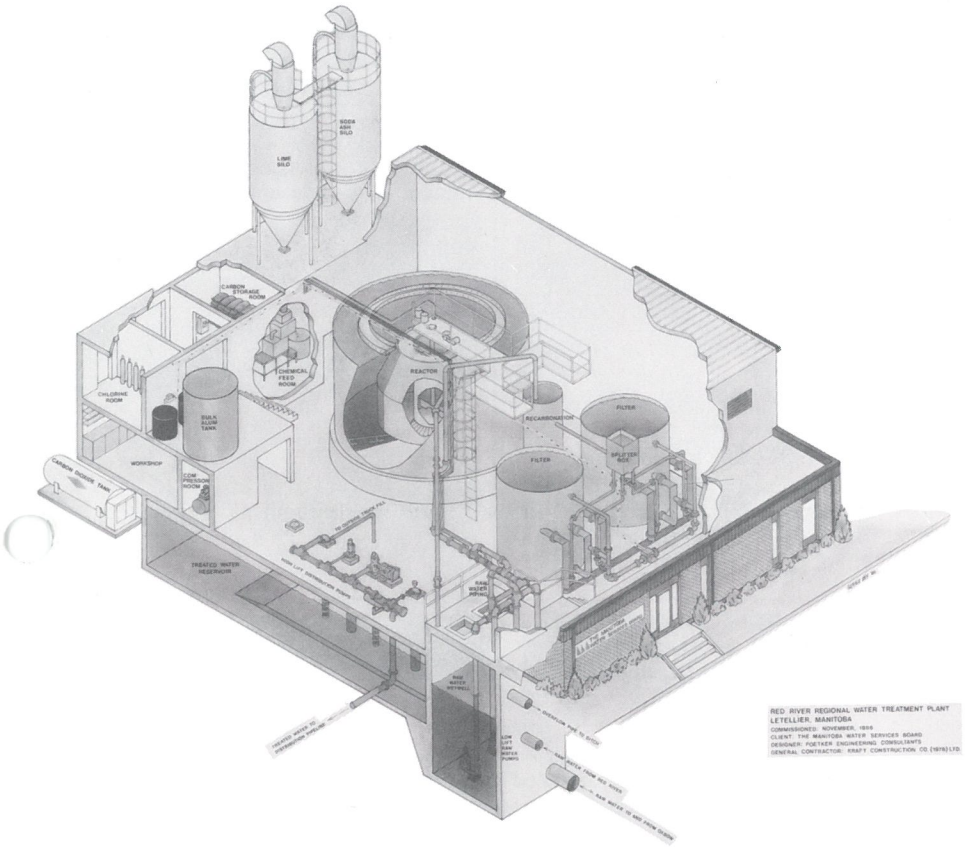
THE MANITOBA

Professional Engineer

ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF MANITOBA

April, 1987



A cut-away diagram of the water treatment plant at Letellier.

Opening of Red River Regional Water Systems Showcases Engineering

by D. Menon, P.Eng.

The Red River Regional Water Supply System was officially opened on Thursday, November 6, 1986 by the Honourable Howard Pawley, Premier of Manitoba and the Honourable Jack Murta, MP. They were accompanied by the Honourable Bill Uruski, Manitoba Minister of Agriculture and, the Honourable Leonard Harapiak, Minister of Natural Resources.

The Red River Regional Water System is a major regional water network and the first of its kind in Manitoba. It involved the construction of a water treatment plant at Letellier and the installation of approximately 145 km of water supply pipelines. Water is taken from the Red River, treated at a lime soda ash plant at Letellier and distributed to the communities of Altona, Letellier, Gretna, Gnadenfeld, New Bercthal and Sommerfeld, and over 200 farms in the Halbstadt, Marais and Altona areas.

Plans are presently being finalized by The Manitoba Water Services Board to extend a 15 km supply pipe east, crossing the Red River to provide treated water to the communities of Roseau River and Dominion City. The total cost of the project was approximately $5,620,000 (of which the Government of Canada contributed $1,520,000 and the Government of Manitoba $2,180,000. Municipal governments and local organizations contributed the remaining costs.)

(continued on page 2)

Jobs For Professionals Decrease 7% in Last Quarter of 1986

by N.A. Macdougall, P.Eng.

Job vacancies for accountants, engineers, scientists, executives and other professionals slumped seven percent in the last three months, according to the Technical Service Council, an industry-sponsored placement-service and personnel-consulting firm.

The Council's quarterly survey of 1,700 employers from coast-to-coast showed that Alberta suffered the greatest losses. There, vacancies decreased 56% in the last three months and 72% in the last year. The slump was attributed to hiring freezes and cut-backs by oil companies, pipelines and oil-field supply firms.

Openings also plummeted in Saskatchewan, due to similar reductions by oil companies and suppliers to the oil industry.

Ontario firms reported more vacancies than any other province, followed in order by Quebec, Alberta, B.C. and Manitoba. Industry in Ontario and Quebec has been little affected by the reduction in crude-oil prices. The relatively active job market in eastern Canada has attracted many Albertans who have been laid-off.

However, opportunities still exist in Alberta for zealous job-hunters. One Calgary sales manager refused an interview in Toronto, saying that he was a leading candidate for three Alberta vacancies.

Experienced computer programmers and systems analysts are in greater demand than any other occupation. Also sought are experienced electronics engineers, accountants, plant engineers, electrical engineers, manufacturing engineers, sales engineers and organic chemists. Most vacancies require experience in some industry or specialty or both.

Job opportunities for new university and college graduates vary greatly with the course and the province. In general, graduates in electronics, computer-science, accounting and business have the best job prospects, although there are notable variations across the country.

Because of limited vacancies for some graduates, some universities are offering courses in entrepreneurship. Engineering,

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NOTICES: Rules of Order

At its meeting on February 9, 1987, Council approved a motion that the membership be advised of the availability of the following document — "Robert's Rules of Order — Guidelines". This document can be obtained through the Association Office at 942-6481.

Payment of Annual Fees

Fees which were not received in the A.P.E.M. office before March 1st are subject to the additional $35.00 administration fee. If annual fees plus administration fee are not **received in the office before July 1st,** deregistration will result. There are no exceptions.

Red River System

(continued from page 1)

The historical background of the Red River Regional Water System started with an agreement signed in 1960 between The Manitoba Water Services Board and the City of Neche, North Dakota, located south of Gretna, calling for Neche to supply water to the Town of Altona, Village of Gretna and the Rural Municipality of Rhineland. In recent years it became apparent that the system would be unable to meet the growing demands of the area.

To find a solution to the problems of increasing water supply to the Altona area, several options were studied. The conclusions indicated that the most economical method of bringing a secure water source to the Altona area was to construct a water treatment plant at Letellier and a pipeline to Altona using the Red River as a water source.

The water quality of the Red River had been a concern in previous studies. Spills from a sugar beet plant in North Dakota and releases of saline groundwater appeared to be the main water quality concern of the river. However, with the exception of short periods, when the water quality was impacted by spills or flows were low, it appeared that the Red River had been a good municipal source since 1961. Also because of the river's capacity and dependability of supply, it was possible to expand the proposed Altona-Letellier system into a regional water supply network.

The plant in Letellier is located near a natural impoundment, an oxbow of the Aux Marais River, which is filled each spring with water from the Aux Marais River and has been the source of supply to Letellier for two decades. The piping from the wetwell structure at the Red River has been designed to pump water to either the treatment plant or the oxbow. At times, when the quality of the Red River water is poor, this arrangement allows for water to be drawn from the oxbow for treatment.

The water treatment plant at Letellier was designed by Poetker Engineering Consultants and built by Kraft Construction Ltd. The wetwell, supply line to the water plant and the pipeline to Altona was designed by P.F.R.A. The remaining works, including the proposed east supply to Dominion City have been designed by The Manitoba Water Supply Board. The water treatment plant is operated by The Manitoba Water Services Board.

Jobs For Professionals

(continued from page 1)

science and law graduates are reluctant to consider self-employment or work outside their field. A survey of 251 Ontario engineering graduates showed that only two went into business for themselves.

People who are laid-off who make job-hunting a 40-hour-a-week activity are getting positions in an average of four months, down from eight months in 1982. In today's market, the fastest results are achieved by people who are flexible about both type of work and job location.

"The economy's slow growth is creating few opportunities for promotion", according to Neil A. Macdougall, Technical Service Council's president. "Because birth rates soared during the 1950's, an unusually large number of people are competing for fewer-than-usual openings. As a result, we foresee a slow increase in turnover rates, which have been below five percent in many organizations."

Having seen friends laid-off, sometimes only a month or two after changing jobs, many professionals are security-conscious. Consequently, more job offers are turned down than in normal times and the number of professionals job-hunting has slumped from 20 percent to an estimated five percent.

Some employment advertisements still attract 100 replies. To avoid rejecting so many potential customers, some consumer-goods companies are using consultants to advertise while others simply wait for a suitable candidate to apply on speculation.

Unrest in South Africa has caused a surge of enquiries from executives and professionals there who want to immigrate to Canada. Although many have experience which is attractive to Canadian industry, many cannot obtain landed-immigrant status without having a job offer. Employers here are unwilling to make job offers without interviews, while would-be immigrants are reluctant to finance an expensive job-hunting trip to North America.

The TSC has offices in Montreal, Toronto, Winnipeg, Calgary, Edmonton and Vancouver. Its quarterly reports on the job market are widely followed by manpower planners, guidance counsellors and government officials. The Council also conducts labour-market studies, advises governments on university and college courses, undertakes relocation counselling and sponsors seminars on personnel subjects.

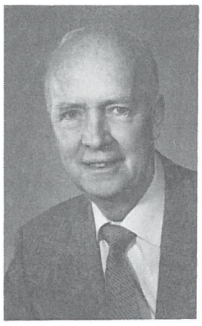
WANTED: CANDIDATES FOR APEM AND CCPE AWARDS

Nominations for the Merit Award, the Outstanding Service Award and Honorary Life Membership may be submitted to the Awards Committee. For further information regarding terms of reference etc., please contact the Association office.

Saskatchewan Association Differs in Focus on Issues

President's Message

Ted Speers, P.Eng.



On March 6th and 7th of this year, I had the honour of representing our Association at the annual meeting of the Association of Professional Engineers of Saskatchewan in Saskatoon.

The first morning, the guests from the sister Associations were invited to attend an open Council meeting and to participate — it was interesting to note the variations from the problems we discuss at Council. They place a stronger emphasis on public relations raising the image of the engineer in the community. For example, their Centennial effort features portable display stands which will circulate throughout the province and their display was "opened" by the Saskatchewan Minister of Highways using a CO_2 laser beam to cut the ribbon. In addition, posters for schools and billboards will carry the message, "The Application of Science is Engineering."

On Saturday morning, a Rap Session took place involving six tables with six to eight members per table. Our table discussed consulting, discipline, and enforcement of the Act. In Saskatchewan, the current regulations call for five years experience before "Permission to Consult" will be considered by a six person committee chaired by a Council member. There is a five year renewal requiring an up-date of experience resume with five references.

Discipline and Act Enforcement go hand-in-hand. In Manitoba, several companies doing military, electronic, or aircraft work, involving foreign governments, do not allow their engineers to stamp their drawings. This, apparently, is not a problem in Saskatchewan, largely, it seems, because in their industrial mix this type of company is scarce.

Our local companies maintain that, if stamped, foreign governments will not accept drawings. This practice occurs contrary to Section 19(1) of our Engineering Profession Act which requires that each registered member "shall make an impression of the seal on every estimate, specification, report, working drawing, plan or other document issued under his hand."

In discussion with CCPE President Yvon Dupuis, the prevalence of international and industrial espionage was given as a possible explanation for not stamping military drawings. By stamping, the source of development would be revealed. This subject will require further thought by Council.

Saturday afternoon, then President, Nairn McQueen (Al Schwinghamer is the newly-elected President) chaired the APES Annual Meeting with about one hundred and fifty attendees. All the guests brought greetings from the respective Associations (British Columbia, Alberta, Manitoba, Nova Scotia) plus CCPE President, Yvon Dupuis, and Don Laplante, Executive Director.

So, what was learned from the meeting? First, APES does a better job of PR at the high school and public levels (at least, this year) and we should again consider a PR committee to generate posters for high schools. APEBC has a booklet entitled, "Spokesmen and Specialists 1987" to assist writers, editors, and others wanting to learn about engineering and technical subjects.

Second, general concern appeared for the problem of more and more decisions being made on engineering matters by non-engineers, particularly in international companies and governments. Many of the problems experienced by society today have been the result of decisions divorced from engineering input as to the consequences. More engineers should seek political office so that the safety of the public may be guarded.

Letters

Congratulations on your publication! I was pleased to see that the notes I had made from the Council Minutes dating back to 1920 had been located. Those Minutes made very interesting reading when I was doing those notes.

The most memorable aspect of my years with the APEM, looked at from blossom city, has to be the super people the job afforded me an opportunity to get to know. At first they seemed to me to be middle-aged or elderly, then in the later years they seemed very young.

The most memorable event had little to do with engineering. For years there was an autumn dance, called the Fall Frolic, and at this particular dance there were awards given for various achievements.

The Social Committee discovered that to give a recipient a live creature was very entertining (for everyone but the winner). Brian Whitfield won a live chicken one year, fed it popcorn at the dance and ate it two days later. Wilf Garvin won a live goose which he traded for two chickens. The goose was such a success at the dance that the Social Committee decided to try to repeat that situation. But the Committee member in charge of locating a goose was unable to find one he could buy. But he did located one we could borrow for the evening. Vic Chorley, the Social Committee member in charge of the goose, was advised by the owner that he would not sell it because it was a 'prize' goose, but if Vic would promise to take very good care of it we could borrow it for 24 hours.

Vic picked up the goose, in a bed of straw in a large cardboard box, and he brought it to the Royal Alexandra Hotel where the dance was being held.

My husband, Donald, and I had not been very long at the dance when Lou Earp and Vic Chorley (both from the Social Committee) came to advise us that there was a problem with the goose. It was bleeding. The straw was getting red and likewise the feathers on the breast of the goose. I went to look at the situation (several times) but 'looking' was all I could do. I know nothing about the diseases of geese. More and more of the goose's feathers were turning red, and the same situation prevailed with the straw. Vic Chorley kept reminding us it was a 'prize' goose. The creature itself seemed very lethargic. It just sat in its own blood and looked sad. It emitted no cries. No one on the Committee knew how to apply a tourniquet to the breast of a goose. Vic Chorley became increasingly nervous that the creature was going to haemorrhage to death, and that we would be sued. An emergency meeting of the Social Committee came up with the solution of calling a cab and sending the goose back to its owner in Charleswood. The driver of the cab refused to have the goose in the car, so the poor creature was put in the trunk, the driver was given the address of the owner, and we returned to the dance to try and enjoy ourselves. Within a few minutes Vic Chorley was summoned to the telephone. It was the cab driver. He was at the address given, the man who lived there said he had no knowledge of a goose and had never heard of Vic Chorley. Vic asked the driver to return to the address, to check to make sure he had the correct one.

We heard no more that evening. We considered sending the goose a get-well card but decided against that. We feared it has expired and fully expected to hear from the owner or his solicitor. On Thursday the owner phoned Vic Chorley. It had all been a prank. He had fed the goose a diet of beets prior to its visit to the Royal Alexandra Hotel. It had never been a prize goose. It was fine.

One's most memorable recollection of three decades working with engineers should more properly have something to do with a successful engineering achievement, but mine revolves around an evening dominated by a 'haemorrhaging' goose.

While I am enjoying retirement, I do miss my friends in Winnipeg and the marvellous people I met through the APEM. Please give them my warm regards.

Mrs. L. Dunklee, Victoria, B.C.

Mrs. Dunklee was involved in various capacities, with our Association for 30 years, up until her retirement in 1985. I contacted her and asked about her most memorable recollections of the APEM — Ed.

The Ten Most Exceptional Feats of Canadian Engineering's First Century

The Engineering Centennial Board is marking the inauguration of the centennial year by highlighting the 10 most exceptional and representative feats in the history of Canadian engineering. We will highlight two feats in each of our next five issues.

A jury comprising eight engineers and headed by James W. MacLaren (Toronto, EIC) made its selections according to stringent criteria and after having publicly invited engineers and Canadian firms to submit their nominations of works which could be judged the most representative to engineering in Canada. Mr. Yaroslaw Zajac, communications director of the Association of Consulting Engineers, was Secretary while Mr. Norman Ball, research consultant with the National Museum of Science and Technology, acted as Special Consultant. Other members of the jury were: Messrs. Glenn A. Morris (Winnipeg, CCPE); Lorne Gold (Ottawa, CCPE); Jack Chisvin (Toronto, ACEC); Jacques Tremblay (Trois-Rivieres, ACEC); Ian S. Ross (Vancouver, ACEC); Ron A. Parsons (Calgary, EIC) and Jean-Louis Fontaine (Montreal, EIC).

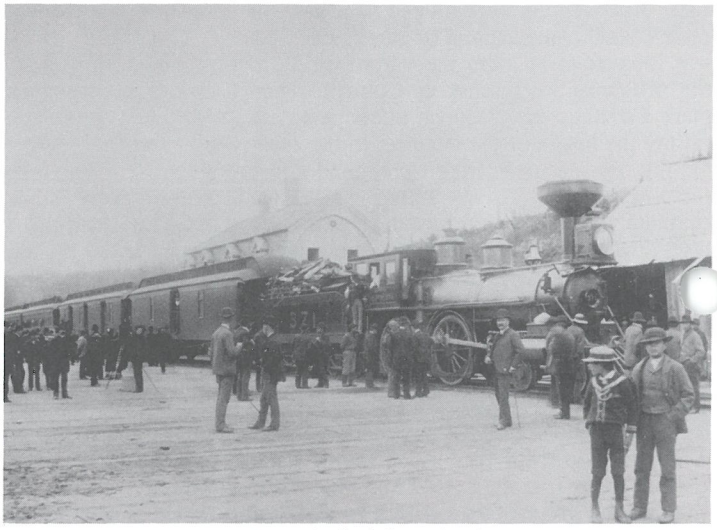
In April 1986, some 110 projects of all disciplines and reflecting the vitality of all regions of the country were submitted. Of these, 25 were retained for further study. The final selection would be difficult in that it would have to stringently comply with selection criteria. Each of the nominated projects had to have contributed in significant fashion to the development of engineering and in a notable way to the physical, social and economic development of Canadians. Within its own era, it must have played a catalytic role and led to major economic and so change. It also must have received international recognition of note. It also must have posed extraordinary demands in organization and administration. Set within its proper context, the feat should be identified by its original character, ingenuity, creativity and true uniqueness.

Together we can admire the grandeur and scope of these feats. We can also try to imagine the marvel felt by our forefathers a century ago at the discovery of new inventions which were greeted with unbounded enthusiasm. Today, everything seems to come too easily, and we might be too blase to fully appreciate the challenges brilliantly met a hundred years ago... the true sign of the greatest eras.

The Development of the Railway Networks Across Canada

"All aboard, toward the Pacific Ocean," said William Cornelius Van Horne, the General Manager of Canadian Pacific Railway in 1885. It took only four years, and not the projected 10 to carry out this gigantic and unique feat in the annals of Canadian engineering history. The true nature and scope of the logistical problems felt was measured by pick and shovel, one day at a time.

In early 1880s, the task was to unite the three travelling worksites, started in Ontario, Manitoba and British Columbia. Intemperate weather, black flies, and the inhospitable surroundings were not the only major obstacles. Politicians also had to be convinced. The engineers knew this going in. Proving the project's worth to the federal government was gambling Canada's very existence. British Columbia and the Prairies were leaning to North-South economic communications because the East-West economic axis did not seem feasible at the time. A true country with recognized borders emerged from this feat, as industries and cities sprung up along the railway lines. The telegraph followed, and then ports at railheads, leading to trade with Europe and the Orient, and then large waves of immigration used the railways to populate Canada. The "folly" of engineers created a continent-wide country, a fact which must never be forgotten.



The arrival of the train always created excitement.

The Building of the St. Lawrence Seaway

Jacques Cartier dreamed of it. Even as far back as the beginning of this century, the federal government believed that the St. Lawrence River system, a major navigational lifeline, was clearly insufficient. The history of Canadian-American relations on this subject is a laborious one. From 1950 to 1954, consultations finally led to the mounting of an effort without equal in that era: bridges, tunnels, caissons, locks, canals, dams, railways and roadways were constructed around the rerouting of 563.25 kilometres of water, from Montreal to Lake Erie. More than 20,000 people and 500 engineers tackled this monumental project on both sides of the border. Total investment was more than $1 billion and more than 2 million horsepower of electrical power generated. Some 75 per cent of the merchant marine of this era finally had access to the heart of the North American continent.

The St. Lawrence Seaway allows shipping to move 3,700 km into the interior of the continent, a rise of 182 m above sea level. The Seaway has received worldwide recognition as one of the most important man-made waterways, with more than 40 million tons of cargo shipped each year during its eight-and-a-half month season. A close examination of its workings turns up an impressive engineering feat... and a real economic success story.



The Seaway is an invaluable transportation link to the interior of North America.

There is Not a Great Deal of Time

by P.L. Fraser, P.Eng., Past-President of the Association of Professional Engineers of the Province of New Brunswick.

Traditionally, the task of the President as his term draws to an end is to reflect on the achievements and note how well Council has done under his direction. I intend to depart from this format. Instead I want to present some of the issues facing our profession gleaned from my perspective as President over the past year.

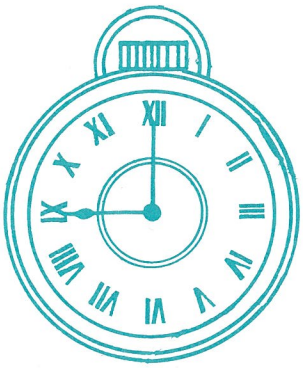
Some provinces now require all Engineers entering their jurisdiction to register in the same manner as a new Engineer. No recognition is given to membership in another Association, nor to years of experience in our profession. The stated reason is political and indeed there may be some pressure from that forum. The point is that regardless of the efforts of C.C.P.E. we are becoming islands unto ourselves and in effect are saying that we do not share common entrance requirements.

Many provinces now have, as a minimum, "Right to Title" legislation for their technicians and technologists. We, as others have, opposed passage of such legislation generally on the grounds of the effect such an act would have on our ability to carry out our mandate of public protection. If we take a hard look at the situation, however, we see the technologists are better trained than in the past and more importantly we cannot clearly define the practice of engineering. Furthermore, the grey area of overlap between the technologist and the engineer is increasing in size.

The dividing line has traditionally been drawn at design. Engineers do design. Right? Today it is possible for a lay person with absolutely no engineering background to produce safe, efficient, low cost designs in specific areas using one of a growing variety of computer aided design packages. Quite properly, one may argue the issue is not one of who or what does the design but one of who takes responsibility for it and herein lies a dilemma. Over the past few years engineers have been actively seeking ways of limiting their liability and, to me, this is an expression of the fact that we would prefer to take less responsibility for our work.

Responsibility in itself is a rather poor means of differentiating engineers from others. Within our ranks we see various levels of responsibility. Consultants must be concerned with their responsibility as it relates to their liability, but to the employee engineer the issue has a totally different impact and perception. Much of the work done in corporations never leaves the corporation and who is responsible for what is often difficult to determine.

Well over 90% of our membership are employee engineers and this makes us quite distinct from the other professions with which we feel so often compelled to compare



ourselves. One solution would be to adopt contract employment as a self-employed professional. While this presents many obvious benefits to the profession and the individual we'll never do it. Engineers, especially Canadian engineers, are strongly motivated by a sense of security. Thus, any scheme that adds uncertainty and a total reliance on one's self stands little chance of acceptance. Furthermore, we have conditioned employers to look at engineers in the same manner as any other employee group. Thus, such a move would most likely be opposed by employers.

In the same vein, we hear suggestions from within our ranks of a class system for engineers. The adoption of any plan that basically divides engineers into classes such as practicing and non-practicing will essentially sound the death knell for the profession as we now know it.

I believe Bernard Friedland and Peter Dorato in the December issue of the I.E.E.E. Spectrum present a direction that, if adopted, could resolve many of the difficulties we will have to face. However, it too, is fraught with problems. Basically, they propose a "Doctor of Engineering" degree. Distinct from the Ph.D. this program would consist of an undergraduate degree in science or technology and a three year post graduate program leading to the degree of Doctor of Engineering. Those interested in persuing a traditional academic or research career would follow the existing program.

"We seek a public profile akin to doctors and lawyers, but yet remain silent on the vast majority of issues facing our country."

Such a program combined with mandatory continuing education would indeed radically change the profile and image of the engineering profession both internally and externally.

We build things and generally they work. We are concerned with safety and competence and generally the incidence of problems is very low. But before we rest on our laurels remember our inward concern with our status in society and our image are really of very little concern to the general population. We regard ourselves as invisible but to what end do we wish to make ourselves visible? We lament the erosion of our profession but fail to agree on even the most trivial of changes to our entrance requirements. We seek a public profile akin to doctors and lawyers, but yet remain silent on the vast majority of issues facing our country. Worst of all many, if not the majority, of our members view membership in an Engineering Association simply as a means of continued employment.

So there are problems and challenges to be faced. The real problem is one of time because there is not a lot of time to put our house in order. Let us hope we have the vision and fortitude to move forward and face the next century as a unified and distinct Association of Professional Engineers.

Thompson Chapter Productive at Annual Meeting

by A. Murchie, P.Eng.

Thompson Chapter of the APEM held their annual meeting at the Paint Lake Marina on January 30th, 1987, with a turnout of 20 engineers enjoying the meal and program of activities. The meeting was chaired by Chapter Vice-President Rodger Blunden in the absence of President Robert Cotterill who was unable to attend. Rodger acknowledged a year that included a business meeting, a golf tournament, and support for a northern candidate for APEM Council, Milt Goble.

The constitution and by-laws were approved at the annual meeting. Subsequently, election of the Executive Committee took place. After explanation by Vice-President Blunden that according to the approved constitution, the Executive Committee must select officers from its membership at the first committee meeting; the officers elected consisted of Robert Cotterill, Rodger Blunden, Milt Goble, John Fulton, Alex Murchie and John Sagman.

A slide presentation followed that provided an interesting briefing on the dredging of Thompson Lake, preparatory to the start of the Thompson open pit mining operations. A glimpse was provided of the technicalities involved in the removal of the dredge at completion of its work. Ray Prochera, project manager for the open pit project delivered the presentation.

Subsequent to the meeting, the Executive Committee chose Robert Cotterill as President, Milt Goble as Vice-President and Alex Murchie as Secretary-Treasurer for the year 1987.

THE WINNIPEG AQUEDUCT

"Not because it was the cheapest, but because it was the BEST."

by I.B. Henderson, P.Eng.

In 1912 Winnipeg was a bustling city. Its population in only ten years had quadrupled to 175,000. Now in 1987 with a nearly static population of over half a million its water supply, conceived in 1912 and completed in 1919, is still adequate.

The engineering of the aqueduct and water supply system was remarkable. It used the now little-seen principle of graphical statics for design of the pipe. The construction through muskeg and rock and across the alkaline soils of the Agassiz Basin was an achievement to be proud of. The operation, repair and maintenance, while the water continued to flow, was an outstanding achievement.

Perhaps the greatest engineering achievement was not in the design and construction of the structure, but in the perception and utilization of unique natural resources which, combined, gave Winnipeg a water supply requiring neither pumping nor treatment and which was adequate for over half a century.

The immense reservoir of Lake of the Woods nearly 300 feet higher than Winnipeg, provided water of excellent quality and a virtually inexhaustible supply. It took six years and cost over 13 million dollars to build, and now delivers up to 85 million gallons a day to Winnipeg. In summer at the hottest dry season, consumption can reach 100 million gallons a day. Large reservoirs on the eastern side of the city provide storage for water to meet demand in excess of the capacity of the aqueduct.

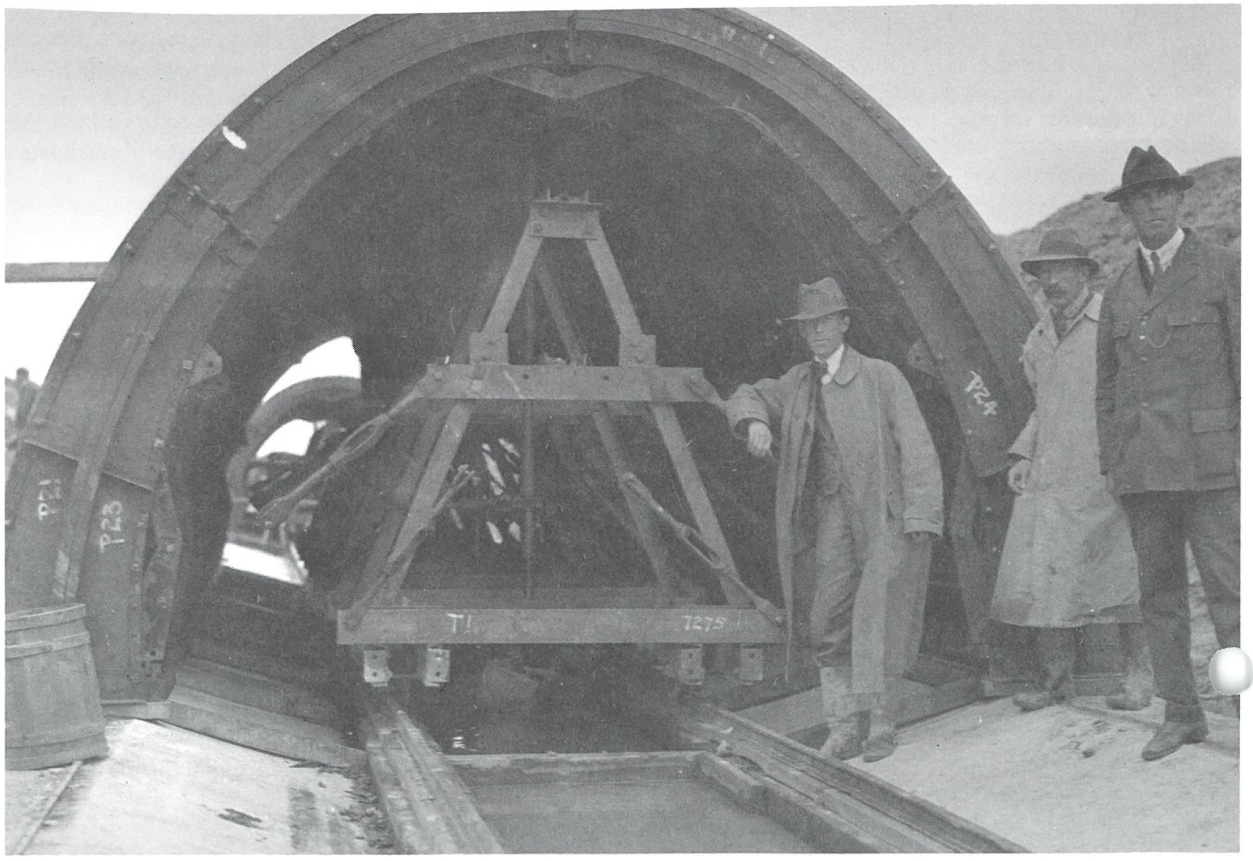
The pipe suffered alkali attack, cracks developed, and short sections had to be repaired, but the aqueduct that now serves Winnipeg is essentially the same as that which was built some 70 years ago.

For 80 miles of its 98 mile length, the aqueduct consists of horseshoe shaped concrete arches varying from a minimum of 6 ft. 4¾ inches wide and 5 ft. 4¾ inches high to a maximum of 10 ft. 9 inches wide and 9 ft. high. The larger pipe is required where the grade is flattest in order to maintain a constant flow. Manholes and air vents are placed at one-mile intervals. When the aqueduct passes under rivers its shape changes from a horseshoe-shaped arch to a circular pipe siphon. The aqueduct was originally inspected by lowering the water and traversing it in a boat. Now, however, because reservoir capacity is large enough to allow the aqueduct to be shut off for a few days, a specially designed bicyle is used to carry floodlights and a tape recorder during inspections. The aqueduct is basically designed without the use of reinforcing steel but reinforcement has been added to the invert where the foundation was particularly poor and to arch sections where additional strength was required for places such as road crossings and railway crossings.

The aqueduct was officially opened on September 9, 1919 by His Royal Highness the Prince of Wales.

A report written by Dione Payment for the CEHR highlighted many of the major achievements of the project. Some are listed below:

1. The Winnipeg Aqueduct design, construction and operation scheme "is noted among the world's greatest engineering works."
2. Structurally and technologically it has withstood the test of years beyond any reasonable expectations.
3. It made possible the great industrial growth of Winnipeg as a manufacturing and distribution centre.
4. New York, Boston and Los Angeles have built aqueducts necessitating dams and the creation of artificial lakes. Winnipeg built its aqueduct using a natural lake as its source. "None, in perfection of watershed, in quality of water or in magnitude of supply, compare with the enormous reservoir of Shoal Lake."
5. The aqueduct is a unique achievement, the first gigantic engineering enterprise in Western Canada; involving World Authorities in waterworks engineering.
6. It is the only 'cut and cover' aqueduct such length and capacity in Canada.
7. The aqueduct is a tribute to the spirit and enterprise of Canadians at the turn of the century.



Aqueduct interior form and carrier. Similarly, an exterior form travelled on rails at the edges of the invert.

This table shows the shapes, sizes, and grades for selections indicated on the profile.

The aqueduct is an open-flow system until out 14 miles from the city.

SECT.	SIZE	LENGTH FT.	Slope in ft. per 1,000 ft.
	48'' Circular	11659	
	60'' ''	1113	
	66'' ''	48964	
A	96'' ''	22123	0.78
B	8'-9'' x 7'-4 5/8''	85975	0.30
C	6'-4¾'' x 5'-4¾''	48328	1.537
D	8'-3¾'' x 7'-0''	36195	0.382
E	90'' circ.	13939	
F	7'-4'' x 5'-2¼''	43599	0.744
G	7'-7½'' x 6'-5¼''	30000	0.600
H	7'-5½'' x 6'-3½''	75698	0.684
J	81'-2'' Circ.	185	
L	6'-7'' x 5'-6½''	10004	1.290
M	87'' Circ.	190	
N	7'-11½'' x 6'-8½''	24267	0.480
O	96'' Circ.	160	
P	96'' Circ.	130	
R	8'-10¾'' x 7'-5'-8''	11104	0.279
S	10'-9'' x 9'-0''	10860	0.279
S	'' ''	33410	0.110
T	108'' Circ.	251	
INTAKE WORKS TRANSITIONS, VENTURI METERS, SPECIALS ETC.		340 967	
2ND BRANCH AQUEDUCT			
	66'' Circular	63510	
	60'' ''	62	
	54'' ''	15730	
	TOTAL	588763	

CHRONOLOGY

1897 Study to determine the best water supply for the City of Winnipeg began.

1906 Provincial Government act establishes Board of Consulting Engineers.

1907 Report recommends Winnipeg River.
Municipalities cooperated with City of Winnipeg to form the Greater Winnipeg Water District and agreed to share costs.

1912 Report pointed to Shoal Lake.

1913 Board of Consulting Engineers recommend aqueduct from Shoal Lake.

1913 June • Federal Government Act to enable City of Winnipeg to get water outside Manitoba.

1913 Fall • Work started.

1914 January • International Joint Commission authorized the withdrawal of 100 MDG.

1915 Spring • Construction of Aqueduct was started.

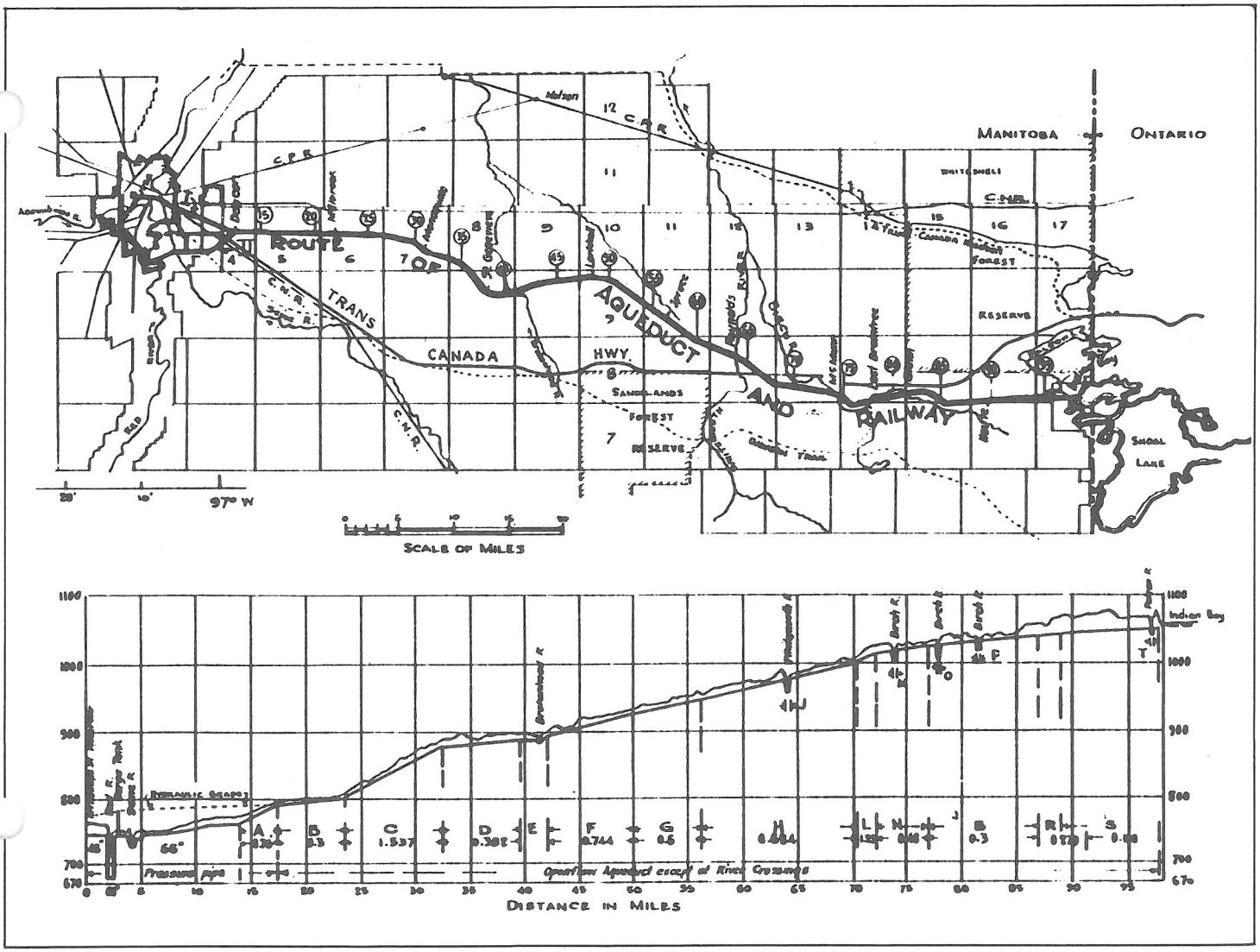
1919 April • Water flowed to Winnipeg taps.
September • Official opening by H.R.H. The Prince of Wales.

1939 June • *Free Press* reports Winnipeg Water chosen from 100 alternates for Royal Train throughout Western Canada.

1981 September • City receives the National Environment Award.

1985 September • American Water Works Association declares the Aqueduct to be a "Water Landmark."

The writer, a civil engineer was Waterworks Engineer with the City of Winnipeg until his retirement in 1986.



Plan/Profile of the Aqueduct showing the different pipe cross-sections and their lengths.

RECOLLECTIONS OF PAST PRESIDENTS

In our remaining five issues of the Centennial, 1987, we will feature the recollections of noteworthy-events of some of the past-presidents of our Association.

Two such reminiscences follow:

1970-1971: President Russ Hood, P.Eng.

In late 1970 the newly-proposed Practice and Ethics by-law was passed, which, for the first time, gave the Association the methodology to monitor and investigate cases of unprofessional conduct by Association members.

The first tribunal related to the new Practice & Ethics by-law commenced early in 1971 and was a deeply emotional experience for members of both the Council who heard the case and for the Practice & Ethics Committee who acted as the complainant. The tribunal lasted for the best part of 1971; the Professional Engineer was found guilty, and as a consequence was suspended from the Association for a period of years. Interestingly enough, the verdict was appealed, and in the appeal the judgement of the Association was upheld.

The controversy surrounding the decisions related to the diversion of the Churchill River was at its peak in 1971. It was considered by the Council at that time, that because of the accusations being made regarding the professional conduct of certain of its members, that it was necessary to meet with these members to ascertain if there was a basis for the accusations. As a result of the meeting, Council issued a statement that in itself became very controversial, indicating that they had not found a basis for these accusations. Later this was to become a major issue in the Hydro Enquiry.

It is noted in the records of the Association, that the Council of the 1970-71 period found it necessary to have special meetings without the press at the old Carlton Club. These meetings used to last past midnight, however, they were always successful in getting Council to take a position on several of the controversial issues before them.

The 1970-71 period produced some significant initiatives for the Association. In order to develop a better relationship between the Faculty of Engineering and the Profession, the first University Liaison Committee was established; the "Canada Northlands Award" honouring Major Les Charles was established; the first Policy Statement relating to collective bargaining for Professional Engineers was published; and amendments to the by-laws giving Council authority for the establishment of annual dues were made.

★ ★ ★

1975-1976: President Doug R. Grimes, P.Eng.

A major concern facing Council in 1975 was whether to support groups of salaried engineers who were coming under some pressure to join non-Professional Unions. These unions were becoming very active in Government departments and Crown Corporations.

In 1975 the first recommended salary schedule was issued and employers were urged to use it as a guide in establishing salaries. Being the first one, there was naturally some concern as to its acceptability as a guide, particularly for the more junior engineers.

Council meetings were sometimes more than once per month — December and January there were five meetings in two months and these were usually lengthy, often over five hours.

The postal strike interfered with the election of Councillors at the end of 1975 and while the annual general meeting was held as per schedule, the election of officers was not until some three months later, resulting in a 14-15 month term of office as President.

Council Reports

JANUARY 12, 1987 *by J. Bogan, P.Eng.*

Where Council authorizes publication of discipline by the Ontario Association concerning professional misconduct relating to an arena expansion. Also discussed; a proposed engineering centennial week, the upcoming display at the Manitoba Museum of Man and Nature and establishing a Committee to review the present Code of Ethics.

Engineering Centennial Week: Council discussed several proposals to highlight the upcoming engineering centennial. A motion was passed that the President approach the Premier and ask him to declare an Engineering Centennial Week. Also, an Ad Hoc Committee was appointed to highlight outstanding engineering accomplishments in Manitoba. The Ad Hoc Committee consists of two members: Councillor Hawaleshka and Councillor Kjartanson. Other members would be welcomed to the committee.

Young Engineers Sponsorship: It was agreed that the President would write to executive officers of major engineering employers to encourage the sponsorship of junior engineers to attend the Engineering Centennial Celebrations, which will be held in Montreal from May 18th to 22nd, 1987.

Museum of Man and Nature: A presentation was made to Council describing the exhibit planned for the Manitoba Museum of Man and Nature. The diorama will feature the construction of the Hudson Bay Railway. A budget of $140,000 was established for the project, with the Association contribution being $10,000. Opening of the display is planned for Thursday, June 25, 1987.

Professional Misconduct: Council authorized the publication of an article which appeared in the July/August Ontario Association publication "Dimensions".

Code of Ethics: Council passed a motion to undertake an in-depth review of the Code of Ethics. It was felt that several canons in the code are widely violated and therefore, their validity must be questioned. At least half of the Ad Hoc Committee will be comprised of members from the Practice and Ethics Committee. At least two past presidents and a representative from the Legislation Committee will be included. It was also suggested that a lawyer participate in the review.

Old Pinawa: Council decided that the A.P.E.M., in cooperation with the Culture, Heritage and Recreation Division of the Department of Natural Resources, establish a commemorative plaque at the Old Pinawa site together with an appropriate booklet. The Association's maximum expenditure was set at $1,500.

FEBRUARY 9, 1987 *by A. Kusiak, P.Eng.*

At which Council considers the submission of an annual brief to the Provincial Cabinet.

After the agenda and the minutes of Council Meeting of January 12, 1987 have been approved, the financial statement was discussed. A motion was carried that the financial statement be approved in the form prepared for the Council. Applications for licences, engineering graduates, transfers, registrations and reinstatements were considered and for the most part approved.

Robert's Rules of Order-Guidelines: Council considered t... Guidelines prepared by Mr. Mackenzie. It was agreed that the document be distributed to all committee chairmen and members of committees and that a notice be put in a subsequent issue of *The Manitoba Professional Engineer* informing the membership that such a document exists and can be obtained through the Association office.

The Pride of the Grand Trunk Pacific

ommenced in 1911 as a ten-storey steel-framed structure that was to be called the Selkirk Hotel, at its opening on December 11, 1913, the building had grown to fourteen storeys and had acquired a new name — The Fort Garry.

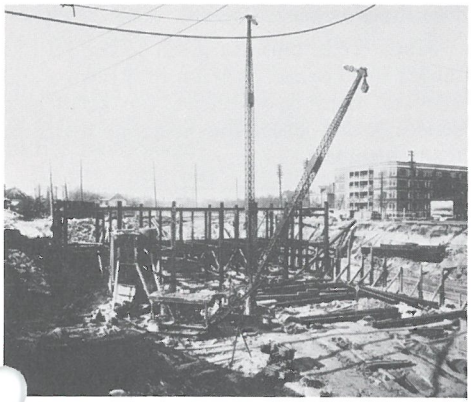
Designed by the firm of Ross & MacDonald in the French Chateau style that was to rule hotel-architecture in Canada until after the Second World War, it was clad in limestone imported from Indiana. The foundations are described as being a "granite foundation". Purdy and Henderson were the structural engineers. Construction was by the Fuller Company.

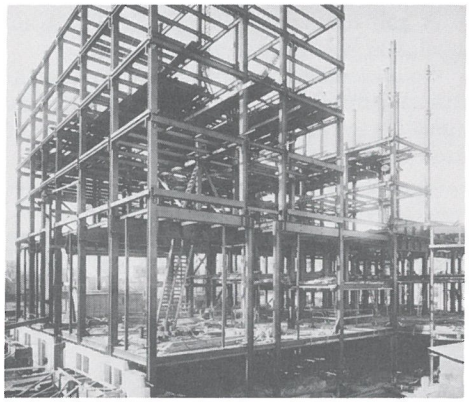
The boom days of the 1920's saw a major renovation completed in 1929 — in time for the Depression of the 1930's. This modernization provided modern bathrooms, power facilities, and telephone service for each room. Later renovations included the MacDonald Room.

If the architects were to return today, the only change they would notice on the exterior of their building, would be the rear entrance which was constructed in 1970 when it was recognized that the automobile is here to stay.



Photographs courtesy of Provincial Archives of Manitoba.







Research and Development Committee — Terms of Reference: A motion was carried that Council accept the terms of reference outlined in the third paragraph of Mr. Mackenzie's letter dated February 9, 1987, and that a Research and Development Committee be formed.

It was agreed that Council request the members who took part in the informal meeting on January 28, 1987, in the Association office, to form the Research and Development Committee and that the committee appoint its own chairman.

Report of the Ad Hoc Committee on the Use of the Seal: Council considered a report on the "Guidelines in Respect to the Ethical Use of the Seal". Certain typographical errors were noted and certain corrections agreed upon.

A motion was approved that the corrected Guidelines on the Ethical Use of the Seal prepared by the Ad Hoc Committee be printed for distribution to the membership.

Engineering Centennial: The report prepared by the Chairman of the Ad Hoc Engineering Centennial Committee was accepted. Council considered the question of sending an official A.P.E.M. delegate to the Engineering Centennial Convention and referred this matter to the Executive Committee.

Brief to the Provincial Government: Mr. Speers suggested that Council consider the submission of an annual brief to the Provincial Cabinet. The matter was discussed and it was agreed that Mr. Speers would prepare a list of items which might be included in such a brief and forward these to Council before the next Council meeting.

Canadian Public Works Council: Council considered a letter from the C.P.W.C. dated January 30, 1987.

A motion was carried that the Manitoba Chapter of the C.P.W.C. be requested to provide more detailed information on the proposed Manitoba History of Public Works regarding the project schedule, budget, format, etc.

Upon receipt of the information, and a possible presentation to A.P.E.M. Council by a representative of the Historic Project Committee, the A.P.E.M. Council may give further consideration to financial support.

Canadian Accreditation Board Meeting: It was agreed that members of the A.P.E.M. Executive Committee, with their spouses, represent the Association at the CEAB meeting on September 21, 1987 at Minaki Lodge and that expenses be paid for by the A.P.E.M.

Group Practice: Mr. Whittaker, Chairman of the Consulting Engineers Committee was invited to the meeting to speak on the two motions contained in the Consulting Engineers Committee Minutes dated January 22nd, 1987.

Council considered and discussed the final report of the Sub-Committee on Group Practice.

A motion was carried that the final report of the Consulting Engineers Committee's Subcommittee on Group Practice be accepted by Council; and that Council establish an Ad Hoc Committee of Council to review the report, and to provide Council with recommendations regarding the implications of implementing such a policy.

It was also suggested that the above-noted committee include two members of Council (Mr. K. A. Buhr and Mr. W. McGilvery); one member of the Consulting Engineers Committee (Mr. Doug Strang); one member of the Practice & Ethics Committee and one member of the Legislation Committee.

A motion was carried that Mr. W. McGilvery be appointed chairman of the above-noted Committee.

The meeting began at 3:30 p.m., and adjourned at 7:30 p.m.

The Second Decade of A.P.E.M.: 1930-1939 The Dirty Thirties

by D.N. Spangelo, P.Eng.

In continuing our series of historical notes on our Association, we will now look at the period from 1930-1939.

The Dirty Thirties: 1930-1939

One of the items discussed at the 1930 Annual General Meeting was the reduction of Annual Fees, from $5.00 to $3.00, since reserves had reached $10,000.

In the minutes of the 1931 A.G.M. it was recorded that no members of Council were present except the secretary. However, coordination between the Engineering Institute of Canada and the Provincial Association was discussed. Following the discussion, a slight-of-hand artist performed.

Unemployment, particularly of students, became a great concern in 1931. A joint E.I.C.-A.P.E.M. committee on unemployment met every two weeks. At one point, it was reported that 13 members were unemployed and 4 were on relief. A special meeting of Council was called to deal with unemployment and possible destitution among members.

Although many members were experiencing difficult times, the APEM was quite active in 1932. A quarterly publication was started and the first annual student luncheon was held. Membership at year end was 236.

In 1933 much of the work of Council again appeared to be in connection with unemployment. Income from securities were used for relief purposes, money was lent to members at 3%. Christmas gifts were distributed to children of impoverished members. Forty five members were removed for non payment of dues, as membership fell to 196 by year end.

A golf tournament, possibly the first annual, was held on August 28th, 1933.

Council officers were elected during the annual general meeting in 1934 for the first time. Up to that point, they had been elected later in the year.

Council approached mining companies hire graduate engineers at $10-15 a month, so that they could gain experience.

On April 10th, 1935 a revised Engineering Profession Act was passed by the Provincial Legislature.

In 1936 the city of St. Boniface was advised that it may face prosecution if it did not hire a professional engineer to do their engineering work. Total membership at year end jumped to 232. The economy was obviously turning around.

In 1937 the A.P.E.M. was advised that it was the only Association not supporting the Dominion Council which later became the C.C.P.E. In 1938 Council finally agreed to join the Dominion Council.

Much credit must be given to the APEM during the thirties. They not only revised and adopted many new policies, but acted as a service group providing essential needs to many members.

What is Artificial Intelligence???

by Andrew Kusiak, P.Eng.

There is no universally-agreed definition for artificial intelligence (AI). The best way to understand what is meant by the phrase is to look at some areas of research that are generally considered to be in the AI domain. They include:

a) Robotics, which is in the domain of AI when the robots use tactile sensors and vision systems, to respond to changes in their environment.

b) Computer vision, where the goal is to get computers to receive and understand visual images,

c) Speech recognition, where the goal is to get computers to understand spoken words,

d) Natural language processing, which is the effort to get computers to both understand and generate everyday language instead of using a specific programming language,

e) Expert systems, in which computers are programmed to act as an expert in a particular field.

Expert systems may appear in various forms. One of the most commonly known forms is a rule-based expert system.

What is a Rule-Based Expert System?

A rule-based system is simply one in which knowledge is represented by a series of rules. These are written in the general form of "IF a is true and b is true THEN c is the probable result."

Anyone familiar with programming languages like BASIC or FORTRAN will recognize the "IF ....THEN" format and might conclude that there is nothing special about a rule-based system; that the same thing could be done in any language. But the beauty of an expert system is the flexibility it offers for changing the rule. Rules can be added or removed simply, without having to rewrite any program logic.

In addition, the use of the word "probable" in the above example is important. Expert systems are based on heuristic, or rule-of-thumb reasoning, as opposed to a traditional system where strict rules of logic apply.

Another characteristic of at least some rule-based systems is that they can automatically build new rules based on examples, or experience. For example, if the system notes that a machine it is controlling consistently breaks down after 20 hours of operation at temperatures greater than 90°F, then a new rule calling for maintenance after 15 hours might be generated.

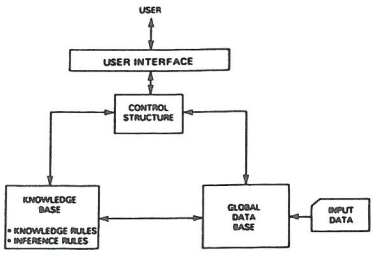
A rule-based expert system consists of:

—a set of "IF...THEN" rules which are stored in a knowledge base.

—a working memory called a global data base for keeping track of the problem status, the input data and the history of what has been done.

—a control structure called an inference engine for utilizing the knowledge base in the solution of the problem.

The user communicates with the expert system via a user interface.



AI Systems and Languages

To date many systems for building expert systems have been developed. Some of the most widely used are known under acronyms ART, OPS5, EXPERT, ROSIE and EMYCIN. Several lower level languages have also been developed. The most common are LISP and PROLOG. They make expert systems easier to develop, but their effective use requires a considerable amount of training. More common languages such as, for example, the "C" language can also be used.

Are Expert Systems for Me?

As recently as in 1980, it would have cost as much as a few hundred thousand dollars just to buy computer hardware to run an artificial intelligence system. There were few people involved, and fewer success stories to write about.

Today one can get started with a personal computer and a few hundred dollars worth of software. In the large scale industry arena, AI has been used as a design tool, an aid in equipment maintenance, and as a sales aid.

What is Knowledge Engineering?

Due to developments in the theory and applications of expert systems, a new area of engineering known as a knowledge engineering has been created. Knowledge engineering deals with the methodology and design of expert systems.

Future of Expert Systems

Currently most of expert systems are being used in very advanced companies. As additional software for building expert systems becomes available, one expects to see increased numbers of expert systems used by advanced companies. This is going to happen in abut three to four years time. Projections show that by 1990 expert systems will be in general use in typical, small-scale companies.

Professional Development Breakfasts

by V.L. Dutton, P.Eng.

It was a pretty good show — your Professional Development Committee's first breakfast meeting in 1987 — not many empty chairs and an interesting talk by Dr. Rob Bailey. Dr. Bailey is a chemist by training but he moved into patent work a number of years ago. His talk impressed me with its common sense. The spate of questions that followed the talk was an augury of what Dr. Bailey might have told us had not Chairman Klein been forced to stanch this flow in order to allow Manitoba's Industrial Complex to start work on time that day.

I do not propose to summarize Dr. Bailey's excellent talk which covered too much material with which I am unfamiliar. Further, this raises a question of philosophy — do we want to promote these P.D. breakfasts or should we simply print the talks as papers in this publication?

As the "new boy" on your Professional Development Committee (two meetings behind me), I am excited by what I have seen already — dedicated young men developing meaningful plans for us as we continue with our professional development.

Committee member Barry McBride has produced a draft of the Committee's objectives for consideration. In this document, five objectives are listed. The tasks associated with each of these objectives are:

1. Information on Existing Professional Development Activities.
   1.1 Construct a data-base of P.D. opportunities and regularly up-date it.
   1.2 Provide access to the data-base for all engineers.
   1.3 Develop an evaluation system to assist engineers in selecting Professional Development opportunities.
2. Develop Professional Development Opportunities where none exist.
   2.1 Document what P.D. is needed by engineers in order to maintain competence.
   2.2 Determine (from Task 1.1) what is being done.
   2.3 Identify deficiencies and establish priorities.
   2.4 Provide Professional Development opportunities in areas of need (e.g., breakfast meetings, seminars, courses, conferences, sponsorships).
3. Monitor the P.D. activities of members.
   3.1 Develop monitoring mechanism.
   3.2 Monitor, evaluate, and report.
   3.3 Work to increase participation in reporting.
4. Promote P.D. to Membership, Clients, and Employers.
   4.1 Develop Professional Development brochures.
   4.2 Distribute Professional Development brochures.
   4.3 Direct mailings to Engineers/Clients/Employers.
   4.4 Articles in the Professional Engineer.
5. Work with other Engineering Associations to develop a National Professional Development Program.
   5.1 Prepare inventory of P.D. in other jurisdictions.
   5.2 Promote the establishment of, and participate in, a national Task Force on Professional Development.
   5.3 Have guidelines approved by Council and distributed.

The intention is that our Professional Development Committee establish Sub-Committees to work on each of these five subjects. This means that our P.D Commit-

(continued on page 12)

Besom and Stane(*) and Engineering Mayhem

Curling is a game for the young-at-heart, whether they be old, young or ancient. And every January a select gathering of young-at-hearters involve themselves in a very special event. The skirl of the pipes is heard and the kiss of the granites, the quiet whisper of the push-brooms and the slap, slap, slap of the corn brooms all accompanied by the hysterical shrieks and calls of the skips. Strange and wonderful outfits are in evidence. Unbelievable feats of body-english are observed as shots go awry. And throughout it all, conviviality and fellowship reign supreme. In short, it's the annual rockfest — The Engineering Bonspiel!!

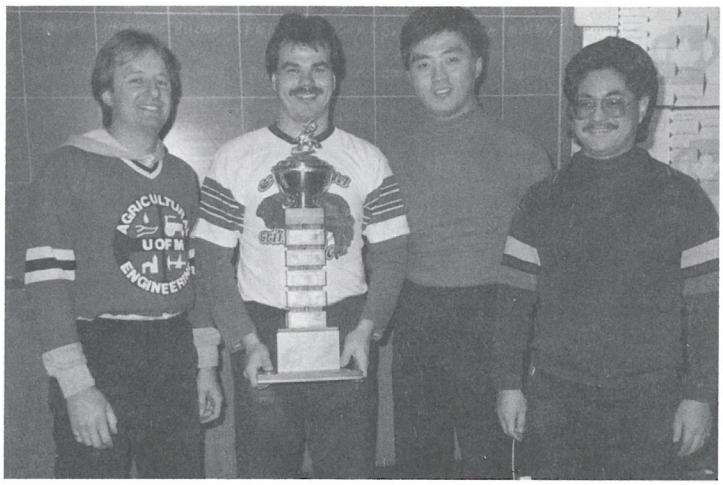
This year some ninety-six stalwart engineers (young, old and ancient) followed the piper onto the ice at the venerable old Granite Club and the 1987 APEM Bonspiel got under way. It seems fitting that, in this year of The Engineering Centennial, the engineer's bonspiel should be held in a curling club that not long ago celebrated its own centennial.

During the day a few spectacular shots were observed along with many more of the other kind and a few of the third kind. Mutterings from the front-end minions could be heard as the skip's strategy backfired. Behind the glass armchair skips called every shot flawlessly and congratulated each other on their strategy analysis. Later in the day, after the more inept had eliminated themselves, the final games were completed and silence fell over the ice area. The cream had inevitably risen to the top, Jim Suzuki and his rink were declared winners and Number One. Jim, along with Murray Vanderpont, Lance Vigfusson and Harvey Kaita are 1987 APEM Champions! (And nary a Scot among them!) Numerous other rinks won numerous other events while a good many others were clearcut winners in the social event. In the last analysis there were no losers.

Kudos and thanks go to Bill Saunders and his hard-working sports committee for organizing and running the first-class show — the engineering bonspiel!

*For the uninitiated, "besom and stane" is highland Scottish for "broom and stone".

Joe Mepa, Cub reporter.



Bonspiel Champs: Murray Vanderpont, Lance Vigfusson, Harvey Kaita, Jim Suzuki.



Some of the old and ancient: George Pratt, Russ Sharpe, Stan Bailie.

News from Other Associations

Ontario's Attorney General has put self-governing regulatory bodies "on notice", indicating that the **public is raising serious questions** as to the continued plausibility of the faith in self-regulated bodies such as the A.P.E.O. The Attorney General indicated that the public feels that self-governing professions sometimes act to protect the interests of their own members rather than the interests of the public as a whole.

The **Annual Brief to Government** issued by the New Brunswick Association is so successful, they are extending the concept to include municipalities.

The Alberta Association has recommended that current legislation governing the **erection and maintenance of amusement rides** should be amended to include engineering input, in the interests of public safety.

The Saskatchewan Association's centennial exhibit, an **interpretive display based on the use of lasers in engineering fields,** will be displayed throughout the province. The Association is entertaining requests from all areas of the province for display bookings.

Membership fees will rise in Ontario in the wake of preliminary budget projections which indicate an excess of expenditure over revenue of about $554,000.

The New Brunswick Association has established a task force to study the status of **mandatory continuing education.**

A **Coat of Arms** is being considered by the B.C. Association. Ontario is the only province in Canada with one at this time. The question of a Coat of Arms arose when the B.C. Association was considering lapel pins and their seal was thought to be uninteresting.

Increasing and more critical attention is being paid to **what constitutes "satisfactory experience"** in applications for membership to the Alberta Association.

A recent survey completed by the Ontario Association suggests that while employers are satisfied with the technical knowledge of recent graduates, they are very **much less appreciative of the graduate's non-technical skills.**

Students Boost Engineering Endowment Fund

by G.A. Morris, P.Eng.

On January 20, 1987, undergraduate Engineering students at the University of Manitoba pledged strong support for the Faculty of Engineering Endowment Fund. In a faculty-wide referendum, they voted 86 percent in favour of a "voluntary" annual $50-per-student contribution. The student contribution plan was developed by Senior Stick Mitch Gregoire and Vice-Stick Irene Mikawoz and endorsed by the University of Manitoba Engineering Society, who conducted the referendum.

The Engineering Endowment Fund was established in September 1986, to promote excellence in the Engineering Faculty. To date, Engineering staff and students have contributed or pledged more than $300,000. The next phase in the fundraising campaign, a canvass of professional engineers and engineering organizations, is in the planning stages.

Development Breakfasts

(continued from page 11)

tee will need more man/woman power to serve on the sub-committees. Pick the one that interests you and telephone the Association. Miss Bilodeau's number is 942-6481.

Stuart Ursel is looking after the P.D. breakfasts and can tell you, now, that the topics for the next three breakfasts are: Work-place Safety and Health, Ethics, and Torts and Contract Law for Engineers.

Perhaps you might have a suggestion for a future breakfast. Stuart would appreciate hearing from you. His number is 945-7528.

Please enter in your diary that the next one of these breakfasts will be held at the Viscount Gort on May 5th.

Practising Engineers Offered Substantially Increased Scholarships

North American Life is pleased to announce that their Engineers' Scholarship Program is open for applications for the 1987/1988 academic year, and **also that the value of the scholarships has been increased to $7,500 each, from $5,000.**

The scholarship program was set up in 1973 to encourage excellence and high standards in the engineering profession in Canada through the promotion of advanced studies and research. Since its inception more than $200,000 has been awarded to 60 winners.

Three scholarships are awarded annually by the North American Life Assurance Company on the recommendation of the Scholarship Selection Committee of the Canadian Council of Professional Engineers.

The program is open to any engineer who is a member of one of the twelve constituent associations of the Canadian Council of Professional Engineers. Scholarships are for full-time post-graduate studies at a recognized university.

The deadline for applications for the 1987/1988 academic year is May 1st, 19[illegible]. Application forms can be obtained from North American Life Assurance Company, 5650 Yonge Street, North York, Ontario, M2M 4G4.

LICENCES ISSUED IN FEBRUARY AND MARCH '87

R. Adhikary (Colorado)
P. F. Ast (Ont.)
T. A. Fekete (Ont.)
J. B. Fussell (B.C.)
G. Brodecki (Ont.)
T. A. Hamilton (Alta.)
J. A. Hayes (Ont.)
J. C. Herbert (Ont.)
R. J. Hopkins (Ont.)
L. G. Keeping (Ont.)
S. L. Lackey (Alta.)
J. Laidlaw (Que.)
A. D. Liptak (Alta.)
J. A. Mastrofini (Ont.)
R. J. Maynard (Alta.)
R. L. Nalezyty (Ont.)
J. B. Neil (Ont.)
R. G. Ohler (Ont.)
R. I. Phipps (Alta.)
B. R. Pluhator (Sask.)
D. Pristach (Ont.)
G. L. Reid (Ont.)
H. D. Reilly (Que.)
M. M. Wall (Alta.)
J. J. White (Sask.)
P. H. L. Wong (Alta.)

ENGINEERING GRADUATE MEMBERS REGISTERED IN FEBRUARY AND MARCH '87

C. J. Blatchford
S.M.W. Brown
D. P. Dubois
R. A. Fay
D. O. McMahon
M. P. Spratt

Congratulations to D. P. Dubois who achieved 100% on the Professional Practice Examination.

NEW MEMBERS REGISTERED DURING FEBRUARY AND MARCH '87

M. Aidun
D. R. M. Anderson
J. A. Anderson
Y. Bourlas
J. A. Brereton
G. J. Buttner
J. L. Conquist
W. G. Davidson
B. J. Dierckens
G. F. Fisher
A. K. Gupta
B. P. Kavanagh
C. N. Kohuska
D. G. McCabe
M. H. Morgan
J. S. D. Parker
K. N. Patel
K. S. Rezkallah
K. G. Roy
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