TEMPERATURE CONDITIONS IN THE EYE OF SOME TYPHOONS

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Fr. Algué(1) in his discussion of the temperature and humidity conditions during the calm experienced in the center of many typhoons, came to the conclusion that the evidence seemed contradictory. In this connection, much use has been made in meteorological literature of the remarkable changes in temperature and humidity experienced in the center of the Manila typhoon of October 20th, 1882. Fr. Faura relates that during the calm the thermometer rose from 25° C. (77° F.) to 31.5° C. (88.7° F.), and the relative humidity fell from saturation to 43 per cent, a percentage which is but rarely observed in Manila during April and May. While many meteorologists have used this change to strengthen their theory of descending air in a typhoon center, others contend that the change in temperature is due merely to the fact that the partial or total clearing in the "eye" permits the sun to exert its normal heating effect. As Fr. Algué himself remarks:(2) 31.5° C. is very near the midday normal for a clear day in October.

Normand, in his excellent article on the value of wet bulb temperature readings, has this to say on the subject:(5)

"In the calm centers of most severe tropical cyclones there sometimes occurs a region of hot, dry air, which is most reasonably explained by assuming a gentle descending current in the center or 'eye' of the cyclone. Now the hurricane winds in the region surrounding the central calm must induce an isentropic distribution, both in the vertical and horizontal directions; and the central descending current, having originated in, must also be isentropic with, the surrounding whirl. Hence, though the air temperature may rise suddenly as the calm center passes over an observatory, the wet bulb temperature should remain constant. Another explanation of the high temperature in the calm center has been based on the ground that the central air, exposed under a thinly clouded sky to solar radiation, can rise to the normal height for a cloudless day. This explanation involves that the absolute humidity should remain unchanged and the wet bulb temperature should rise, as the central calm passes over the observatory. Let us take the classical example of the Manila typhoon of 20th October, 1882 to test these theories. Diagrams showing the variation of pressure, temperature and relative humidity during the day have been published; the data have been taken from the diagrams and used as a basis for calculating the wet bulb temperatures and absolute humidities shown in the table immediately below:

Time	Air temperature	Relative humidity	Wet bulb temperature	Absolute humidity, mixing ratio (gr.)
a. m.	°C.	*Per cent*	°C.	
9	24.3	92	23.3	17.8
10	23.8	95	23.2	17.8
11	23.8	100	23.8	19.1
11:40	**31.6**	**50**	**23.4**	**15.1**
13	24.4	100	24.4	19.6
14	24.8	98	24.5	19.4