

JOINT COLLOQUIA

1 October 1959

Forecasting in Antarctica

by Thomas I. Gray

Mr. Gray, United States Representative at the International Antarctic Analysis Centre, who was Officer-in-Charge, Weather Central, Little America, during the I.G.Y. (1958) stated that Antarctica is enclosed in a belt of easterlies within westerlies. The Circulations of the Southern Ocean are west-to-east-moving cyclones. These cyclones do not generally reach the surface in Antarctica because of strong surface inversions. The cold part of the cyclone tends to move meridionally while the cyclone itself moves zonally along a line of latitude. During summer there is frontal activity, which is absent in winter. Anti-cyclones do form at times.

The normal pressure at coastal regions is about 990 mb compared with 1013 mb in other parts of the world. When pressure rises to about 1015 mb very clear days result. Pressures of about 1030 mb have been experienced. Highs tend to move from east to west rather than from west to east.

Regarding the weather in Antarctica the speaker said that waterdrop fogs are experienced in summer and ice-crystal fogs in winter when temperature is low. Ice-crystal fogs are also formed when winds have an upward component. These advective type fogs have formed at Byrd due to ascent of west to south winds up the ice slope. The frequency of fogs is not large. It amounts to about 5 percent in summer and less in winter. Except in open water on the edge of an ice field, fogs do not usually last for even 12 hours.

Loss of heat from radiation is marked and fogs form under favourable conditions, but katabatic wind generation counteract their formation. Heaters give out moisture and with radiation could produce local fogs. Such conditions can persist for considerable lengths of time, immediately in the vicinity and down wind from the combustion source. The combustion products of an aircraft flying over a landing ground could produce a fog so that a second plane would not be able to see the ground for landing.

With appreciable gradients, katabatic winds could be strong and form line squalls and blizzards. Katabatic winds of 15 to 20 knots usually raise snow and reduce visibility, but in some places

winds of at least 30 knots are necessary to form blizzard conditions.

The majority of clouds in the Antarctic are of the ice-crystal type and water-drop cloud is rare, Low Stratus is quite frequent where there is moisture in the lower layers. Cirro-stratus, Alto-stratus, cirro-cumulus and alto-cumulus clouds are common. An optical phenomenon known as 'White-out', in which the horizon is obliterated, is experienced over large sheets of unbroken ice and with one or more decks of uniform stratus. This is usually present with an upper air trough and precedes a storm.

Changes in temperature are extensive and considerable. Changes often occur within a month's time, due to movement of migratory systems. The range of temperature is about 30°C in summer and 35° to 75°C in winter.

Winds are mainly katabatic at the surface and gradient winds aloft. Often there is a sudden increase of wind for 3 or 4 hours without any change in pressure but accompanied by a marked decrease in visibility, due to imbalances of the katabatic and gradient wind forces.

Mr. Gray said that forecasting was very difficult at present, and persistence of prevailing weather for known periods varying from as much as 3 to even 20 days or more, was generally used. Thus if the prevailing weather lasted for more than 3 days it could be expected to continue for at least 7 days and so on.

29 October 1959

1. A Recorder for use in Remote Areas

by C.J. Summer

Mr. Summer of the Division of Meteorological Physics, C.S.I.R.O. Aspendale, the first speaker, divided his talk into three parts.

Firstly the need for devising the instrument, next the description of the instrument and lastly the testing of the instrument.

He said the Water Resources Board required a cheaper recorder than the one presently available for recording over long periods without attention. An instrument was needed which would satisfy the following requirements.