Bannon (1954) have drawn attention to an association between the upper air-changes near the tropopause over the Middle East and the onset of the Indian summer monsoon. Table I gives the dates of onset of monsoon on the Malabar ccast in the years 1948 to 1953 with associated upper tropospheric changes observed over Aden (Lat. 12° 49′ N, Long. 45° 02′ E), Bahrein (Lat. 26° 16′ N, Long. 50° 37′ E) and Habbaniya (Lat. 33° 22′ N, Long. 43° 34′ E).

TABLE I

	1948	1949	1950	1951	1952	1953
1 First appearance of easterly winds over Aden at 200 mb. ..	..	May 18	May 19	May 25	May 12	May 22
2 End of Polar type tropopause over Habbaniya ..	June 9	May 27	May 22	May 26	June 1	June 11
3 Onset of SW monsoon on Malabar coast ..	June 10	May 23	May 27	May 31	May 28	June 7
4 First appearance of easterlies over Bahrein at 200 mb. ..	June 15	June 13	June 10	June 13	June 8	June 20

It will be seen that the appearance of the easterlies over Aden precedes the onset of the monsoon by one to two weeks An inspection of Fig. 3 shows that in respect of the South Indian stations Trivandrum and Madras also, the easterlies get established in the upper troposphere before the onset of the monsoon, the mean winds for the month of May being easterly at all the upper tropospheric levels.

6. Examination of contour heights of standard isobaric levels in respect of Aden and Bahrein based on averages for the period 1948-50 shows that preceding the onset of the Indian southwest monsoon the reversal of pressure gradient between Aden and Bahrein takes place in the upper tropospheric levels at nearly the same epochs at which the reversal of the gradient between Madras and Delhi takes place over the Indian region

7. Our study shows that there is great similarity between the upper tropospheric changes over the Middle-east stations and over the Indian region preceding the onset of the *Indian summer monsoon. As* Sutcliffe and Bannon have pointed out, a careful study of these changes may have prediction value. We are making a detailed study of the upper air conditions over India and neighbourhood for the seven years 1955-61. Preliminary examination shows that the early onset of the monsoon in 1956, the late onset and early withdrawal of the monsoon in 1957 and the good monsoon activity in 1961 are all reflected in the contour diagrams for the upper tropospheric levels. Fuller details of our work will be published in the *Indian Journal of Meteorology and Geophysics.*

1. Yeh Tu Cheng. Dao Shin-Yen and Li Mei-Ts'un, *The Atmosphere and the Sea in Motion* (Rossby Memorial Volume), Oxford Uni. Press, 1959, pp. 249–67
2. Sutcliffe, R. C. and Bannon, J. K., *Sci. Proc. Int. Association of Met.*, Rome 1954, pp. 322–34.

ULTRASONIC ATOMIZATION OF LIQUIDS

WHEN a beam of ultrasonic sound of sufficient intensity is passed through a liquid and directed at an air interface, atomization of the liquid occurs. Liquid particles are ejected from the surface into the surrounding air, and under proper conditions very fine dense fogs may be produced. Unlike pneumatic atomization, the ultrasonic atomization has this advantage that the fog particle size and fog density can be independently controlled.

It has been suggested that capillary surface waves play a role in the atomization mechanism. This has been found to be the case according to R. J. Lang who reports the results of an experimental study on ultrasonic atomization [*Jour. Acoust. Soc. Amer.*, 1962, 34 (1), 6]. He finds that a definite relationship exists between the capillary wavelength at a given frequency and the size of the particles produced. Frequency range from 10 to 800 kc was used in the experiment and surface disturbances were studied by photographic method. Special methods were employed to measure the particle size.

It was found that uniform crossed patterns of capillary waves were formed on the liquid surface when atomization occurred. The diameter of the particles produced was found to be a constant fraction, 0·34, of the capillary wave-length.