

JOINT COLLOQUIA

20 March, 1958

Climatic change in recent times

by E.L. Deacon

Mr. Deacon of the Division of Meteorological Physics, C.S.I.R.O., stated that significant climatic changes had taken place in the Northern Hemisphere in the last 70-80 years and there was evidence that some change had also taken place in Australia. For example, a study of temperature, pressure and rainfall data for the period 1880-1950 (Deacon 1953) had shown trends which together suggested that the mean track of anticyclones tended to be more southerly in the latter half of this period than in the former. While this southerly progression had probably been irregular, Das (1956) had shown it to have been a statistically significant effect over the period 1909-1954 for which more complete pressure data were available than in earlier years.

Meteorologists had given much attention to factors which could have contributed to climatic change in recent years. Three of these were (1) Carbon dioxide, (2) Volcanic dust, (3) Solar variation.

Carbon dioxide amounting to 6×10^9 tons per annum was currently being added to the atmosphere as a result of the combustion of fossil fuels and Plass, improving on earlier calculations on the long wave radiation absorption of CO_2 , found that the average surface temperature of the globe could have been increased by some 0.4°C in the last 50 years.

Volcanic dust had an appreciable effect in decreasing the net radiation income at the earth's surface and the fact that violent volcanic eruptions had been rare since 1912 may have contributed to the differences between this century and the last.

Solar activity had long been suspected to play some part in climatic change but despite much work the position was still obscure.

In an attempt to see whether, in Australia, earlier work on solar/weather correlations had remained valid Kidson's (1925) rather striking result that the extent of the annual latitudinal oscillation of the mean track of anticyclones varies markedly in harmony with the sunspot cycle, was tested with data subsequent to 1922. Out of the three solar cycles since then two had shown the effect very prominently, the third rather partially.

Opening the discussion Professor Leeper expressed much scepticism as to the statistical significance of the summer rainfall changes in Southern Australia over the period considered. He found (Leeper 1957) the sequence of wet and dry years (i.e. above and below median rainfall) to be random and that applied to the separate seasons as well. Discussion also extended to whether the temperature data prior to 1910 could be considered homogeneous with later observations in view of changes in exposure, etc.

Dr. Priestley pointed out that the strength of the argument for some climatic change in Australia resided in the degree of harmony between the various collateral lines of enquiry.

17 April, 1958

Seasonal variations in the atmospheric circulation
over the extratropical regions of the
southern hemisphere

by W. Schwerdtfeger

Dr. Schwerdtfeger, on leave from the University of Buenos Aires with the Department of Meteorology, University of Melbourne, presented some facts on the semi-annual pressure oscillation over the southern hemisphere and considered its possible cause.

The mean annual march of pressure in different parts of the world can be interpreted as the superposition of an annual and a semi-annual oscillation, both being of the same magnitude in the extratropical regions of the southern hemisphere. Till now it was assumed that the semi-annual component was only related to the corresponding phenomenon in the annual march of temperature in the equatorial belt.