Letters to the Editor

A DEW POINT RECORDER FOR USE AT AIRPORTS

An instrument to measure and record directly at a distance dew point temperatures, has been constructed, using as sensor a dewcell, which makes use of the hygroscopic properties of lithium chloride to determine the partial pressure of the ambient water-vapour in terms of the LiCl dew point. The principle of operation of the dewcell devised by Hickes (1947) is well known.

The instrument consists of the dewcell with its power supply, a thermistor used in bridge circuit for sensing the equilibrium temperature, a constant gain d.c. amplifier which with the bridge converts the LiCl dew point into dew point readings, and a remote indicator and recorder for continuously indicating and recording the dew point (Fig. 1).

The dewcell consists of a thin-walled cylindrical metal tube, closed at one end, on which is wound a woven glass tape impregnated with saturated lithium chloride solution and over which is wound a pair of silver wires which serve as heater elements. The dewcell is powered with a 24 volt a.c. supply. A perforated protective metal guard is provided and a bead-in-glass thermistor fitted inside the tube. The thermistor is shunted by a resistor to obtain a linear scale for the LiCl equilibrium temperature in the range 20° to 90°C. The output of the bridge is fed to a constant gain d.c. amplifier. The amplifier circuit is similar to that used in the telethermometer designed by the authors (1966). The bridge values and the amplifier gain are so adjusted that the recorder and indicator give directly the dew point.

The errors of the dewcell have been discussed by Tanner and Suomi (1956). The disadvantages are that since the LiCl cell cannot cool to temperatures below the air temperature, dew points at extremely low relative humidities cannot be measured. And since differences between the dewcell temperature and that of the ambient air affect the convection and radiation heat losses, ambient air temperature also influences the equilibrium temperature of the dewcell. Because of the complex nature of the dewcell heating and equilibrium mechanism, it is also not very accurate in its absolute readings, especially when used with thermistors which may sample hot or cold spots in the dewcell bulb. The dewcell must, therefore, be calibrated under conditions in which it will operate. It should also be operated 10°–15°C above ambient to read close to the LiCl dew point.

The main advantages of the dewcell are its operational simplicity and the fact that the dewcell data are directly and conveniently reduced to dew point and vapour pressure data. The relative error of measurement is the same for all values of dew point and it is accurate within ±1°C under stable conditions. The instrument neither adds nor removes water from the atmosphere and can function even with quite low air ventilation values. The time lag of the order of 2–4 minutes is advantageous, when representative readings for synoptic reports are required. The instrument needs no attention except the dewcell, which must be reconditioned every three months.

The dewpoint recorder designed for use at airports, has been in regular operation at Poona since 1965 and has given consistent, reliable records for over a year.

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AN OBJECTIVE METHOD OF FORECASTING PENTAD RAINFALL AT BANGALORE DURING MONSOON SEASON

On the lines of Lund and Wahl (1955), Jagannathan and Ramamurthi (1961) and Sejannani (1964) developed technique for forecasting pentad rainfall utilising 700 and 500-mb contour heights at selected points as predictors. A technique on similar lines has been developed to forecast pentad rainfall at Bangalore during the monsoon season.

The character of pentad rainfall was classified into three categories — abnormal (A), normal (N) and subnormal (S) utilising 30 years (1921-50) pentad rainfall data to determine the numerical limits (Table 1) which define these classifications. 13 years (1950-62) pentad rainfall data classified as above were used for developing the technique and subsequent three years data (1963-65) were utilised for testing it and assessing skill score.

The predictors used were the 5-day mean and 1-day contour heights of radiosonde stations over Indian region for the 5-day and 1-day periods antecedent to rainfall pentad. As done by earlier workers, preliminary selection of predictors was made by examining the contrasting features of contour height patterns and height anomaly patterns of composite charts based on six abnormal and six subnormal rainfall pentads for each month. Method of graphical correlation followed by relevant statistical tests (Jagannathan and Ramamurthi 1961) was used for final selection of three sets of predictors for each month. No such predictors were available for the month of June. Suitable predictors for months July, August and September are chosen and prediction diagrams based on them are presented in Figs. 1 (a) to 3 (c). Areas α, β and γ in these prediction diagrams are the areas having predominantly A, N and S points respectively.

From the contingency tables between α, β, γ, and A, N, S based on these diagrams, contingency