JOINT COLLOQUIA

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LOW LEVEL JET-STREAMS, NOCTURNAL THUNDERSTORMS AND COASTAL DESERTS

By H.H. Lettau

Professor Lettau of the Meteorology Department, the University of Wisconsin, described studies of the behaviour of low level jet streams, including a detailed study conducted on the Great Plains of Nebraska where a large tract of land has a gentle upward slope from east to west of about 1 in 500.

For the latter study, techniques were devised to measure wind profiles at heights above those which could be reached by instrumented towers. Here, winds obtained from photographs of the tracks of pilot balloons taken every alternate 20 seconds showed a wind maximum at about 400 metres.

Two-hourly wind observations at a chain of U.S. Weather Bureau stations along latitude 35°N showed the existence, towards the western side of the slope, of a night-time maximum with jet characteristics in the southerly component. The pressure field indicated a warm low in the west and a cold high in the east. Professor Leattau also showed that the summer maximum in thunderstorm activity over U.S.A. occurred in about the same location and at the same time of the day as the low level jet.

He then outlined earlier theories on the formation of the low level jet and advanced his new concept of thermo-tidal winds. Here, insolation cycles associated with meso to large scale effects of sloping terrain set up diurnally see-sawing thermal winds as the forcing function, while the response of actual air motion is modified by internal friction and the coriolis force.

Professor Lettau demonstrated that this concept provides the common basis for the explanation of certain observational features including the nocturnal low level jet of the Great Plains west of the Mississippi River, the nocturnal thunderstorms of this region, and also the regional tendency towards daytime subsidence which may lead to coastal deserts in certain strips along the Pacific slopes of the Andes and Rocky Mountains, analogous to coastal deserts in other tropical and subtropical regions.

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OZONE SOUNDINGS AS IN AID IN TRACING ATMOSPHERIC MOTION

By A.B. Pittock

Dr. Pittock of C.S.I.R.O. Division of Meteorological Physics, Aspendale, Victoria, remarked that the production, transport and destruction of ozone involves the whole of the atmosphere of interest to meteorology. Ozone is produced by photochemical processes in the upper stratosphere, where it is in photochemical equilibrium. It is carried down through the lower stratosphere and troposphere by air motion, and is destroyed by oxidation processes at the earth's surface.