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SOME UPPER AIR CORRELATIONS

Correlations connecting the thickness of the 500—300 mb layer with thickness of 700—500 mb, and temperatures at 500 and 300 mb have been examined for England.¹ It appeared worthwhile examining similar correlations for the Indian region since the India Meteorological Department has now started constant pressure analysis by the Differential Method using thickness between standard pressure surfaces. Correlation coefficients (CC) and regression equations were worked out separately for Poona and New Delhi combining all the radiosonde ascents for the months January, April, July and October for the years 1947 to 1949 and these are given in the accompanying tables. Means and standard deviations (S.D.) of the elements are also included. It is presumed that these relations will also hold good for the neighbouring areas.

Excepting the high CC between $*H_{53}$ and T_3 at New Delhi the others for India are all markedly less than for England, thereby indicating greater variability in lapse rate corresponding to the same thickness between pressure surfaces. The lower CC over England between H_{53} and T_3 is due to the occurrence of tropopause below 300 mb which does not happen in the Indian latitudes. The standard errors (S.E.) for the values derived from the regression equations are all higher than for England. The ratios between the standard errors and the standard deviations are also high in many cases showing that the values derived from the regression equations are not in good agreement with actual values. Only equations 3, 6 and 7 in Table 3 could be of utility in arriving at a fair estimate of temperatures at 500 and 300 mb. It would be of interest to note that the regression equations connecting T_3 and H_{53} both for Poona and New Delhi are almost alike and hence any one of the two is applicable for a wide area.

* T_5 = Temperature at 500 mb
 T_3 = Temperature at 300 mb

TABLE 1

Means and standard deviations

	POONA (No. of observation 248)		NEW DELHI (No. of observation 302)	
	Mean	S.D.	Mean	S.D.
H_{53}	8920 ft	84 ft	8792 ft	195 ft
H_{33}	12519 "	183 "	12513 "	348 "
T_5	-5.7°C	3.0°C	-20.2°C	6.2°C
T_3	-30.9°C	4.4°C	-35.1°C	7.5°C

TABLE 2

Correlation Coefficients

CC between	Poona	New Delhi	England
H_{53} & T_5	.710	.882	.96
H_{53} & H_{33}	.805	.833	.944
H_{33} & T_5	.777	.908	.968
H_{33} & T_3	.883	.920	.867

TABLE 3

Regression equations

Element	Regression equation	100S.E.	
		S.E.	S.D.
POONA			
1. T_5	$T_5 = -233.7 + .02556H_{53}$	2.0 C	67
2. T_3	$T_3 = -171.2 + .01323H_{53}$	1.7 "	57
3. T_3	$T_3 = -297.3 + .02127H_{33}$	2.2 "	50
4. H_{33}	$H_{33} = -2730 + 1.7095H_{53}$	115 ft	63
NEW DELHI			
5. T_5	$T_5 = -258.1 + .02819H_{53}$	2.9 C	47
6. T_3	$T_3 = -210.2 + .01624H_{53}$	2.6 "	42
7. T_3	$T_3 = -280.3 + .01992H_{33}$	2.9 "	39
8. H_{33}	$H_{33} = -755 + 1.4876H_{53}$	170 ft	49

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REFERENCE

- Murray, R., *Met. Mag.*, (M.O. 514), 78, 927, p. 263 (1949).

H_{53} = Thickness of 700-500 mb layer
 H_{33} = Thickness of 500-300 mb layer