REPORT ON RAINMAKING

METEOROLOGICAL DIVISION SUMMARY: The Department of Transport on July 2 released a summarization of facts as known at present by the Canadian Meteorological Division with respect to the present status and practical applications of artificial inducement of precipitation from clouds. Prepared by Andrew Thomson, Controller of the Meteorological Division, this summarization also briefly indicates the considered opinion of reputable scientists on the possible applications of these techniques to the control of weather in general.

Langmuir and Schaefer, of the General Electric Company, successfully formed ice-crystals from super-cooled water droplets in the laboratory in 1946. They first "seeded" the clouds of droplets with dry ice (solid carbon dioxide), but subsequent experiments were equally successful with silver iodide, pulverized clay and volcanic ash. This would seem to indicate that any one of a number of inoculants may be used as artificial nuclei. There is some question, too, whether the water droplets must be super-cooled before the "seeding" will produce results. Originally it was believed so, but continuing experiments now seem to indicate otherwise.

Recent experiments with dry ice on natural clouds have included attempts in the United States, England, Australia and Mexico, as well as a very large number of unofficial tests on shower clouds by private fliers and commercial agencies. The conclusions to be drawn from the many experiments are indeterminate. The majority of the experiments have been so unscientific in character that the evidence is worthless.

RESULTS SUMMARIZED

The results to date may be summarized as follows:

1. It has been definitely shown that particles of dry ice dispersed in clouds with temperatures below freezing will, under conditions not yet fully known, cause the precipitation of snow which may then melt and form rain. However, much of the snow or rain may evaporate on its way to the ground and there is as yet no authenticated case where precipitation reaching the ground solely as a result of "seeding" a cloud has amounted to more than a fraction of an inch.
2. Up to the present time there is no conclusive evidence as to how much, if any, of the shower was produced entirely by artificial means (dry ice) and how much resulted from natural causes. Experiments are under way to determine quantitatively the amounts that can be produced artificially under various circumstances.

It is generally agreed that no method so far developed is likely to produce sufficient rainfall to relieve drought under the conditions of inadequate supply of moist air, a deficiency that practically always prevails when there is a serious drought. Clouds will not form unless there exist both sufficient moisture and upward movement of air.

According to Dr. Langmuir's researches, seeding creates myriads of sublimation nuclei or "ice germs"; and each ice germ may grow to an ice crystal and fall as precipitation if there is sufficient moisture available. Ordinarily there is not sufficient moisture in the treated cloud to gather around each and every ice germ and cause it to grow to sufficient size to fall. The moist-use content, however, may be increased by convection and/or advection. But when additional moisture (either liquid or vapor) replaces the seeded portion to the cloud, there will be few or no seeds available in the new cloud formation to transform it into an ice cloud. Hence it is very important for spread of the precipitation area that the ice germs diffuse to unseeded portions of the cloud by mixing or convective processes. The extent of this diffusion is a subject of current investigation but is not likely to exceed a few miles.

SILVER IODIDE

Silver iodide also has ice nucleation properties and has the advantage that the nuclei thus formed do not evaporate or melt and so can remain for long periods regardless of the temperature until they come into the presence of supercooled water droplets and produce their effect. On the other hand the nuclei produced by dry ice are minute ice crystals which evaporate and melt when the air is dry or the temperatures are above freezing. Such ice nuclei are produced not only by dry ice but apparently by any material at temperatures below -35^{0} C.

As indicated above, the question is not, "Can we make it rain?" The answer to this question seems to be, "Yes, provided certain special conditions exist". Can rain be produced artificially on such a scale that it will be of some assistance to the national economy? Can precipitation in useful quantities be artificially induced from clouds under conditions where and when the best meteorological estimates agree that it will not fall naturally? These are the questions which Canadian scientists have now undertaken to settle for themselves.

MR. JUSTICE ARCHIBALD APPOINTED: The Prime Minister, Mr. Mackenzie King, has announced that, pursuant to legislation enacted at the session of Parliament just ended, and in accordance with the intentions of the Government as announced in Parliament, Mr. Justice W.B. Archibald, of the Supreme Court of Nova Scotia has been appointed a Judge of the Exchequer Court of Canada; and as Chief Commissioner of the Board of Transport Commissioners in place of Colonel J.A. Cross whose resignation has been accepted