficulty in getting around with "English" except in Paris where he reports "French" would have been much more useful. He found "German", with which he is acquainted, quite useful as a second language also.

ROCK SALT

By W. H. FINNBOGASON, P. Eng.

Contrary to popular belief, the Metropolitan Corporation does not follow a policy of indiscriminate use of rock salt in its ice control and snow removal program. It is rather a policy that has strict limitations, namely:

- (a) Street conditions must be such that the only effective means of controlling the "glare ice" condition is by use of the de-icing agent (rock salt).
- (b) Temperature conditions as forecast at time of use must be 15°F and rising.

It has been our experience that the most dangerous icing conditions occur during the periods of early and late winter when the temperatures range between 20°F and 32°F and are usually caused by freezing rains or wet freezing snowfall. Rock salt is most effective in this temperature range. When temperatures fall below 15°F or when the "glare ice" conditions have been eliminated by the use of rock salt by itself, it is the policy of the Corporation to revert to the use of abrasives treated with salt.

The safety of the motorist and the pedestrian is of paramount importance in any program of street maintenance and during the winter season the controlled use of rock salt by itself and salt treated abrasives has proven to be the most economical and most effective means of coping with winter street maintenance problems.



BON VOYAGE — VIC CHORLEY

The Social Committee held a luncheon on January 21st, in honor of Vic Chorley, Past Chairman of the Committee, who has moved to Calgary. Vic served on the Social Committee for several years and was its Chairman in 1964.

President Borgford paid fitting tribute to Vic and expressed the appreciation of the Association for the services he had rendered.

Vic's keen wit and amiable personality will be missed. However, the Committee will not be entirely deprived of his wisdom and guidance as they have agreed to phone him collect any time they feel they need his advice.

It can be said with real sincerity in Vic's case, that Alberta's gain is most certainly a great loss to Manitoba.



L. R. MCGINNIS, P. Eng.

Lloyd Robert McGinnis, at the age of 31, is perhaps one of the youngest engineers to become a member of Council. He was born in Roblin, Manitoba, in 1933 and attended Elementary School in the Silverwood School District. He completed his school career at the High School at The Pas and graduated from the University of Manitoba with the degree of B.Sc. (C.E.) in 1956.

Mr. McGinnis is best known to the profession in Manitoba through his association with W. L. Wardrop and Associates, Consulting Engineers. He joined the firm late in 1956, having worked after his graduation for a short time with Canadian National Railways. Not long after joining W. L. Wardrop and Associates, Mr. McGinnis himself became an associate and is presently Director of Development and Control. His genial disposition has won him many friends within and outside the engineering profession.

Besides his membership on Council, Lloyd is also a member of the Engineering Institute of Canada, The American Public Works Association, The Canadian Institute on Pollution Control and the American Water Works Association.

In addition to all his professional activities, Mr. McGinnis is a very active worker in his church and is keenly interested in church extension work. He also finds time to indulge in golfing and curling but claims his real hobby

is reading, particularly biographical works and books on the arts. Married in 1955, he and his wife, Vera-Anne, and their two boys seven and two years old, live in Selkirk where Mrs. McGinnis keeps up her hobby of teaching the piano. Prior to her marriage, Mrs. McGinnis was a school teacher.

In spite of his spare time activities, Lloyd is an engineer to the core and has little time for those engineers who look on their profession as just another job. Many of us tend to bemoan the fact that the legal and medical professions command more respect than our own. One cannot help but feel that if more of us had that sense of vocation which Lloyd possesses, then the engineering profession would indeed be held in higher esteem by the general public.



A GENTLEMAN STEPS DOWN

There was some discussion at the Annual Meeting about the image of the professional engineer. As in most cases, the image reflected depends on who is looking into the mirror. To those who have had the good fortune to be associated with Ben Chappell, the image is one of rare quality.

Mr. Chappell enriched the office of President with a quiet dignity. Conscientious, diligent, unselfish and benevolent, he undertook the onerous duties imposed on him capably and industriously. Modest in the face of his own achievements, he is generous in his praise of others.

In these times of haste and pressure, Ben Chappell takes the time to be a gentleman in the finest sense of the word.

While he will no longer represent us as our President, he will continue to portray the professional engineer as a gentleman of the rare combination of humility and nobility.—L.

M. A. LYONS, P. Eng.

It is with great regret that we record the death of M. A. Lyons, in his 88th year. Mr. Lyons was the first President of this Association, serving in this capacity for two years, 1920 and 1921. In 1955 Mr. Lyons received the Association's first certificate of Honorary Life Membership.