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SUBJECT Proposed Construction for Eskimo
Settlement at Frobisher Bay, N.W.T.

The Division has been much interested in the proposed relocation of the Eskimo settlement at Frobisher Bay and appreciated the opportunity of having one of its members included in the survey team. Based on discussions with him and with other members of the team, the staff of the Division have discussed carefully a proposal that concrete blocks can usefully be used for the new buildings necessary for the new settlement.

The more this suggestion has been considered the greater do the difficulties in the way of its successful application appear to be. As a contribution, therefore, to further study of this matter and as a record of the considered opinion of the Division at this time, this note has been prepared.

If a change from the traditional type of dwelling used by Eskimos at Frobisher Bay is to be considered two major questions are involved:-

- (1) The type and shape of structure.
- (2) The building materials to be used.

For convenience, the second of these questions will be considered first in view of the specific suggestion that concrete blocks are the solution to this difficult problem.

Concrete blocks have been suggested since there appears to be available at or near the site a suitable supply of fine and coarse aggregate. No details are available of the character of the aggregate deposits. Since these cannot be accurately assessed by eye, it would be necessary to have available analyses of typical samples before it could be known with certainty that good concrete could be made with them. The fact that cement in addition to block making machinery, would have to be brought into Frobisher Bay, is naturally an economic factor of considerable importance.

Assuming, however, that the aggregate is suitable and concrete blocks can be made, the next consideration is that of the relatively poor thermal insulation properties of concrete. For the climate at Frobisher Bay concrete blocks by themselves would not be sufficient for providing the exterior walls of even simple construction. Accordingly, some type of insulation would be essential.

If insulation to be applied to the interior walls were considered then conventional construction would be almost approached. This would involve building skills and close inspection of construction of a kind which could not be expected from Eskimo inhabitants in such an isolated location. It is understood that it is desired to develop a structure which could be erected largely if not completely by Eskimos themselves.

The alternative would be to apply some type of insulation on the outside. This might well be done by using turf or similar organic material. It is understood, however, that there is very little if any suitable organic material in the vicinity of the building site which can be used for this purpose. There is some possibility that snow might serve as insulation.

Even if some type of exterior insulation could be found and properly applied there would arise the very serious problem of condensation on the inside faces of the structures built. The inside wall temperatures, at least in parts of any simple type of structure, would be such that moisture vapour would condense on them in cold weather in the form of ice if there was an excess of moisture in the air. This ice formation would gradually build up and would therefore lead to moisture problems when the climate improved and outside temperatures increased.

It is an interesting commentary of the standard igloo design that, although apparently such a simple structure, it is technically highly efficient with regard to this problem of condensation, since the walls themselves are built of snow.

An alternative suggestion has been that light-weight concrete blocks could be manufactured in order to give better thermal properties to blocks. A number of difficulties arise here. The more common types of light-weight concrete are made from light-weight aggregates obtained by processing special materials. These are unlikely to be found in the area in question and might therefore have to be shipped great distances.

Light-weight concretes of the foamed or cellular type which have been suggested require relatively little aggregate but the cement content per cubic foot is materially greater. In addition the field manufacture of these foamed concretes is something that is seldom attempted in ordinary practice. Factory control and controlled working conditions are almost essential for the manufacture of these materials. To expect Eskimos in Baffin Island to be able to do for themselves what has so far proved to be impossible in building practice in populated areas is questionable.

It will therefore be seen that there are grave doubts about even the technical possibility of using concrete blocks for the purpose indicated quite apart from the further questions relating to the economics of this proposed type of construction. Naturally, it would be of interest to carry out some experimental building with concrete blocks at Frobisher Bay but whether this would be a worthwhile venture in view of other possible forms of construction is a matter which requires a good deal of further study.

Form and Shape of Buildings

Mention of other types of construction raises the first general question -- that of the form and shape of buildings to be used. The traditional structures at the location have been igloos or tents.

The normal way of using concrete blocks is in a structure which would be square or rectangular in cross-section. Not only would this involve a departure from traditional building practice which might raise sociological questions but it also raises the question of roof construction. Quite obviously concrete blocks cannot be used for either a flat or peak roof of the conventional type.

This would involve either the use of separate structural elements for roof construction which would introduce at least the beginnings of ordinary building techniques and would involve special care at the junction of walls and roofs or the use of some type of prefabricated roof unit. If prefabricated units have to be used for roofs then they might as well be considered for the entire structure.

On the other hand, if it were acceptable to use arch-shaped buildings, a number of structurally suitable designs might be developed using concrete. It would not be impossible to develop a concrete block which could be used to give an igloo type of structure. The technical difficulties regarding such a structure, already detailed, would remain.

It is clear, therefore, that the apparently simple suggestion of using concrete blocks for new Eskimo buildings at Frobisher Bay raises some fundamental questions regarding building in the North sociological, technical and economic in character.

The Division of Building Research is obviously not in a position to comment on sociological questions. Although it appreciates the suggestion of using concrete blocks, the foregoing discussion will show that it has very grave doubts as to their suitability for the purpose intended. At the same time, it would be willing and anxious to assist with any modest experiment to determine if such blocks can be made to serve. It would suggest, however, before this is done that the basic economics of such building be most thoroughly studied in view of the grave doubts as to the technical efficiency of this method of building.