

these operations, Mr. Phillipot found standard deviations of the wind and temperature errors of 10.5 to 12.5 knots and  $3.5^{\circ}\text{C}$  respectively, with a resultant standard deviation in the flight fuel consumption of very nearly 1000 lb. He said, the practical significance of this is that extreme meteorological errors are likely to result in a variation of the planned arrival time by some 30 minutes. This, he said, in turn emphasizes the significance of the terminal conditions (and terminal forecasting accuracy) as the great increase in fuel consumption at lower heights alone demands that a substantial fuel reserve be carried for every flight.

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### A Theory of Fronts in Relation to Surface Stress

by

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Mr. F.K. Ball, of the Division of Meteorological Physics, C.S.I.R.O., Melbourne gave the results of his mathematical investigations of the equations governing the motion of the cold air ahead of a warm front or behind a cold front into which he had introduced surface stress terms.

He stated that solutions for the steady state indicated that a kata-front inversion tends to become horizontal at increasing distances from the front, whereas an ana-front inversion may continue to slope upwards indefinitely. The depth of cold air will, when the upper flow is curved cyclonically, actually decrease with increasing distance from a cold kata-front. He also showed that the existence of a sharp surface warm front depends on the sudden breakdown of a trailing layer of cold air. The thickness of this layer increases with decrease in latitude and as a result sharp warm fronts are unlikely to occur at low latitudes. The conclusions concerning cold fronts, Mr. Ball said, are in broad agreement with Sansom's (1951) observations.