JOINT COLLOQUIA

4 September 1958

Regression, Correlation and Structure

by P.A.P. Moran

Dr. Moran of the Research School of Social Sciences, Australian National University, Canberra, presented a paper under the above heading.

He demonstrated the logic of statistical analysis as applied in cases where two or more measurements were made on each individual member of a sample. After distinguishing between the use of statistical methods in description and in inference, Dr. Moran discussed the problem of "identification". He described four basic models:

(a) Regression (single variate);

(b) Correlation (two variates);

(c) Error in variable (two observed variates);

(d) Berkson's model (one observed variate);

and discussed the inferences drawn from these models.

Dr. Moran's paper will be published in the next issue of the Australian Meteorological Magazine.

2 October 1958

Recent Investigations in Fire Weather

by G.U.Wilson

Mr. Wilson, of the Bureau of Meteorology, reviewed the results of investigations into the relationship between weather, fuel inflammability and fire behaviour in forests and grasslands. He said that forest fires in Australia burn an average area of 6.5 million acres annually, causing damage of more than £2 million each year.

Wallace in Western Australia and workers in Tasmania pioneered Australian fire weather research as early as the summer of 1934/35. Work in this field was intensified by the Bureau of Meteorology after the inauguration of the Fire Weather Service in 1955.

In discussing the effect of weather on fuel state, Mr. Wilson stated that the moisture content of fine fuels (twigs, leaves, grass etc.) was determined primarily by air temperature and relative humidity, wind speed also being important while the fuels were wet. The effect of rainfall was soon dissipated. Whittingham found with heavy fuels (logs, heavy branches, etc.), that the preceding rainfall and evaporation were the critical factors: fluctuations in temperature, humidity and wind speed had little effect on the inflammability of such fuels.

Many of the factors influencing fire behaviour were non-meteorological in character, but fuel temperature, fuel moisture content, wind speed and atmospheric stability were the principal factors directly or indirectly attributable to weather conditions. Field experiments of the Forestry and Timber Bureau had shown that fires tended to burn slowly and steadily during the "initial establishment period", after which their rate of spread and intensity increased rapidly. The period depended on the type and moisture content of the fuel, and the rate of spread in the early stages of the fire was dependent on these factors. After the initial establishment period, wind speed became the controlling factor and fuel moisture content was less important in determining the rate of spread.

Mr. Wilson concluded by referring briefly to fire storms and crown fires. Fire storms were considered to be attributable to heavy accumulations of fuel and orographic effects. Crown fires in Australia were generally associated with extremely strong gradient winds. It was planned to test the hypothesis of Byram (U.S.A.) that the upper wind structure could account for otherwise unexplained behaviour of such fires.

The effect of convection columns over a fire in producing local areas of low pressure and the part played by atmospheric stability and a negative wind shear in establishing these convection columns were treated at some length in the subsequent discussions.

30 October 1958

Numerical Forecasting with the Barotropic Model

by Dr. U.Radok

This colloquium was held in the School of Physics, University of Melbourne. Dr. U.Radok of the University Meteorology Department described the method by which the University's CSIRAC digital computer integrates the vorticity equation for horizontal non-divergent flow. The absolute vorticity field is computed for the initial 500 mb chart and advected with the geostrophic wind for 1½ hours. The resulting new vorticity pattern is then matched with a new wind field (by "relaxation",