

CENTRAL OFFICE COLLOQUIA AND DISCUSSIONS

MONTHLY JOINT COLLOQUIA 1954

March 25th:

Australian Forecasting Progress by H.M. Treloar

Dr. Treloar discussed the subject under the following headings:

- (a) Progress in forecast performance,
- (b) Forecast tests,
- (c) Relation of empirical and theoretical tools,
- (d) Specific features in Australian forecasting,
- (e) Australian forecasting research, and,
- (f) Past and future sources of forecast improvement.

April 29th:

A method of approach to the problem of long range and extended forecasting in the Australian area by S. Karelsky.

Mr. Karelsky explained the construction of "cyclonicity" and "anticyclonicity" charts (based on tracks and movement of cyclones and anticyclones) and the use of such charts as a representation of the atmospheric circulation in the Australian and over a long period.

Using the average of such charts over the seven year period 1946-1952 and the changes in anticyclonicity and cyclonicity from month to month he found these charts and their monthly variations were closely connected with the distribution and monthly variations of average surface temperatures.

He outlined how current monthly anticyclonicity and cyclonicity charts, their monthly variations and departures from normal were being used to investigate the possibility of forecasting anticyclonicity and cyclonicity anomalies and general weather features for the following month. He outlined a classification of cyclonicity and anticyclonicity for all "natural synoptic periods" into a

certain number of types. (A "natural synoptic period" is the interval between the arrival of two consecutive anti-cyclones at a particular longitude (e.g. Long. 130°E).)

June 3rd:

At an evening meeting Mr. P. G. Law Director of the Antarctic Division of the Department of External Affairs described his experiences during his visit to the Antarctic Continent in the "Kista Dan". His talk was illustrated with coloured slides.

June 24th:

Classification of Australian summer pressure distributions by W.W. Moriarty.

Mr. Moriarty described an investigation being conducted by the C.S.I.R.O. Section of Meteorological Physics in an attempt to gain some insight into the manner in which continental heating affects the circulation in the Australasian region.

He presented a classification of summer pressure distributions into ten types and showed how an attempt was being made to relate these classes to various large scale features of weather.

July 29th:

The Australian tropopause by U. Radok.

Dr. Radok presented the tropopauses observed during a five year period over nine Australian stations as points in a temperature-pressure co-ordinate system. This representation showed that the actual distribution of these points can be well approximated by ellipses enclosing a given proportion of all tropopauses for a given station. The major axes of the ellipses for various stations were shown to be roughly parallel to the meridional mean profile of tropopause temperatures plotted against tropopause pressures suggesting that meridional advection is the most important factor in the variation of tropopause pressure and temperature from day to day.

August 26th:

What use is climatology? by G.W. Leeper.

Professor Leeper of the School of Agriculture,

University of Melbourne in a plea for simplicity of formulae presented his views on the formula of Thornthwaite giving the relation between the mean monthly temperature and potential evapotranspiration and Prescott's climatic index P/E^m , where P is the precipitation, E the evaporation from a free water surface and m a constant with a probable mean value of 0.73.

Professor Leeper drew attention to the fact than in former years land settlement was largely based on trial and error methods whereas nowadays the direct application of climatological data could predetermine the limits of successful agriculture.

Dr. Priestley pointed out that Thornthwaite's formula was based on energy balance considerations and fundamentally sound whereas, unless $m = 1$ Prescott's formula was dimensionally incorrect.

September 23rd:

Refraction in the lower atmosphere and the effects of the lower troposphere on radiowave propagation by H.R. Phillpot.

The behaviour of electro-magnetic waves at various frequencies - optical and radio - was discussed and the basic formula relating the refractive index n to pressure, temperature and water vapour content of the atmosphere, given together with possible variations of n with frequency of the incident radiation.

The basic theory of the problem, covering Snell's Law, the conception of the modified earth's radius, the modified index of refraction M, the effects on n of variations in the atmospheric parameters, the atmospheric processes leading to duct formation and the techniques adopted for forecasting temperature and humidity distribution under advective conditions was then given, together with a review of earlier work over various land and sea paths in the U.K., U.S.A. and Australia.

Finally the current work for two sea paths in Australia was considered and the results of the investigations made to date presented.

Full details of the work covered will be published at a later date.

October 26th:

The work of the British Agricultural Meteorology Section and some problems of agricultural meteorology by L. J. Smith.

Mr. L. P. Smith, head of the Agricultural Section of the British Meteorological Office, commenced by referring to the development of his section in the last six years. The first concern of the Section was to observe the activities of agriculturalists and decide where it could be of help.

Mr. Smith discussed factors affecting agriculture under the headings: frost, disease, wind and water.

Investigations enabling avoidance of frost pockets were described and methods of frost protection, e.g., spraying, were discussed. The relation of plant disease to weather was illustrated by reference to advices issued by the Section when outbreaks of potato blight were expected. These advices were based on criteria developed by Beaumont.

The effects of wind shelters were studied for their aerodynamic effects, their effects on temperature and humidity and the biological effect of shelters on animals. The general conclusion was that a shelter of 50% penetrability was the most effective. It was maintained that the main effect of a glass house in horticulture was that the shelter it afforded from winds allowed of much higher day temperatures owing to lack of turbulent heat transfer. The difference in the nocturnal temperature fall inside and outside the glass house was small. Hence the higher day temperature resulted in a higher minimum inside a glass house.

It was mentioned that water supply was becoming a serious problem in England with industries taking up increasing amounts. The question to be answered here was how much irrigation is required to obtain the maximum yield per acre. Mr. Smith showed how this could be estimated from meteorological observations using Penman's formula to calculate monthly evapotranspiration for various stations and correlating the values obtained with monthly duration of sunshine. Using the past months sunshine total to obtain a rapid estimate of the evapotranspiration and knowing the past months rainfall an estimate was obtained of the amount of irrigation required to keep the crop at maximum yield.