

Saskatchewan, the eclipse of the sun, saw a meteor flash in the northern sky, the trail of which remained visible near the horizon for about three-quarters of an hour, taking on a form somewhat resembling the later ones depicted by Captain Belknap, and in that time changing its position considerably, both relative and absolute.]

THE TYPHOON AT MANILA, PHILIPPINE ISLANDS, OCT. 20, 1882.

THE accompanying diagram gives an abstract of the curves traced by the meteorological instruments at the observatory in Manila, Philippine Islands, during the typhoon which swept over the central provinces of Luzon, Oct. 20, 1882, from the time when the first indications were noticed at the south-east of Manila, at noon of the 19th. The observers were the Jesuit Fathers under Padre Faura, and the instruments those once used by Father Secchi at Rome. Observations made at the marine and telegraph offices in the city, and on the national war vessels on the coast, are incorporated in the diagram.

Barometer.—The mercury descended at noon of the 19th to 756 mm. (about 29½); varying little till near midnight (19–20th), when it began to go down more rapidly. It has been noticed, that, when it descends to this point in the Philippine Archipelago, it always indicates a storm at a considerable distance. Up to dark there had not been observed the cirrostratus clouds, nor the solar halos, nor the characteristic sunset colors, which usually indicate the proximity and direction of approach of a typhoon. There remained only the direction of the superficial winds oscillating from north-east to north-west (of little value), and the course of the clouds, which, till 1 A.M. of the 20th, came from the north-east. At 3 P.M. of the 19th, warning was given from the observatory, 'Signs of a cyclone at the south-east;' but there were no unusual barometric changes. It was at this time more than 370 miles away, with a destructive diameter of about 80 or 90 miles.

From 10 P.M. of the 19th to 4 A.M. of the 20th, the barometer went down more than .15 of an inch: at this time warnings were sent to all the public offices that danger was imminent, and word was telegraphed to Hong Kong that a typhoon was beginning at the east of Manila, and was proceeding west-north-west. At midnight it began to fall more rapidly till 8 A.M. of the 20th; and then, in two hours, fell from 746 mm. (29) to 728 mm. (28.4). About noon

it began to rise as rapidly till 2 P.M., and then gradually to 756 mm. (29½) at 10 P.M.

Thermometer.—At noon of the 19th it stood at 32° C. (89½° F.); it gradually went down to 24° C. (75° F.) at 7 P.M.; it remained at this point till about 11 A.M. of the 20th, and then in less than an hour went up to 31° C. (88° F.), and descended again to 24° C. (75° F.), at 10 P.M. standing at 26° C. (79° F.).

Moisture of Air.—It occurred toward the end of the rainy season, and during the south-west monsoon. At noon of the 19th it was 65, rapidly rising between 2 and 6 P.M. to 90, and varying from that to 95 till 10 A.M. of the 20th; at 10.30 it was 100; then in half an hour it went down to 55, and back again to 100, thence gradually declining to 90–95 at 10 P.M.

Velocity of Wind.—There was comparative stillness till 6.30 P.M. of the 19th; from then to 4 A.M. of the 20th it rarely exceeded 20 feet per second; then in three hours it rose to 63 feet, and, after a half-hour's descent to 40, in 1½ hours, or at 11 A.M., reached at least 180, and probably more, as at the height of the gale the registering instrument was carried away: this is equivalent to about 125 miles an hour, and the velocity may have attained 140 miles. In an hour it began to diminish rapidly, and at 1.30 P.M. had gone down to 33 feet, and to 13 at 10 P.M. After several sudden changes, at 2 A.M. it began to blow from the north-west, and so continued till about noon, when it shifted suddenly to the south-west for half an hour, and then blew from south-south-east and east-south-east up to 10 P.M.

Rain.—Rain began to fall just before midnight, 19–20th, and increased, with occasional lulls, to about 11 A.M., when it fell in torrents; after that it gradually decreased, and ceased about 8 P.M. It was accompanied by some lightning.

Direction.—The storm entered the archipelago over the Catanduanes Islands, near Tabaco and Albay, and went across the east of the North Camarines, near Daet, judging from the successive positions of the vortex, then passing over Manila and to the China Sea, by Subig. The course was therefore from south-east to north-west, and its velocity 19 miles an hour, the greatest ever known here.

Form.—The barometer went down much more slowly than it ascended; whence it may be deduced that the curves of equal pressure were not circular, being wider at the anterior than at the posterior part of the typhoon, forming a kind of ellipse, in which one of the foci occupied the vortex. The tracing of the