

## JOINT COLLOQUIA

30 September 1970

## A STUDY OF SIMULATED "WILD FIRES" IN WESTERN AUSTRALIA

by R. G. Vines and R. J. Taylor

Dr. Vines of the CSIRO Division of Applied Chemistry, Fishermens Bend, Victoria, introduced the talk with a description of the experiment. He explained that the Western Australian Forestry Department, which uniquely operates controlled burns in its forests, agreed to a special series of very hot fires. Controlled burns are normally carried out on days of stable atmospheric conditions and they produce little significant convection; because they take place when burning conditions are mild, the fires produced are never fierce.

However, in the "hot-fire" experiments the aim was to observe much more intense fires lit when atmospheric conditions were less stable - that is with high surface air temperatures, low relative humidities and moderate surface winds. The Forestry Department agreed to burns under these conditions for three areas about 60 miles northwest of Albany, Western Australia, on 5, 6 and 13 December 1969.

Dr. Vines described the instrumentation around the fire areas; these included double theodolite wind observations from a site 30 miles from the fires and time lapse cameras at sites with different aspects of the fires. The fuel burnt was estimated to be about 50,000 tons on each occasion. On an average the burns took  $1\frac{1}{2}$  hours to light, half an hour to reach a peak, and all litter was consumed one hour later. The energy generated was  $7\frac{1}{2}$  cal/cm<sup>2</sup>/min, as compared with solar radiation (0.6 cal/cm<sup>2</sup>/min) and normal controlled burns (2 cal/cm<sup>2</sup>/min).

Mr. Taylor of the CSIRO Division of Meteorological Physics, Aspendale, Victoria, presented some of the results of the experiment. He displayed the following table based on the assumption that entrainment and condensation can be neglected.

Date of Fire	Cloud Height	
	Predicted	Observed
5 December	2,600 metres	3,000 metres
6 December	2,800 "	4,300 "
13 December	2,400 "	2,750 "

He also calculated the energy used in the cloud development, making allowance for condensation, and compared it with the energy available. There was unexplained loss of energy in the second fire.

Other results Mr. Taylor produced were computations of the latent heat contribution, vertical velocities in smoke and clear air and horizontal temperature gradients between smoke and clear air.

The accelerometer results were also discussed and the maximum vertical velocity was said to be +15m/sec. A velocity of +13m/sec was maintained for 30 seconds.

Dr. Vines concluded by showing some spectacular time lapse sequences of the fires; the familiar convective toroid, which gives a mushroom shape to the cloud, was commented on.

M. H. L.

25 November 1970

### ALFRED WEGENER – HIS LIFE AND WORK

by F. Loewe

Dr. F. Loewe of the Meteorology Department, University of Melbourne, and the Institute of Polar Studies, Ohio State University, who was a close associate of Alfred Wegener addressed the Colloquium on his life and work. His talk has been given in full earlier in this issue.

