MOTHER-OF-PEARL OR IRIDESCENT CLOUDS.

In speaking of mother-of-pearl clouds, we have not in mind noctiluscent clouds, which are cirrus-like silvery clouds seen only at night and at a very great height, say about 80 km., and which may possibly consist of ice-crystals. (Cf. Humphreys, Physics of The Air, 3rd Ed., p. 307). Nor do we speak of nacreous clouds, thin, iridescent clouds resembling cirrostratus, seen only in rather high latitudes, and at a height of about 25 km. However, since ~~it is~~ supposed to consist of minute water droplets formed in the ascending branch of the general circulation of the stratosphere, ~~its~~ their nature seems quite close to if not identical to that which theory give to the ordinary mother-of-pearl or iridescent clouds. As to the latter, about which we ourselves treat, we give the following extract from Humphreys:

> "Thin, and perhaps slowly evaporating cirrostratus, cirrocumulus, and other high clouds, occasionally develop numerous iridescent borders and patches of irregular shape, especially of red and green, at various distances from the sun up to 30 degrees or more. A brilliantly colored iridescent cloud of considerable area is justly regarded as one of the most beautiful of cloud phenomena, but one for which, until recently, there was no satisfactory explanation. Simpson, however, has shown that the colored patches in question, presumably, are only fragments of coronas formed by exceedingly small droplets of approximately uniform size."

During his "Cloud Year" from March 15th, 1946 to March 15th, 1947, the author has been carefully looking for such iridescent clouds, and has collected data on about a dozen occasions, which will be discussed in the present paper.

In every instance these clouds were observed near the eastern or western horizon near sunrise or sunset respectively. This is but natural. In the first place, the diffuse light of the sky is so great that the delicate coloring of these iridescent clouds is apt to be lost except near sunrise and sunset. In the second place, the clouds have always been found ~~xx~~ associated with cumulonimbus, and since cumulonimbus are only some ten or more kilometers in height, and the clouds are somewhat near the sun, the best way of seeing them is when there are cumulonimbus near the horizon and the sun is low in the eastern or western sky.

An analysis of the air masses present at the time of the mother-of-pearl clouds reveals the interesting fact that in every case Manila was in deep seated trade wind air, rawins showing that the trade wind was at least 10 km. and often over 15 km. deep. Furthermore, in the lower levels the trade was convergent, with the equatorial front or polar front not very distant; hence enough instability was present to give rise to cumulonimbus, at least near the mountains on the eastern and westerns coasts of Luzon near Manila. Cumulonimbus are not found in pure SW monsoon air at Manila, hence it is not surprising that these iridescent clouds are not seen therein. Above the surface trade, which is unstable, there is generally superior air, so-called, a continuation of the trade, which is subsiding and very dry. In other words, the conditions under which these clouds were actually found favor the theory that they consist of undercooled water droplets. The strong updraft in the center of a cumulonimbus is very likely to throw fine water droplets