The tabulation of the net changes in temperature due solely to the moving of the shelter at Escondido (Table 1) shows very large changes on *mild* mornings (minima of 38 to 33), but very small ones on *cold* mornings (minima of 32 or lower) during November and February. The changes were *large*, however, on both types of mornings during December and January.

Passing from frost temperatures to milder ones, a statement of monthly mean minimum temperatures was prepared (Table 2) which shows a general agreement as to signs. Escondido after the change being uniformly higher then El Cajon. Considering the total number of minimum temperatures recorded the net effect of the change in the position of the thermometer shelter at Escondido appears to be an increase in the minimum temperature at that station of 2.5° F. on the average.

Summarizing results we found that the principal effect of changing the position of the Escondido shelter has been to raise the minimum temperatures, on mild mornings, 3.6° in November, 3.7° in December, 4.2° in January, 4.1° in February; on cold mornings, 0.7° in November, 4.5° in December, 3.8° in January, 0.3° in February.

TABLE 1.—*Apparent net changes in minimum temperatures at Escondido due to moving the instrument shelter to higher ground.*

Month.	Temperature limits.	Net changes.
	°F.	°F.
November	38-33	+3.6
	32-30	+0.7
February	38-33	+4.1
	32-28	+0.3
December	38-33	+3.7
	32-28	+4.5
January	38-33	+4.2
	32-26	+3.8

TABLE 2.—*Comparative monthly mean minimum temperature, El Cajon and Escondido, Calif.*

Before.				After.			
Year.	Month.	El Cajon.	Escondido.	Year.	Month.	El Cajon.	Escondido.
		°F.	°F.			°F.	°F.
1916	November	37	38	1919	November	41	42
1917	do	42	43	1920	do	40	42
1918	do	43	42				
1916	December	35	34	1919	December	38	40
1917	do	36	36	1920	do	36	38
1918	do	37	36				
1916	January	42	40	1919	January	40	42
1917	do	38	35	1920	do	37	39
1918	do	36	36				
1916	February	44	42	1919	February	44	43
1917	do	39	37	1920	do	37	39
1918	do	41	40				
Mean		39.2	38.2			39.1	40.6
Difference			−1.0				+1.5

CONVECTION-DOME HYPOTHESIS OF ORIGIN OF CYCLONES.

By GRIFFITH TAYLOR.

[Excerpts reprinted from "Australian Meteorology, a textbook including sections on aviation and climatology" (Clarendon Press, Oxford, England, 1920), chapter 18, "The origin of the tropical lows in Australia," pp. 172-188, figs. 133-152.]

"The 'convection dome' hypothesis, as I may term it, assumes that a fluid flowing around an obstacle (the convection dome) is built up in our troposphere, and that most of the tropical eddies in Australia originate there. The clear skies often associated with the dome show that it is not constituted quite like temperate lows. The isobars and isohyets strongly support this hypothesis.

[This hypothesis of the origin of cyclones might be called convecto-dynamic since it is intermediate between the convectional and dynamic theories. The old convectional theory is that cyclones originate because of the low-pressure area caused by warmer air in it than that in an anticyclone. Hann definitely overthrew this convectional theory so far as European conditions are concerned by proving that above 1 or 2 kilometers the air in cyclones is colder than in anticyclones.[1] While this proved that European cyclones were not *maintained* by the low pressure owing to the lighter air, it did not prove that cyclones did not *originate* from low pressure produced by convection over a warm area. Once an eddy is established there is no reason why it should maintain all of its original characteristics. Its temperature at any part of its course would be determined by that of the air entering the whirl (and modified by changes of pressure or the physical condition of the water content); and so long as the eddy is driven or maintained, say, by differences in temperature at the same level, its degree of internal temperature is prescribed by the cooling due to the forced ascent of the air, and thus its temperatures in intermediate and upper levels are lower than those at corresponding levels in anticyclones.

Dr. Taylor shows that 80 per cent of the summer tropical lows of Australia are formed by budding off from the two semipermanent areas of heat low pressure.—*C. F. B.*]

"*Mechanism of the lows.*—In figure 152, I show in a generalized fashion what I believe to be the mechanism of many of our tropical LOWS in summer. The sun is heating northern Australia and a convection dome is built up, reaching into the westerly and northwesterly drift as shown. This causes the formation of eddies from time to time in the upper air which sail away to the southeast. They do not always extend down to the surface, possibly being at times obstructed by the trade-wind belt.

If the conditions are favorable they may supply rain with loop isobars at the surface (see fig. 150). They may increase in intensity and form a definite cyclonic low as in figure 151.

"*Summary.*—The distribution of permanent winds, of cyclones, anticyclones, and calms is always in a state of flux. Nature makes a compromise from day to day between the various dynamic and thermal controls. The writer believes that the regions of greatest convection (the convection domes) are logically more likely to control the supply of LOWS and of rainfall and storms than the so-called "centers of action" (permanent HIGHS). The latter are the stagnant portions of the atmosphere—the Sargasso Seas of the ocean of air. Here are those regions where convection is least operative and which nature accordingly uses as her "sinks." They, too, may, however, act as more or less stable obstacles in the belts of high pressure.

"It is easy to trace the "budding off" of HIGHS from the center of action in the north Atlantic. Every few days an independent anticyclone appears to split away and travel across to France or Spain. It can apparently be traced around the world, merging in the other centers of action as it arrives in their domain, and then traveling on again.

"To sum up, I feel sure than until the semipermanent HIGHS and LOWS are explored at least as fully as has been the case with the traveling eddies of temperate climes, it will be unwise to neglect convection as a very vital factor in our world circulation."

[1] See pp. 103-128 in vol. 2, of "*Les bases de la Météorologie historique—état de nos connaissances*," by H. H. Hildebrandsson and L. Teisserenc de Bort, Paris, 1900.