

JOINT COLLOQUIA

26 July, 1956

Meteorological and other Impressions from a Voyage
to the Middle East

by U. Radok

Dr. U. Radok of the Meteorology Department, University of Melbourne, gave an account of his meteorological and other impressions from a voyage to the Middle East, made as meteorologist to a French oceanographic survey of the Indian Ocean. The voyage led him to Egypt from where he returned with the aircraft carrier "Melbourne". The scientific work consisted of radiation observations and a series of pilot balloon and radar wind flights. The talk was illustrated by slides including some of the ancient Egyptian monuments and of Ceylon. In the discussion some new oceanographic instruments were described, viz. the Tucker wave recorder used hitherto mainly on weather ships in the Atlantic, and the "geoelectrokinetograph" of von Arx. The latter instrument serves for recording the ocean current component at right angles to the ship's track while the ship is in motion, and its principle of operation has been described by Longuet-Higgins, Stern, and Stommel, in M. I. T. and Woods Hole Papers Vol. 13 No. 1 (November 1954). In conclusion Dr. Loewe expressed the hope for greater interest in physical oceanography and that meteorologists might avail themselves of the possibility of doing part of their work for a higher Australian degree at the National Institute of Oceanography at Wormsley, England.

30 August, 1956

The Physics of Natural Evaporation

by W.C. Swinbank

Mr. Swinbank of the C.S.I.R.O. Division of Meteorological Physics emphasised the physical requirements of the evaporative process - namely a heat source and a gradient of humidity. Consideration of these leads to the various methods of measuring evaporation through the energy balance, sink-strength and aerodynamic approaches.

Concepts such as 'saturation deficit', and the indications of various types of atmometer, were rejected as being, in general, physically insignificant inasmuch as

evaporation is a process of vertical diffusion.

The tank evaporimeter might be expected to yield acceptable indications of evaporation from larger water surfaces under certain conditions and for long periods, say a year. But for shorter times its predictions may be erratic and unreliable and, in extreme cases, quite misleading. In any case the evaporimeter cannot be accepted as a meteorological instrument.

The merits and limitations of the various methods for measuring evaporation, based on one or other of the physical requirements, were discussed and, provided accurate measurements of net radiation can be made, the energy balance chosen as best. But radiation estimates based on climatological formulae are inadequate.

The work of Penman and Ferguson was summarised, and the recommendation made that the simplest procedure in the use of these methods, if radiation equipment is available, would be to determine the temperature of the water surface directly by measurement and then substitute in the appropriate 'sink-strength' formula for water vapour transfer.

The 'aerodynamic' methods (Thorntwaite - Holzman - Pasquill) were outlined. Their restriction to short periods, and the complications introduced under non-neutral conditions, were noted. Finally, the 'eddy-correlation' technique, developed in the Division of Meteorological Physics, C.S.I.R.O., was explained, and its potentiality for measuring natural evaporation under practically any condition emphasised. Progress in the mechanisation of the method was reported.

20 September, 1956

Evaporation Pan Coefficients in Australia

by C.E. Hounam

Mr. Hounam of the Bureau of Meteorology defined pan coefficient as the ratio E_p/E_t where E_p is the lake evaporation and E_t that from a pan or tank.

Coefficients have been measured at several overseas storages but these cannot be applied in Australia as they apply to a different type of tank.