

JOINT COLLOQUIA

25 June 1959

Digital Computers in Australia

by D. Jenssen

Mr. Jenssen of the Meteorology Department, University of Melbourne, briefly outlined the basic elements of computer design, including the representation of ordinary decimal numbers in their binary form and how they are handled within the machine. Various types of memory storage were explained and also the ordering of commands for sequential machines (where the commands are selected successively in an automatic manner) and non-sequential machines (where the position of the next command must be given to the computer).

He then showed how any general problem could be solved by means of a digital computer. The steps necessary for this were a restatement of the problem as a series of small arithmetical and logical operations (an arithmetical operation being addition, subtraction, etc., and a logical operation a test for a number negative, a jump to different parts of the calculation according to the value of some variable, etc.); a translation of these steps into machine code; and from the written code the production of a punched paper tape, compatible with the machine, with the commands now as a series of holes on it.

Mr. Jenssen described the general features and main differences of the computers available in Australia.

The talk was concluded with an analysis of the particular case of a bouncing snow particle subject to wind and resistance forces and its solution by the digital computer CSIRAC, at the Physics Department of Melbourne University.

30 July 1959

Measured Radiative Flux Divergence near the ground
and Radiation Charts

by J.P. Funk

Dr. Funk of the Division of Meteorological Physics, C.S.I.R.O., Aspendale, explained the importance of a knowledge of radiation near the ground for agriculture and other purposes.

An improved net radiometer, enclosed in a spherical polythene case was described. Two of these instruments, suitably matched to give a null reading at the same height, on a very sensitive galvanometer, permit direct measurements of the nocturnal radiative flux divergence between 0.5 m and 1.5 m.

He gave results he had obtained at Aspendale and Edithvale where the ground was uniform and more suitable for these observations, for a wide range of wind speeds and cloud conditions, and a comparison of observed and calculated values. He also gave a comparison of observed radiative flux with values read off the charts of radiometers. The measured value was found to be about twice the calculated value. Since the measured radiative cooling rates were considerably higher than actual it was concluded that in the lowest few metres nocturnal cooling is generally of radiative origin and that these layers are warmed by eddy transfer of heat.

Dr. Funk dealt with the variation of radiative flux with height and deduced that there was a height at which the flux was nil. He also mentioned the connection between radiation and eddy diffusivity and discussed the formation of dew and frost. At present, he said, observations were terminated when dew began to form. Comparison of radiation ground temperatures with those obtained from mercury grass thermometers were shown.

3 September 1959

Reflections on the I.G.Y at Little America

by K. Morley

Mr. Morley of the Bureau of Meteorology, who was an Australian observer at the American Antarctic base at Little America during 1958 gave a vivid description of the base illustrated by slides.

After briefly mentioning the trip, the construction of the base was explained. Prefabricated huts were arranged in parallel fashion, allowing streets between them and the whole collection covered with wire netting and jute hessian. The snow soon accumulated over this, converting the streets into tunnels and creating an "underground" village (ten feet below the snow after one year).

Among the amenities provided was the steam bath, devised by the camp doctor, after the style of the Finnish sauna bath. Large stones, brought down from New Zealand, were heated by an oil stove, in a metal lined room. Ice was thrown on the hot stones, producing dense steam. After sweltering on wooden benches in this atmosphere for some minutes the bathers ran outside and rolled in the snow. Small certifi-