Letters To The Editor

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SQUALLS IN MADRAS

1. Introduction—A Dines' Pressure Tube anemograph—recording wind speed only and not direction—has been functioning at the Madras harbour since 1918. In February 1938, another Dines' anemograph, recording both speed and direction, was installed in the compound of the observatory in Nungambakkam. This latter site is 4 miles to the westsouthwest (240°) of the harbour. The instrument at the harbour is at a height of 117 ft above sea level and that at Nungambakkam at 76 ft above sea level. The height of the ground at the latter site is about 19 ft above sea level so that the instrument is at 57 ft above ground. A study of the squalls at Madras as shown on the anemograms of the two sites for the period 1938-50 (the period when both were available) has been made by the authors and the results will be presented later in a scientific paper. Meanwhile, a few salient features shown by the study are given herein.

2. Frequency—Number of days in each month when there was a squall at either of the two sites, during the 13 years, 1938-50 are given in Table 1. The average number of days with squall and of days with squall associated with thunderstorms are also given in the same table.

Thus, squalls occur at Madras on some 25 days each year on the average. They are confined to the months May to November, the largest number being in July. About half of them are associated with thunderstorms, the rest being mere strong winds. June, July and August are the months when a larger percentage of the mere strong winds (unattended with thunderstorms) occur.

3. Usual times of occurrence—Dividing the day into 3-hour periods, the largest number of squalls occur in the period 1800-2100 IST in the months May to September. The time of day with the maximum number of squalls in the season October to April is 0900-1200 IST. The significance of the result in respect of October to April may not, however, be much as fewer squalls occur in this period.

In May to September, 86 per cent of squalls occur between 1500 and 0300 IST, in October to April, only 38 per cent occur in this half of the day.

4. Direction and seasonal variation—79 per cent of squalls came from SW, W or NW in May to September; during October to April, 63 per cent of squalls were from NE and E (This is based on the Nungambakkam records only, as there was no record of direction at the harbour).

5. Duration of squalls—About 20 per cent of the squalls lasted for half an hour or less, 35 per cent from half to one hour, 25 per cent from 1 to 2 hours and the rest did not abate even in 2 hours. The duration of a squall may be taken to be an indication of the size of the eddy in which it is contained and also of the area it affects. In general, the longer a squall lasts, we may assume that the greater is the area affected by it.

6. Maximum gust speed—At Nungumbakkam, in 78 per cent of squalls, the highest gust speed was below 40 mph, in 20 per cent between 40 and 50 mph and in 2 per cent speeds above 50 mph were attained. The highest gust speed attained was 65 mph on 3 December 1941.

At the harbour, 66 per cent of squalls had maximum gust speed under 40 mph, 28 per cent between 40 and 50 mph and 6 per cent above 50 mph. The highest speed was 63 mph on 3 July 1942.

7. Pressure, Temperature and Relative Humidity changes

(*a*) *Pressure*—In 40 per cent cases of squalls there was no sharp pressure change; in 36 per cent rise of pressure was of 1 mb or

TABLE 1

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Total No. of days with squall (1938-50)	1	1	3	4	21	54	70	49	43	36	25	13	320
Average No. of days per year					2	4	5	4	3	3	2	1	25
No. of days associated with thunderstorm per year					1	1	2	2	2	2	1	..	11

less ; and in 20 per cent it was 1-2 mb. Rises above 2 mb occurred in 5 per cent of cases.

The highest pressure rise was 5·8 mb which occurred on two days—3 June 1944 and 5 May 1948.

Pressure falls occurred only on 4 out of 308 occasions and the maximum fall was 1·4 mb.

(*b*) *Temperature*—It fell in 74 per cent of cases. In 24 per cent, there was no conspicuous change. It actually rose in 2 per cent of cases ; but the rise was always less than 5°F. In 29 per cent the fall of temperature was 1-5°F ; in 36 per cent, it was of 6-10°F and in 9 per cent it was of more than 10°F.

The greatest drop in temperature occurred on 3 June 1944 and amounted to 21°F.

(*c*) *Relative Humidity*—There was no sharp humidity change in 29 per cent of cases.

Rises upto 20% occurred in 24 per cent of cases and 21-40% in 16 per cent of cases. Falls upto 20% occurred in 21 per cent of cases.

Rises above 40% and falls below 20% between them included only 10 per cent of the cases.

The highest rise of 68% occurred on 21 June 1939 and greatest fall of 52% on 29 June 1941. On 3 June 1944, the day with the greatest fall in temperature and with one of the greatest rises in pressure, the humidity rose by 49%.

8. Movement of the squall—Portions of the anemograms of both places for two typical squalls, on 16 June 1949 and 26 May 1950 are reproduced in Figs. 1 and 2. In the first case, the direction of the squall was approximately WSW (255°). The squall arrived at Nungumbakkam at 0235 and at the harbour at 0258 IST. The speed of propagation of the squall in its own direction of motion works out from these at 10 mph. The speeds of the highest gusts were 40 and 36 mph.

In the second, the direction was very nearly ENE (060°). The squall arrived at the harbour at 0530 and at Nungumbakkam at 0548 IST. The speed of propagation in this case works out at 13 mph. The maximum gust speeds were 58 and 56 mph.

The nature of the relationship between (*i*) the speed of propagation, (*ii*) the maximum gust speed and (*iii*) the mean speed during the squall is being studied in greater detail.

Other points of interest shown by the pictures are (*i*) the wide variation in duration between different squalls and (*ii*) the repetition of the essential details of the structure of the wind in the squall at the two sites.

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August 21, 1952.

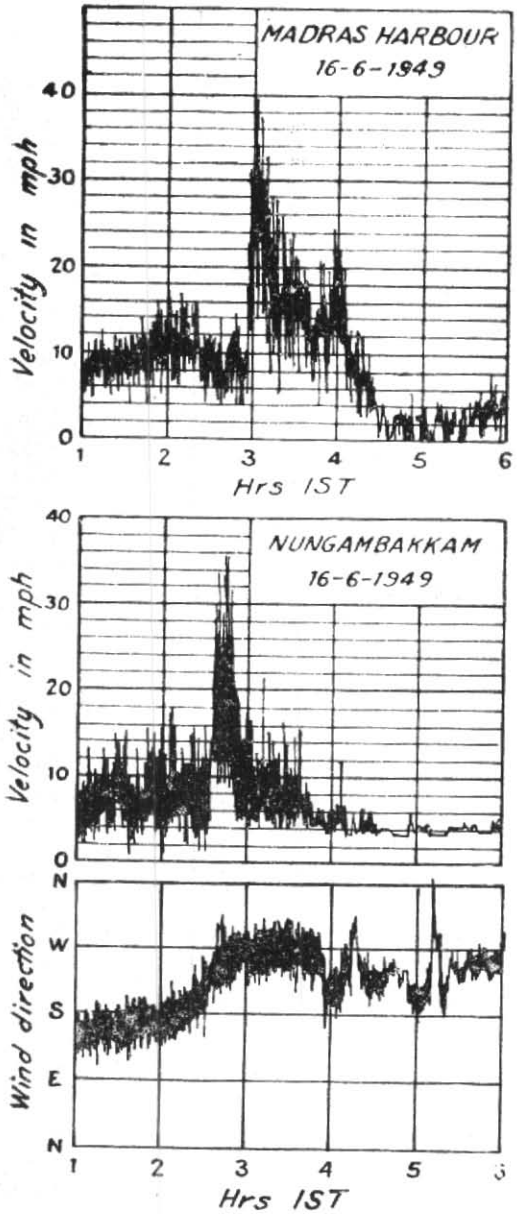


Fig. 1. Anemogram on 16 June 1949

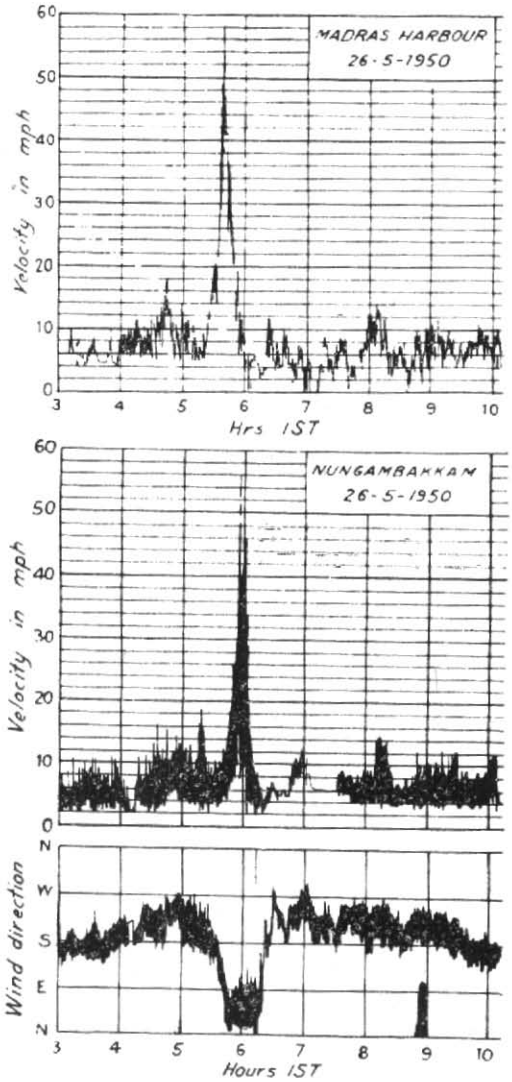
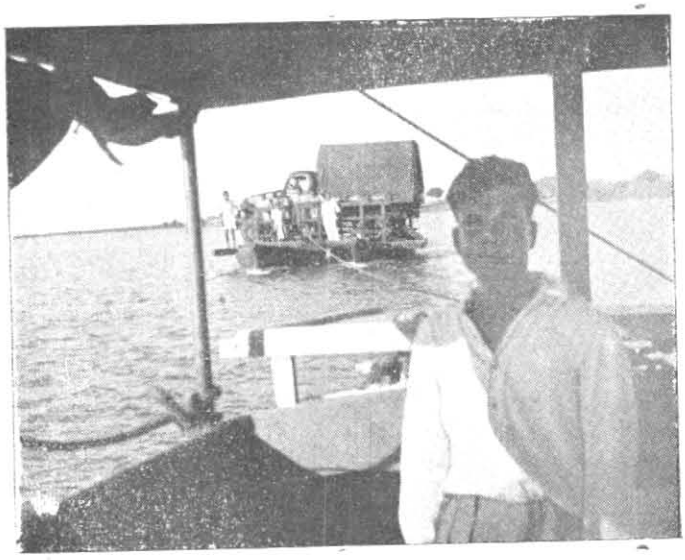


Fig. 2. Anemogram on 26 May 1950

Generator Truck in the field



Ferrying the truck across Dharamtar creek