

Prof. Meinardus's scheme² also includes a series of cyclones traveling from west to east over the southern ocean; but he gives strong reasons against the presence of an anticyclone over Antarctica. His chief objection to such an anticyclone is that anticyclonic conditions are accompanied by an excess of evaporation over precipitation: hence it would be impossible to account for the excess of precipitation which gives rise to the large glaciers and snowfields discharging the known large quantities of ice.

2. The simultaneous observations made at Cape Evans, Cape Adare, and Framheim were then considered to investigate the processes which are at work in the Ross Sea area. The chief conclusions were: The high south-easterly winds—commonly called blizzards [in the literature of Antarctica]—are not caused by cyclones passing into Ross Sea, but are the result of the large differences of temperature which exist in the lower atmosphere over the Barrier and Ross Sea. The cloud observations show that

to reconcile the wind and barometer observations with any system of circulation of wind about a center of low pressure moving from the west to the east. Further, the simultaneous barometer observations at Melbourne, The Bluff, New Zealand, and at Cape Adare were examined without finding any certain indication of the same cyclone affecting the northern and the southern stations.

4. The monthly departures from the pressure normals at Cape Evans were compared with corresponding values for stations in Australasia, and an important negative correlation was found.

5. The importance of a permanent meteorological station on Antarctica was urged.

LOW TEMPERATURE OF THE SOUTHERN HEMISPHERE.¹

While discussing at the Australian meeting of the British Association for the Advancement of Science certain other physical features of Antarctica, Dr. G. C. Simpson made the following comments on the cause of the relative difference in temperature between the Northern and Southern Hemispheres:

"I think we do not sufficiently realize that the Southern Hemisphere is much colder than the Northern Hemisphere, and the reason for this difference is certainly not understood by scientists. When we think of the temperature of a place we think of the temperature in the lower atmosphere. Now, the mere passage of light through the atmosphere will not warm it. The main method by which the atmosphere becomes warmed up is by the sun shining on something it can warm. Now, in the Northern Hemisphere there are large masses of land which can absorb the sun's energy, and then give the heat to the atmosphere. In the Southern Hemisphere, on the contrary, the whole mass of land within the Antarctic Continent [Antarctica] is covered with ice, which is practically a perfect reflector, and therefore when the sun shines on it a large proportion of the energy is reflected into space. I think scientists have not quite realized how important that is—that 5,000,000 square miles of the earth's surface in the Southern Hemisphere reflect into space a large part of the energy received from the sun. I feel certain that this is one of the chief reasons for the difference in temperature between the Northern and Southern Hemispheres."

AUSTRALIAN RAINFALL.²

By H. A. HUNT, Commonwealth Meteorologist.

The main factors to be considered in relation to the controlling causes of rainfall in Australia are the south-east and westerly trade winds, the monsoonal and southern depressions, cyclones from the northeast and northwest Tropics, locally formed cyclones, and the anticyclones, in conjunction with the modifying effects on these various atmospheric movements of the physical features of the different parts of the country.

Around the central dry area of Australia the isohyets describe somewhat concentric curves, the modifications being mostly due to variations in elevation. Thus the Darling Ranges to a great degree account for the rainfall of the southwest corner of the continent. The Flinders

air feeds into the Antarctic at high levels and passes north again in the "blizzards." Meinardus's objection that in such a circulation precipitation would not exceed evaporation was shown not to hold, because of the great cooling of the air due to radiation. The air while sinking loses so much heat by radiation that, when forcibly made to rise again in the "blizzards," saturation is reached at a much lower level than that at which the air entered. Thus anticyclonic conditions are consistent with an excess of precipitation.

3. The existence of a belt of cyclones between Antarctica and Australia was then considered. Curves showing barometer and wind observations at the Gauss winter quarters were shown. From them it was seen that during the passage of deep waves of pressure there is practically no variation of the wind direction at that station. In most cases the wind blows a gale from the east both while the barometer falls rapidly and while it makes an equally rapid recovery. At present it appears quite impossible

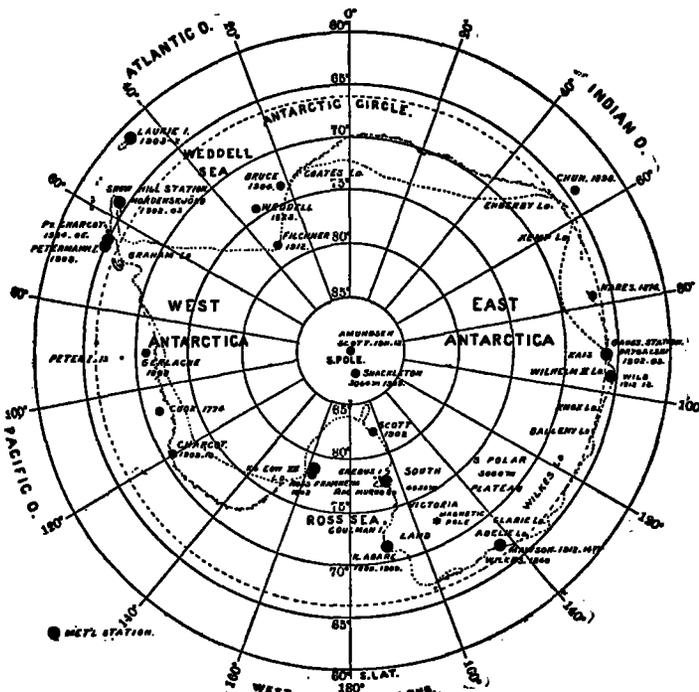


FIG. 1.—Location of meteorological stations within the South Polar Regions.

² See this REVIEW, April, 1914, 42:223-230.—C. A., Jr.

¹ Reprinted from Report of the Eighty-fourth Meeting of the British Association for the Advancement of Science, London, 1915, p. 417.
² Reprinted from Report of the Eighty-fourth Meeting of the British Association for the Advancement of Science, Australia, 1914. London, 1915, p. 439-442.