

23 May 1957

## Pressure jump lines

by F.K. Ball

Mr. Ball, of the Division of Meteorological Physics, defined a pressure jump line as a region of steep pressure gradient which can appear as a line of pressure discontinuity on the synoptic chart. Pressure discontinuities of this type quite frequently traverse parts of Victoria. There are about 20 per year in Melbourne with a pressure change of 1 mb or more in about 5 minutes.

According to the theory originated by Freeman, pressure jump lines are associated with an abrupt rise in the level of an inversion (or stable layer) - the increase in depth of the cold air causing the rise in pressure. The change in level is propagated through the atmosphere in a manner analogous to the movement of an abrupt change of water level in a river or water channel (the hydraulic jump). This model provides the explanation for some pressure jump lines but it is doubtful whether it can explain all of them.

If wind speeds are measured relative to the moving jump then, according to the Freeman model, the normal component ahead of the jump must exceed the critical speed,  $u_c$ , where

$$u_c = hg(\theta' - \theta)/\theta$$

$h$  = height of the inversion

$\theta'$  = potential temperature above the inversion

$\theta$  = potential temperature below the inversion

$u_c$  is the speed of propagation of infinitesimal gravitational waves.

Mr. Ball discussed slides showing autographic records at times of pressure jumps at various stations in south-east Australia.

The following discussion was centred around the question as to whether some of the pressure jumps illustrated by Mr. Ball could be attributed to cold frontal passages - particularly the case in March 1957 in which Mr. Ball tracked a pressure jump from Ceduna across south-east Australia. Mr. Ball said that this case, which was complicated in that thunderstorms and showers preceded the pressure jump at several stations, was to be examined in more detail.

Before the presentation of the topic for discussion, the colloquium chairman, Mr. W.C. Swinbank, referred to the approaching retirement of Mr. J.C. Foley of the Bureau. He spoke of Mr. Foley's work as chairman of past colloquia and, after wishing him a long and happy retirement, expressed the hope that Mr. Foley would continue to participate in future colloquia.

27 June 1957

Some aspects of hydrometeorology in the U.S.A.

by G. O'Mahony

Mr. O'Mahony, of the Bureau of Meteorology, first gave an outline of the organisation and staffing of the Hydrologic Services Division of the United States Weather Bureau and then touched briefly on the methods of operation.

It was shown how this Division has the responsibility of issuing river and flood forecasts throughout the United States, and also, in co-operation with the Corps of Engineers, of preparing hydrologic data required for the planning of major engineering projects such as dam constructions and hydro electric undertakings.

The method of preparing unit hydrographs was explained and also the use of these hydrographs in the subsequent preparations of river and flood forecasts. The forecasts are generally built up on precipitation data "after the event", i.e. after the precipitation has actually occurred.

In the subsequent discussion Mr. O'Mahony indicated how electronic computers, both digital and analogue are used in the construction of hydrographs and