

## INTRODUCTORY REMARKS

Mr. T.A. Harwood, Chairman of the Permafrost Subcommittee, Associate Committee on Geotechnical Research, National Research Council, welcomed delegates to the Conference. He noted the expanding development of permafrost investigations in Canada during recent years. Approximately 180 delegates attended each of the two previous permafrost conferences held at Ottawa, Ontario, in April 1962 and Edmonton, Alberta, in December 1964. The presence of twice as many people at the Third Canadian Conference on Permafrost in Calgary from all over North America indicated the rapidly growing interest in this subject and the importance of it on resource development in the North.

Mr. Harwood introduced Dr. A.W.R. Carrothers, President of the University of Calgary, who welcomed the delegates on behalf of the university. He expressed his pleasure at the selection of the Conference site because Calgary is the oil capital of Canada and the university is also developing an interest in the North, particularly in the fields of archaeology, economics, engineering, environmental sciences, geology and sociology. He has also a personal interest in the North, having served as Chairman of a Commission to advise the Government of Canada on the development of government in the Northwest Territories. It was at this time that he first observed some of the problems cause by permafrost during his travels in northern Canada. Dr. Carrothers remarked that the delegates were meeting to discuss what is basically an engineering problem - the relationship of permafrost to the mining and oil and gas production industries. He asked that the Conference keep in mind the fact that people constitute one of the major resources of the North.

Mr. Harwood expressed the regrets of Dr. R.F. Legget, Director of the Division of Building Research, National Research Council, for not being able to attend the Conference. He was for 22 years Chairman of the Associate Committee on Geotechnical Research, formerly called the Associate Committee on Soil and Snow Mechanics. This Committee has sponsored many geotechnical conferences through its Subcommittees on Soil Mechanics, Snow and Ice, Muskeg, and Permafrost. Mr. C.B. Crawford, Head of the Soil Mechanics Section, Division of Building Research, succeeded Dr. Legget as Chairman of the Associate Committee in 1967. He expressed Dr. Legget's regrets at his unavoidable absence and delivered the following message from him to the Conference delegates:

"It is a matter of the keenest personal regret that I cannot be with you in person to bring you the greetings and best wishes for this meeting from the Division of Building Research, National Research Council. I had looked forward so keenly to attending the conference,

especially since it deals with a subject which is of great personal interest to me. This has proved impossible, however, and I must send you this message from the Division in this way. From the start of its work in 1947, the Division of Building Research has appreciated that it had special responsibility with regard to research work into the problems of permafrost in northern Canada. Our studies started with the survey of building foundations right down the valley of the MacKenzie River carried out by the late John Pihlainen in 1950. From that time on we have always had members of our staff spending full time on these special northern problems. Although we have not done all that we would have liked to have done, I venture to think we have been able to make some contribution to the development of the knowledge necessary for the opening up to industry of our vast northern territory. Our list of publications, copies of which are available for you, will show you what we have tried to do in putting into convenient written form information based on our own researches, and those of others relative to all aspects of northern building.

Perhaps you will allow me to invite your special attention to two notable publications of 1968. First, our first full report on the performance of the dykes at the Kelsey Power Plant by Mr. G. H. Johnston and, secondly, the Permafrost Map; many of you have this, developed by Dr. R. J. E. Brown. Each of these publications records the results of many years of work by my two northern colleagues who are with you at your Conference. All of us appreciate the special importance of the subject which you will be considering at the Conference, a matter which your Chairman, Mr. Harwood, and I have discussed on several occasions. We know something of the problems and I am sure that my colleagues who are with you will have a much better appreciation of what is involved by the time your deliberations of these two days come to an end. In keeping with our overall responsibility to assist the construction industry in this country in all its phases, the Division of Building Research is most anxious to work with the industries here represented to seek further solutions to the problems that have to be faced in connection with your northern development work.

Unfortunately for us our offer of assistance has to be seriously qualified because everyone present will know that the Government of Canada last year imposed the strictest controls on all federal expenditures and restricted the additions of more members of staff to all federal agencies including the National Research Council. Accordingly, we cannot add any members to the staff of the Division, beyond our establishment of 244 as it was on

2 March 1968. Our budget is seriously limited in keeping with this overall government policy. May I make very clear that this statement is made not as one of complaint but as one of fact. We accept the conditions under which we have to work willingly but you will see the difficult position that it places us in when we receive requests such as are almost certain to arrive as a result of your deliberations.

Anticipating such requests we have been considering what suggestions we can make for working with you in the critical months ahead. May I outline two suggestions, which will, at least, be an indication to you of our good will and of our keen desire to work with all who are concerned with the development of the North."

Dr. Legget remarked in his message that, in the first place, the facilities of the Associate Committee on Geotechnical Research can be made available. Mr. Crawford commented on this later. The second suggestion concerns relations between the Division of Building Research and industry as exemplified currently by arrangements with the steel and concrete industries. Each of these industries has a Fellow who is now working with the Division, as if he were a member of staff, with all its facilities available to him, while being paid by the industry concerned and working in a special field of research of direct interest to this industry and mutually agreed upon. The industry pays the Division a small overhead. The result is a very economical way of doing research for an industry, utilizing all the facilities of the Division but without adding to its establishment. Dr. Legget assured delegates that he would be happy to make similar arrangements in other fields such as those represented at this Conference if it would be appropriately useful. Dr. Legget concluded his message by expressing his wishes for a successful Conference and he looked forward to hearing about the meeting from his colleagues who are present.

Mr. Crawford continued from Dr. Legget's remarks by pointing out that there are a number of people on staff at the Division of Building Research, in addition to Mr. Johnston and Dr. Brown, who are knowledgeable in scientific fields closely allied to the problems which will be discussed at the Conference. Although the Division staff and budget are fixed, some effort can be directed to these problems if they are defined and arrangements advanced to give them priority over existing work.

Mr. Crawford explained the organization and operation of the Associate Committee on Geotechnical Research and its subcommittees which are quite separate from the Division of Building Research. When the National Research Council was established in 1916, it had two purposes. One was to ensure a supply of research workers in Canada.

A grant system was established to fund research in universities, and this has continued to the present time. In the year just ending it has amounted to approximately \$60,000,000. It has been increasing annually at the rate of 30 to 40 per cent in recent years although this next year will have a very modest increase. Secondly, a system of associate committees was established to co-ordinate research and these have continued to the present; there are now 45 of these associate committees, one of which is on geotechnical research. They range from dental research to bird strikes on aircraft. Any group of people who have a technical problem and can convince the National Research Council that it requires stimulation and co-ordination can arrange for the establishment of an associate committee. They do not require much money but they do bring together considerable competence. The money is mainly the input of competence to the deliberations of the associate committee, as seen at this Conference.

In the mid 1920's, the National Research Council Act was extended to include its research laboratory effort and the Division of Building Research is part of that effort. The Associate Committee on Geotechnical Research was established in 1945. As mentioned previously Dr. Legget was its Chairman for 22 years, and thus he has had a very great influence on developments in this field. The function of the Associate Committee on Geotechnical Research has been defined as follows:

"To co-ordinate and stimulate research on the engineering aspects of the terrain of Canada, and for this purpose four subcommittees have been set up - Soil Mechanics, Muskeg, Snow and Ice, and Permafrost. These subcommittees have as their purpose to define problem areas in their assigned fields, advise the Associate Committee on research needs, follow through actively in promoting research and assisting in the application and publication of the research results".

The Permafrost Subcommittee was established in 1960; it has been instrumental in two previous Canadian Conferences as well as the Third Conference currently in session. It was also involved in the International Permafrost Conference at Purdue University in 1963.

Mr. Crawford suggested that the Associate Committee can provide assistance in three ways. The first is by organized discussion. The National Research Council, although funded by the Government, is not a department but a fairly independent agency. It has been quite successful in bringing together many people who represent various fields of interest and combining their knowledge for the common benefit of the profession. This is accomplished by holding conferences and subcom-

mittee meetings. For example, the Snow and Ice Subcommittee examined snow removal and ice control which is a multi-million dollar problem in Canada. A small group was brought together under the auspices of this Subcommittee, exchanged ideas, defined the factors that most influenced the cost, and prepared a manual of recommended procedures which is now widely used to the benefit of Canada and elsewhere. This sort of situation could apply to the Permafrost Subcommittee also. Secondly, the Associate Committee on Geotechnical Research can promote research by adding its influence in various ways to organizations and individuals. Thirdly, it maintains links with the Division of Building Research where most of the Secretariat is located, thus providing good two-way communication between the Associate Committee and the Division.