

a mean of those observed during the four years. The diameter of the circle is 600 miles.

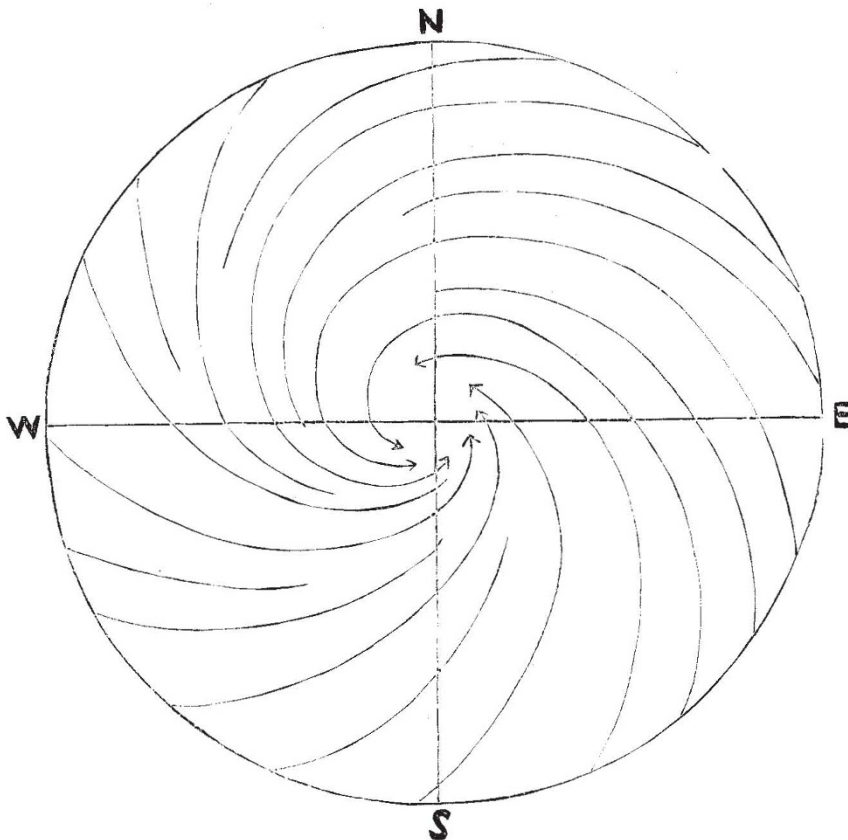
The average force of the wind according to Beaufort's scale (0-12), at various distances from the centre, expressed in nautical miles, is shown in the following table, but owing to the typhoons differing so much in size the figures representing the mean values are often widely different from the values obtained from observations made in a particular typhoon. That is not the case with the direction of the wind, which depends upon the bearing but not upon the distance from the centre or the size of a typhoon.

Distance.	Observatory.	Peak.	South Cape.	China Sea.
60	... 8 ...	9 ...	9 ...	11
160	... 5 ...	6 ...	6 ...	—
250	... 4 ...	5 ...	4 ...	6

This table proves the wind to be strongest over the open sea, and also, though to a less extent, at some height above

sea-level. The force of the wind increases at a greater rate on approaching the centre at sea, and that is to a certain extent likewise the case at South Cape, which is far from the mainland and soon reached by typhoons arriving fresh from the Pacific Ocean, where most typhoons originate; although some of them are formed to the westward of the Southern Philippines.

The force of the wind is much greater behind the centre than in the anterior semicircle both at sea and on shore, and the consequence is that the strongest blow is not experienced till the barometer begins to rise. For instance, at an average distance of about 160 miles, the mean force in Hong Kong is 7 to the north, 3 to the west, 6 to the south, and 5 to the east. At South Cape (Formosa) it is 6 to the north, 5 to the west, 7 to the south, and 6 to the east. To the north of a typhoon the wind is remarkably fresh along the southern coast of China, even when the centre is over 300 miles away. It makes an



A Typhoon in Hong Kong.

impression as if the trade-wind was blowing in the middle of summer, while a typhoon moves westward in the China Sea. In Southern Formosa, where typhoons moving north-westward predominate both in number and in intensity, the wind is strongest to the south or south-east of the centre.

At Victoria Peak the force of the wind does not depend upon the bearing of the centre, or at any rate only slightly so. It follows that the wind-force registered there just before the approach of a typhoon considerably exceeds that registered at the Observatory. The difference in force is only about one on Beaufort's scale, when the centre is north or west of the colony, and while the centre is situated to the southward it usually blows harder at sea-level than on top of the Peak.

W. DOBERCK.

THE STATE OF VESUVIUS.

THE "Note" in NATURE (p. 184) on the state of the Vesuvian volcano has been copied by many newspapers, and I have received a number of letters asking for further information. To satisfy this desire, I give the following particulars as to what occurred subsequent to December 15, 1888, and to the information above mentioned.

During the remainder of the month of December, the vent was extremely active, ranging from the second to the fourth degree of activity, so that the cone of eruption was often quite red, after a burst, from the large number of lava cakes falling on its sides. This constant ejection of fragments of red-hot pasty lava rapidly increased the

height and size of the eruptive cone, making its slope exceedingly steep. So rapid was its growth, that the most casual observers noticed it from Naples, and discussed it. In fact, from November 1 to January 6 at least 20 metres was added to the height of Vesuvius, whilst the size of the base of the cone of eruption was proportionally increased.

On January 1, 1889, the eruptive cone burst on the north side, allowing the lava to issue and flow down, turning east and west so as to fill up, in part, the crescentic depression between the annulus or crater ring of July and August 1886, and the cone of eruption which is situated eccentrically to the former. As I have shown elsewhere, outflows of lava from the cone of eruption are always very limited, the violence of the outburst being generally proportional to the distance of the lateral opening below the summit.

After this relief the activity fell to the first degree, but soon again rose to the third. On Sunday, the 6th, I was standing at the summit of the mountain on the 1872 crater plain, preparing my apparatus for a photograph of the cone of eruption, when suddenly (about 3 p.m.), at about half-way down the side of the eruptive cone, and facing me, a slight puff of dust occurred, followed by the oozing forth of some lava. This rapidly increased in quantity as it carried forward the fragments forming the sides of the aperture. I immediately changed my lens to an instantaneous one, and took two negatives. The explosive activity increased, so that I was standing in a constant hail of red-hot lava fragments. These it required constant vigilance to avoid, and my face and hands were scalded by the radiant heat from the rapidly advancing lava, and tormented by the whirlwinds that always occur under such conditions. My two porters abandoned me, so that I had just time to remove my apparatus two minutes before lava flowed over the spot where I stood. In consequence of these unfavourable conditions, I lost some of my coolness, and allowed my camera-cloth to partly hide the lens. I was therefore greatly disappointed to find only part of this splendid scene registered for the eyes of others who had not had the good fortune to see that interesting spectacle.

The point of rupture was a few degrees east of south, and nearly opposite the cleft of January 1. The opening at beginning could not have been more than 10 metres from the top of the vent, showing the great height of the lava in the volcanic chimney. The outflow was very rapid, for, half an hour after, the place where I took the photographs could not be approached by 40 or 50 metres, having been all inundated with lava. Part of the fluid rock rapidly reached the edge of the 1872 crater plain, and flowed some distance down the slope of the great cone in the direction of Torre Annunziata, and another portion flowed out by another gap a little farther east in the remaining edge of the 1872 crater ring. The supply, however, soon stopped, and late in the evening had already become consolidated. After this, the activity, as seen from Naples, slightly diminished, but the next evening it was again at the third degree. Cloud-cap somewhat interrupted the view up till last night (January 12), when it was again observed to be at the third degree, and the light emanating from the lava was very white, showing the high temperature.

So far, the great cone has resisted fracture, but the south-west fissure, to which I have already drawn attention, is more active, and from this side of the crater plain there is very great fumarolic activity. When, therefore, the hydrostatic pressure overcomes the resistance, it will probably be in this direction that a lateral outburst will take place.

H. J. JOHNSTON-LAVIS.

Naples, January 13.

VOLCANIC SEA WAVE.

THE following account from the Berlin *Annalen der Hydrographie*, 1888, p. 518, with reference to the wave observed in the regions about the north-east of New Guinea, already briefly noticed in NATURE (vol. xxxviii. p. 491), is of interest.

The data given are too vague to permit of definite conclusions as to the probabilities of the disturbances felt at Sydney and Arica having originated in a volcanic eruption in New Guinea, but it may be observed that, assuming that the volcanic centre was from 200 to 400 miles north of Hatzfeldt Harbour, in which direction sounds were heard at 6 a.m. on the 13th, followed in forty minutes by a wave, the disturbance recorded at Arica at 5 p.m. on the 14th would have travelled the intervening distance of 10,000 geographical miles at a speed of 416 miles an hour, a velocity which agrees very fairly with the probable mean depth of ocean traversed.

To Sydney, on the other hand, assuming the first disturbance to have occurred at 6 a.m. on the 15th, the speed would only have been about 60 miles an hour, which is much too low a velocity for the depth.

It will be observed that the waves both at New Guinea and Arica were of short period, and in this respect quite unlike the long-distance waves emanating from Krakatō in 1883.

W. J. L. WHARTON.

“With regard to the extraordinary tidal wave that was observed in the Bismarck Archipelago, and on the coast of New Guinea, on the 13th of March, Heft iii. of the ‘Notices of Kaiser Wilhelm’s Land and the Bismarck Archipelago’ relates as follows:—

“After the Expedition which had been undertaken for the discovery of Herren von Below and Hunstein, who had attempted an exploration to the west coast of New Pomerania (New Britain), had returned without finding any trace of them, a second Expedition, consisting of seven officers and fourteen Miocese, under command of the surveyor, V. Brixen, was despatched on the 17th of March from Finsch Hafen to the west coast of the above-mentioned island. This discovered, on the 18th of March, the spot where Below’s Expedition had landed, which was easily recognized by the objects lying there partly covered with sand—a tent, torn pieces of clothing, and bent bits of metal. A part of the Expedition then repaired to a ruined village near the place where the missing persons (according to the account of the two Miocese who had been saved) had encamped during the night of the 12th-13th of March on the shore. At this place the land falls very steeply, about 25 metres, to the sea, and there is only a narrow strip of flat coast between the declivity and the sea. The tidal wave had even occasioned a landslip, large stones and trees being torn away from the slope, so that here escape could have been scarcely possible, and, according to the two Miocese, the catastrophe happened before daybreak. With the exception of a few bamboos cut by a knife, no trace of an encampment was perceptible. An excavation, attempted on the 19th of March, led to no result. Sea-sand, stones, and things washed up by the sea, covered the former level of the shore for more than 4 feet. On the 20th of March parties were despatched into the interior in a north-easterly and southerly direction, who came upon the encampment of the natives who had escaped from the above-named village. As these confirmed, by gestures and signs, the accounts of the Miocese, hardly any doubt can remain that Below and Hunstein had fallen victims to the tidal wave. On the 21st of March a large cross, therefore, was erected at the place of the misfortune, and, to provide for necessity, two boxes with provisions and drink were buried under a