

With an acidity of 1.0 c.c. of acetic acid per 50 c.c. of total volume of a mixture of calcium and magnesium, good results were obtained only up to a magnesia content twice that of lime.

The above experiments were carried out with a B.D.H. sample of cacotheline for "Spot Tests" and neutral solutions of calcium and magnesium chlorides. A neutral aqueous solution of ferrous ammonium sulphate was used to supply ferrous ions.

Fuller details will be published elsewhere. The author wishes to thank Dr. K. Neelakantam for his kind interest in the work.

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March 9, 1948.

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I. Kuchment and Gengrinovich, *Chem. Abs.*, 1946, 1412; *Analyst*, 1947, 72, 492.

FAR ULTRA-VIOLET EMISSION BANDS OF PHOSPHORUS

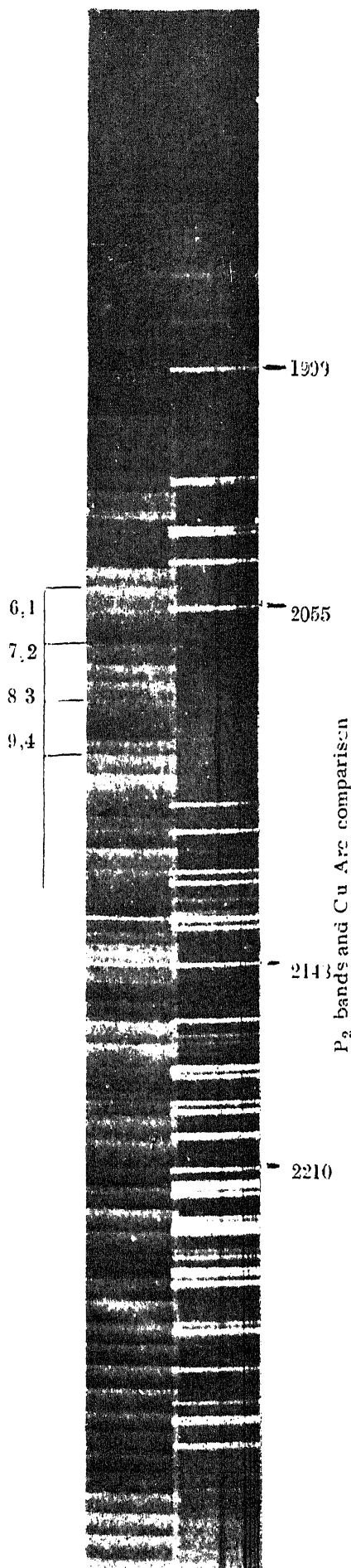
OUR knowledge of the extensive ultra-violet band system ($^1\Sigma_u^+ \rightarrow ^1\Sigma_g^+$) of the P_2 molecule and its vibrational structure is due to Jakowlewa¹ who studied the system in absorption. Herzberg² investigated the same system in emission but reported only bands involving the ground state levels from $v''=4$ to $v''=32$. No bands were recorded arising from levels v'' less than 4.

Excitation of the band spectrum using a High Frequency Oscillatory discharge through heated phosphorus vapour with external electrodes gave a fairly intense system down to λ 1940 (cf. Fig. A). About 50 bands are newly recorded in emission having the ground state levels $v''=0$ to 4. The classification of these and their wave-length data are given in the following table.

TABLE I

Wave-length	Int.	Classification (v', v'')	Wave-length	Int.	Classification (v', v'')
1949.5	..	0 10,0	2108.4	1	3 1
62.9*	..	0 11,1	11.5*	2	8,4
83.3	..	0 8,0	16.4	4	6,3
93.0*	..	1 11,2	22.5	2	4 2
2009.4	..	1 7,0	35.1	0	0,0
09.8*	..	1 10,2	39.9*	2	10,6
17.9	..	1 6,0	43.3	2	3 2
24.3	..	1 11,3	45.5*	3	8,5
27.7*	..	1 9,2	51.5	0	1,1
32.2	..	1 7,1	52.5*	1	6,4
33.1*	..	2	53.5*	1	11,7
42.1	..	1 10,3	59.4*	2	
45.6*	..	2 8,2	60.9*	?	9,6
50.2	..	1 6,1	64.0	0	2,2
55.1	..	1 4,0	79.1	1	3,3
64.7	..	2 7,2	86.6	2	1,2
69.1	..	2 5,1	88.8	3	6,5
73.9	..	2 3,0	93.3	2	4,4
78.3*	..	1 8,3	95.3*	3	9,7
88.4	..	2 4,1	2200.6	4	2,3
92.1*	..	2 9,4	09.3	2	0,2
97.1	..	3 7,3	15.7*	4	3,4

Band heads observed only in emission; not obtained by Jakowlewa in absorption.



In addition to the above system, Herzberg mentions another brief system consisting of five

bands from $\lambda 3970$ to $\lambda 4230$, ascribed to the P. molecule. These bands are not observed on our plates.

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March 19, 1948.

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1. Jakowlewa, *Zeits. f. Phys.*, 1931, 69, 548. 2. Herzberg, *Ann. der Phys.*, 1932, 15, 677.

WINTER RAIN IN SOUTH INDIA

THE weather in South India in the winter period of mid-January to March is characterised by occasional outbreaks of thunder rain, the onset of which is rather sudden and occurs in the early part of the day. These spells of rain are of the N.E. monsoon type¹ and do not disclose themselves sufficiently in advance on the usual synoptic charts. Tephigrams of Madras, analysed in the manner recently suggested by Schell,² have been found by the author³ to be of considerable forecasting value; but their usefulness is confined to the forecasting of the local weather only and that too within a few hours of the atmospheric sounding. Experience of the author at Madras has shown that Isentropic Charts give useful and reliable clues to anticipating spells of such rain in South India well in advance. A typical instance of such usefulness of isentropic charts is reported here.

There was a spell of thunderstorm rain in South India from the midnight of the 14th March 1946 till the evening of the 18th. This followed a protracted period of absolutely dry weather. Widespread and locally heavy rain occurred in the Peninsula south of the latitude of Madras (and also in Ceylon) on the 15th and the 16th. The area of precipitation

almost clear everywhere even as late as on the evening of the 14th. But by the morning of the next day, the skies in the S.E. Madras area were nearly overcast with Cb, Fb, As and Ns. There were no significant pressure changes till the morning of the 15th. The upper winds were more or less normal throughout the above period.

The isentropic chart of the 13th evening at the 310° A level is shown in Fig. 1. The station model adopted for representing the isentropic data is as follows:

(X) Actual mixing-ratio pressure (P)
(X_c) Saturation mixing-ratio ○ condensation Pressure (P_c)

Isobars are drawn on this chart at intervals of 50 mb. as continuous lines and isohyrics at intervals of 2 gm./kgm. as broken lines. The contour of the isentropic chart, as delineated by the isobars, shows the existence of an isentropic "hill" with its apex over the Comorin area. The earlier isentropic charts showed a gradual concentration of the seasonal moist tongue in the South Bay. It advected westwards and invaded the whole of S.E. Madras by the evening of the 13th. The atmospheric cross-sections, not shown here, revealed that the moist tongue extended vertically up to a height of 15,000 ft. The winds on the isentropic chart in Fig. 1 have a considerable cross-isobar component.

The axis of the moist tongue lies between Madras and Colombo, which are thus on its opposite peripheries. Even at these places, we find the "lift" required for condensation to be about 100 mb., as shown by the intervals between P and P_c. The lift would, therefore, be much less near the axis of the moist tongue and may well have been under 50 mb. there. The westward advection of the moist tongue would result in its moving up-slope on the

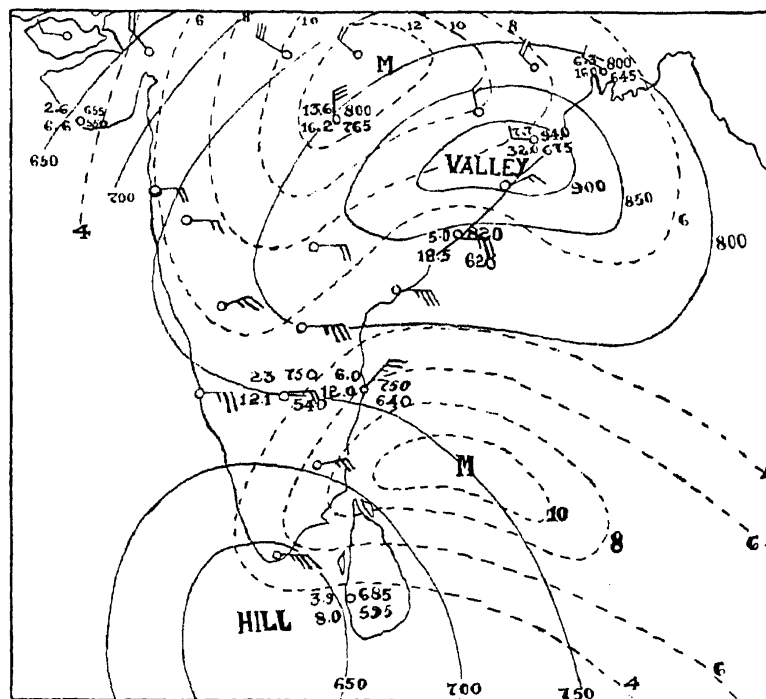


FIG. 1. Isentropic Chart (310° A) for 1700 Hrs. I. S. T. on 13-3-1946.

gradually moved away westwards, until the weather became practically dry again by the evening of the 18th.

The earlier synoptic situation did not yield any clue to this spell of rain. The skies were isentropic hill. Considering that its speed of

movement, as shown by the winds, is of the order of 15-20 m.p.h., one could reasonably expect it to invade the rest of South India within the following 24 to 36 hours. Its moistest axial regions could then come over S.E. Madras by the morning of the 15th. A subsequent westward movement of the moist tongue