

echoes moved east and by 1730 IST the line of cells was located 20 miles to the NW and about 35 miles to the west of Madras airport. By 1800 IST the line enveloped the station from SW to NW extending to NE (Figs. 3-4). After 1840 IST the entire line moved away to the east of the station.

SSWly surface wind with a mean speed of 10 kmph (5 kts) prevailed from 1720 IST. It started increasing from 1800 IST with the squall cloud approaching the station from the west. Shower commenced over the station at 1808 IST. During the first phase of the squall, a max. of 73 kmph (39 kts) was recorded at 1803 IST from a NW direction. In the second phase, speed had gone higher up in gusts upto 104 kmph (56 kts) at 1810 IST from a WNW direction. For next 10 min. max. speed of the order of 65-70 kmph (35-38 kts) prevailed over the station. Between 1820-1830 IST the mean speed decreased to about 45 kmph (24 kts). It decreased further and by 1840 IST was only about 10 kmph (5 kts) as before the commencement of squall.

551-515

SEVERE SQUALL AT MADRAS AIRPORT ON 17 AUGUST 1961

For the first time since the installation of weather radar at Madras, a severe squall with wind pressure sufficient to stop the rotation of the scanner passed over Madras (Meenam-bakkam) airport in the evening of 17 August 1961 (Fig. 1). A maximum wind speed in gust of 104 kmph (56 kts) from WNW direction was recorded at 1810 IST by the D.P.T. anemograph at the airport (Fig. 2). Places in the neighbourhood like Tambaram and Nungambakkam also experienced the severe squall in the same evening, although the exact maximum speeds at these places are not known. This is the most intense squall recorded by the anemograph at Meenam-bakkam airport since its installation in 1951.

A line of thunderstorm cells which produced the squall was also tracked by the radar. A broken line of echoes was first observed on the radarscope at 1615 IST oriented from 265°, 84 miles to 338°, 40 miles. This line of

The surface pressure recorded an abrupt rise of 0.7 mb between 1800-1805 corresponding to the max. epoch of the squall. Dry bulb temp. fell by 7°C between 1805-1825 IST with an abrupt fall of 4.0°C between 1805-1810. Wet bulb also decreased by 2.5°C during the same period. Relative humidity rose from 68% at 1725 IST to 94% at 1810 IST. A rainfall of 9.4 mm was recorded between 1808-1945 IST.

As seen from the relevant synoptic charts of 17 August 1961, conditions over northwest Bay of Bengal and adjoining west central Bay, were unsettled in the morning. Strong westerlies prevailed over the Peninsula in the lower levels. By the evening, winds at lower levels along north Madras coasts weakened although strong westerlies continued to prevail over the interior, which favoured velocity convergence over and near the east coast mentioned above. Also, a trough line in easterlies was apparently

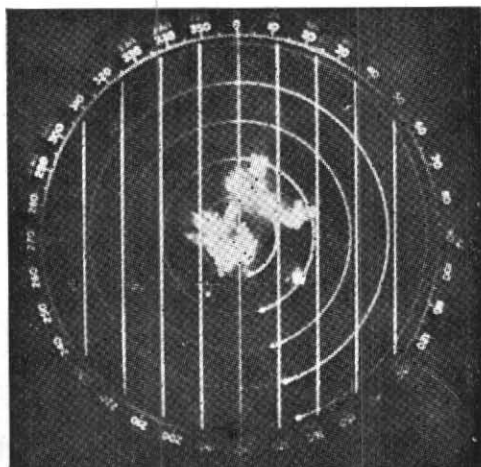


Fig. 1. Radar picture at 1810 IST
Range 50 n.m., elevation 7°, stoppage of scanner
in SSE direction may be seen

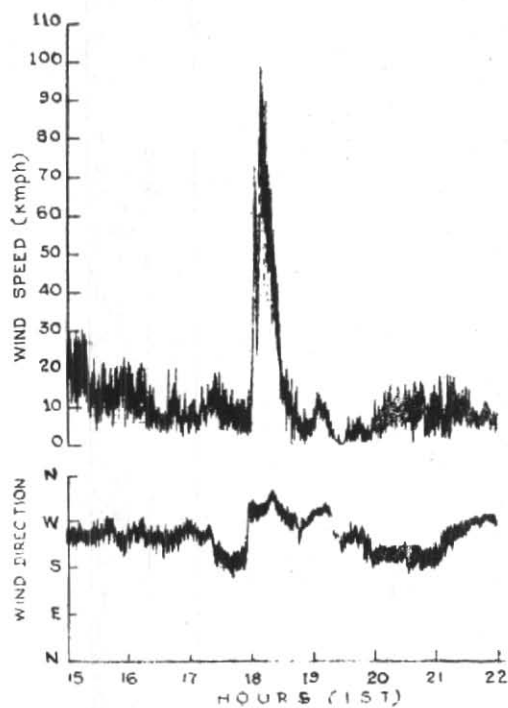


Fig. 2. Anemogram of 17 August 1961

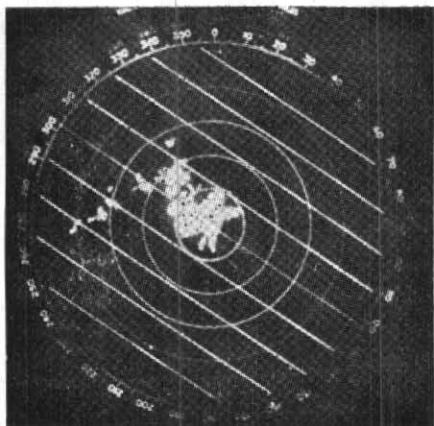


Fig. 3. Radar picture at 1620 IST
Range 10 n.m., elevation 1°

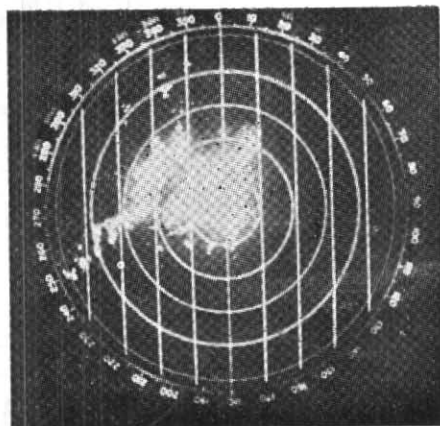


Fig. 4. Radar picture at 1730 IST
Range 50 n.m., elevation 1°

running north-south to the east of Madras at the higher level of 9 km a.s.l., with Madras and neighbourhood falling in the forward sector of divergence. This super-position of low level convergence with upper level divergence possibly favoured the occurrence of the thunderstorm squall.

Showalter Index (1953) and modified squall index after Tripathi (1956) evaluated from 12 GMT radiosonde ascent of Madras on 17 August 1961, prior to the occurrence of squall were -2 and 2 respectively. Since values higher than these were found on occasions of milder squalls, these indices were not helpful to explain the severity of the squall. However, the mean relative humidity got from the above radiosonde ascent by taking the values level by level from 1000 mb to 600 mb at interval of 100 mb worked out to be 82 per cent which was relatively more than the range of 65-72 per cent associated with other squalls of the month. Entrainment of moist air, as in the present case, has apparently helped to maintain the excess temperature and liquid water content of the updrafts, both of which would have been reduced if the environment was drier (Austin 1948). Thus the higher humidity noticed in this squall situation appears to have contributed to its severity.

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