

Portable antennas have been constructed, consisting of a square array of loudspeakers with wooden sideplates, an aperture of 50 square feet, and 100 watts peak power. One of these was used in an attempt to calibrate the sounder in terms of temperature and wind structure in an experiment on the Nullarbor Plain in June 1968, in conjunction with the Postmaster-General's Department and the Bureau of Meteorology. The equipment was set up near a 250 ft tower, fitted with a movable platform on which were mounted two temperature sensors and an anemometer. Mr. McAllister showed slides of records obtained from the sounder and from the meteorological instruments, which showed that acoustic echoes were returned from temperature fluctuations in the atmosphere. Some of the atmospheric structures and processes revealed by the sounder were:

- (i) arrival of weak shallow front-like disturbances;
- (ii) breaking waves in stable air, with temperature and wind records indicating vertical motion within the wave structure, occurring in many situations with a wide range of periods and amplitudes;
- (iii) pronounced sinusoidal vertical oscillations in stable air;
- (iv) separation of the atmosphere into clearly demarcated layers with strong echoes, separating other layers with weak or undetectable echoes;
- (v) formation and breakup of a nocturnal inversion, the breakup occurring with solar heating after sunrise;
- (vi) thermal plumes during the time of strongest heating.

Concluding, Mr. McAllister pointed out that an acoustic sounder can be used to obtain information on turbulence within the pulse volume, and that the time-height pattern of turbulence also gives information on atmospheric structure and motion on a larger scale. The equipment so far used is relatively simple and many developments can be foreseen. In particular, three further applications he is considering are:

- (i) obtaining mean wind speed by measuring the angle of arrival of the return echo;
- (ii) using higher power and frequency to detect echoes which at present are below the threshold of the equipment, so that there may be almost continuous echoes from all heights up to the maximum range;
- (iii) using higher power and lower frequency to detect turbulence up to 40,000 ft.

P. J. R. S.

11 December 1968

AN INTRODUCTION TO THE IBM 360 SERIES SOFTWARE

By G. J. Knox

Mr. Knox, Senior Programmer (Software), Operations Branch, Automatic Data Processing Division of the Bureau of Meteorology, spoke on this non-meteorological subject, which nevertheless is becoming increasingly significant to the local meteorological community, particularly since the installation of the Bureau of Meteorology's IBM 360/65 computer in early 1968.

After brief remarks on the configuration and organisation of the Bureau's system, Mr. Knox defined and discussed the concepts of "Hardware" and "Software", pointing out that the latter normally includes:

- (i) the monitor system;
- (ii) compilers and their supporting programmes;
- (iii) generally applicable routines and packages.

Mr. Knox then briefly retraced the historical development of the computer from the early 1940s to the present time, highlighting the increase in speed and sophistication and the development of such concepts as time-sharing, multiprogramming and multiprocessing.

The speaker then discussed at some length the facilities of a software monitor system, dealing with:

- (i) usual facilities (management, input-output control, file management and retrieval);
- (ii) range of software; and then in more detail
- (iii) multiprogramming with a fixed number of tasks (M. F. T.).

The final topic was support software.

In the ensuing discussion Mr. Knox elaborated on some of his earlier remarks on terminology and IBM programme support, and answered several questions on the more general aspects of computer operations.

J. W. Z.