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On Certain Recent Changes in the Crater of Stromboli

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cells increasing in size markedly and (presumably) subdividing into colonies like the parent colony; in nearly every stage characterized by the thick and many times stratified walls of the integument, and especially also by the abundant oily and chlorophyllaceous contents of the cells.

Lat. 7° S. to 12° S. ; long. 30° W. to 33° W.

ON CERTAIN RECENT CHANGES IN THE CRATER OF STROMBOLI.

By TEMPEST ANDERSON, M.D., D.Sc.

IN 1875, Prof. Judd, F.R.S., published in the *Geological Magazine* an admirable series of articles entitled "Contributions to the Study of Volcanoes."

The part dealing with the Lipari islands has been my constant companion and guide during two visits to those islands in 1888 and 1904, and it deals so fully with the subject, both from a historical and scientific point of view, that I feel it would be presumptuous to attempt to paraphrase the excellent description which he has so well written. Since his visit, however, Stromboli has continued in its wonted activity, generally of a moderate character, and so regular that it might almost be called rhythmical, though occasionally varied with periods of violence, and sometimes of almost total quiescence. As a result, certain changes have occurred in and about its crater; not on any very large scale, it is true, but sufficient to be of interest. When I visited the islands in 1888, I carried with me a camera, with which I took photographs* from selected points of view, believing that I was thus securing records more accurate and unbiassed than any mere verbal description; and in 1904 I revisited the islands, carrying the same camera and lenses, and took comparison photographs from as nearly as possible the same positions. These photographs form the basis of this paper, and have been supplemented by several other photographs and diagrams placed at my disposal by Prof. Riccò, of the Reale Osservatorio, Catania, and Mr. Geo. S. Eunson, of Northampton, who visited the volcano with the Geologists' Association in 1889. These fill up the gaps and show the changes during the intervening years.

Believing as I do that photographs should themselves form the record, and that the letterpress should be mainly explanatory of them, I have placed opposite each plate a note calling attention to the main points shown, and prefaced the whole by such a description of the island as may serve to make my story intelligible. To this I have added a summary of the main changes noticed.

Stromboli is the most easterly and northerly of the Lipari islands. It is situated north of Sicily, close to the track of steamers plying

* See 'Volcanic Studies by Tempest Anderson.' Plates xx. to xxvii. Murray: 1903.

between Naples and the Straits of Messina, and is thus an object familiar to passengers to or from Egypt or the East, though comparatively few have landed on its shores. Its almost constant eruptions have gained it the name of the lighthouse of the Mediterranean. It is almost circular, as its old name Strongyle indicates, and rises as an irregular cone out of deep water. On the north-west side is the crater, "Apparato Eruttivo," of the Italian observers, and the Sciara or steep slope down which the ejecta roll into the sea. The Sciara is bounded on each side by two steep cliffs, Filo di Sciara and Filo di Baraona, which are formed, like the Sciara itself, of lava-streams, agglomerates, and dykes; in fact, of almost every kind of compact volcanic material, chiefly of basic composition.

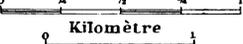
The summit of the mountain consists of a crescentic ridge, the Serra di Vancori, open towards the north. It forms part of an old crater ring, and thus presents points of similarity to Somma. Inside the crescent ridge, and in places joined to it by irregular crests of rock, but mainly separated from it by a valley, "A Fossieidda," similar to the Atrio del Cavallo of Vesuvius, is another crescentic ridge, which, on my first visit in 1888, in many places immediately surrounded the active crater, the bottom of which was visible therefrom. In 1904, owing to changes presently to be described, this view was not obtainable.

Connected with its two extremities, and immediately overlooking the sides of the crater, are two conspicuous pointed rocks, the Torrelle,* which partly obstruct the view of the crater when viewed from the cliffs overlooking the Sciara on its north-east and south-west respectively. These Torrelle, being practically unaltered by ordinary eruptions, present good points of comparison for estimating the changes that take place, and one or other of them is included in most of the photographs. Between the two Torrelle, in the midst of a sort of amphitheatre formed by them and the crescentic ridge last mentioned, is the crater and its appurtenances, "The Apparato Eruttivo" of Italian observers. This amphitheatre is open to the north-west, and from its open side beyond the craters the steep slope of the Sciara extends down into the sea. This Sciara, as is well known, is one of the most peculiar features of this volcano. It extends at an angle of about 35° , which is the "angle of repose" for the kind of material of which it is composed, down into the deep water of the Mediterranean; and though the volcano has certainly been in almost constant eruption during the whole of the historic period and probably much longer, it has never been able to build up a talus sufficient to rise to the level of the sea, much less to that of the lip of the crater, about which, according to the analogy of other volcanoes, it might have been expected to have built up a cone on this side comparable to the portion on the south described above,

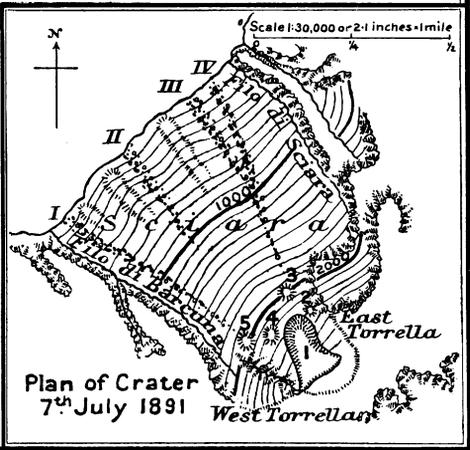
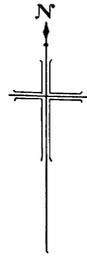
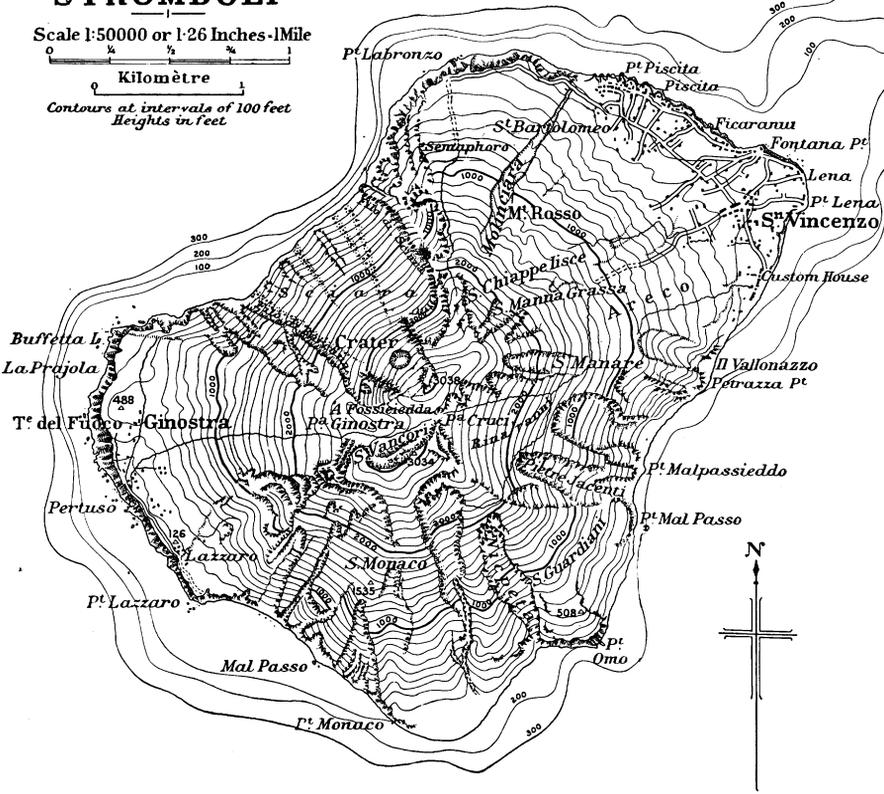
* We heard these rocks called by the natives Torrelle ["little towers"] and Torrione ["big towers"]. They are spoken of by Profs. Riccò and Mercali as Faraglioni.

STROMBOLI

Scale 1:50000 or 1:26 Inches-1 Mile



Contours at intervals of 100 feet
Heights in feet



which cone in that case it would have completed. As it is, the summit of the mountain is about 3000 feet above the sea-level, while the eruptions take place about 600 feet lower, *i.e.* at a height of about 2400 feet.

When I first visited the mountain in 1888 (see Plate II., which is from a photograph taken by me at the time), the crater was an oval hollow, which I afterwards roughly estimated at 60 or 70 yards in diameter, but which, on examining the place again in 1904, I believe to have been much larger. I made a second ascent to check this, but was prevented by bad weather from completing the observation. Prof. Judd's estimate of 400 feet was probably nearer the mark. In 1888 there were two small cones, one on the edge of the Sciara near its western end, from which the explosions took place, another in the hollow of the crater near its eastern end, which only gave out vapour. In 1904 the accumulation of materials thrown out by the volcano had filled this crater and continued the slope of the Sciara upwards, so that the explosions no longer took place from the hollow of the crater or even from its lip, but from mouths on the slope of the Sciara. I have no reason to think that the main axis of eruption has shifted materially down the Sciara towards the sea, notwithstanding the appearance to the contrary, which is, I believe, due to the piling up of fragments to the south-east of the vents on the site of the crater seen in 1888. It is interesting to note that in 1888 the fumarolic activity was chiefly at the north-east of the crater, then a hollow, and the explosions took place from the western portion. In 1904 the relation still continues; the fumarolic area, now much raised into a mound, as shown in Plate IV., is still at the north-eastern portion of the eruptive area, while the main explosions take place from the western parts. It is, however, noteworthy that the flow of lava in 1891 appears to have proceeded from the eastern part of the crater. These facts will have to be taken into account by any one who frames a new theory of the mechanism of Stromboli.

Since my return home, I have endeavoured to collect photographic and other information so as to fill in the changes which have occurred in the interval, and present them in a connected form.

Prof. Judd, F.R.S., has kindly placed at my disposal several papers from the *Atti della Società Italiana di Scienze Naturali*, by Prof. Mercali, of Naples, from which the following information is condensed.

On February 4-5, 1879, a severe eruption of Stromboli took place, and such a quantity of pumice was thrown out that the sea in the neighbourhood is stated to have looked like dry land. There is no mention of any lava being discharged.*

* Mercali, *Atti della Soc. Ital. di Sci. Nat.*, vol. 24. Milano, 1881. This number contains a good list of the ancient eruptions of Stromboli and a discussion of Mallet's theory.

On November 17, 1882, and following days, a severe eruption took place. Towards the commencement there was an explosion more severe than any remembered by the inhabitants, and five new bocche opened on the north-west slope of the Sciara, about 100 metres below the usually active crater. Red-hot stones were thrown on to the southern slopes of the mountain, and one weighing several tons as far as Ginostra. On November 27 the eruption was so severe that the inhabitants thought of emigrating. No lava-flow took place. Mercali contrasts this fact with the usual sequence of events on Etna and Vesuvius.*

On February 25, 1888, there was a severe earthquake on Stromboli, and others on March 21 and May 22. They were local, and not felt on the other islands. Mercali concludes that they were connected with the local volcanic activity, although the eruptions continued with their usual degree of intensity, and that they were different from the Calabrian earthquakes. Such local earthquakes are common in the Lipari islands.

Mercali visited Stromboli in September, 1888, and found a single active crater. In February, 1889, he found the crater more active and notably changed. The bocca active in September, 1888, was now quiet and in a fumarolic condition, and three new bocche had opened on the edge of the Sciara, one of which gave eruptions with a rhythm independent of the others.

In June, 1891, Profs. A. Riccò, of Catania, and G. Mercali, of Naples, visited the island and embodied their observations in a valuable memoir† from which the plan is copied by permission, and the nomenclature and numbering of the bocche adopted by them has also been followed throughout this paper.

They found a large crater, No. 1, corresponding to that described above by myself in 1888, and figured in Plate II., and four smaller bocche on or about its northern edge at the lip of the Sciara. Bocche Nos. 2 and 3, towards the eastern side of the crater, were considered to be situated on one radial fissure, and they appear to correspond in position to the smoking cone of 1888, and to the fumarolic area observed in the same region in 1904. Bocche Nos. 4 and 5, towards the western portion of the crater, are described as situated on another radial fissure. They correspond in position to the cone from which the explosive eruptions took place in 1888, and to the bocche from which similar explosions still took place in 1904.

The writers also describe and mark three streams of lava, ii., iii., iv.,

* Mercali, *op. cit.*, vol. 27, 1884.

† 'Sopra il Periodo Eruttivo dello Stromboli, Relazione dei Professori A. Riccò e G. Mercali con appendice del Ingegnere S. Arcidiacono estratto dagli Annali dell' Ufficio centrale Meteorologico e Geodinamico,' Serie 2, Parte iii. vol. 11, 1889. Roma: 'Tip. dell' unione Coop., edit. 1892.

as having run down the Sciara in June, 1891, from bocca 3. It is noticeable that this discharge of lava took place from a bocca which usually is quiet and fumarolic in its action, and not from the usually explosive area 4 and 5.

In 1889 the English Geologists' Association visited Stromboli, and Plate V., from a photograph by Mr. G. S. Eunson, who was one of the party, shows that changes were already commencing.

Signor Guisepe Renda, postmaster of Stromboli, informed me that about 1890 a stream of lava with three tongues issued from the crater and ran down the Sciara. He fixed the date as having been two years after the great eruption of Vulcano in 1898. This corresponds probably with the eruption described by Profs. Riccò and Mercali as above.

Scattered through the volumes of the *Bolletino della Societa Sismologica Italiana* since their commencement in 1895, are numerous notices by Prof. Riccò and Signor Arcidiacono, both of the Reale Osservatorio of Catania, on the state of the activity of the volcanoes of Sicily and the adjacent islands. These are virtually inaccessible to English readers, as only about two copies appear to find their way into this country, but, thanks to the courtesy of Prof. Milne, F.R.S., I have been able to abstract the following information.

1895. Stromboli was in its usual characteristic state of eruption, except that on March 29 a very violent explosion occurred in correspondence with a slight shock of earthquake felt in several places in Calabria. There followed towards the end of the year several violent explosions sufficiently severe to shake the island. A small stream of lava issued from the Sciara below the bocca 4 this year or in 1894.

1896. Stromboli was in its usual condition during the whole year, except that on July 13 there was a severe explosion, by which masses of incandescent lava and scoria were thrown to a great distance, and some damage was done to the vineyards by fires in consequence. The whole island was enveloped in a cloud of ash, and the noise was heard very plainly at Lipari. A slight shock of earthquake was felt at Palini, in Calabria.

1897. Nothing special was recorded.

1898. Stromboli was chiefly in its usual state. It was more active than usual in October, and unusually quiet in November. On September 14, 1898, Signor A. Semprivi Capo Posto Semaphoro di Stromboli ascended the mountain, and, all being quiet, was able to ascend the western Faraglioni (Torrella), commanding a good view of the craters from above, and found the relative positions of the bocche had not materially varied since the original report by Prof. Riccò, Mercali, and Archidiacono in 1891. No. 5 was still in action, but its direction somewhat changed, so that it could scarcely be seen from the semaphore. It appeared to be the point from which most of the larger explosions took place. On October 28, 1898, Prof.

Riccò ascended the mountain and observed a succession of eruptions. Four considerable ones, besides smaller ones, took place from bocca No. 5, some moderate ones from No. 4, while Nos. 2 and 3 discharged masses of smoke.

1899. Stromboli was mostly in its usual condition, with occasional increases of activity. There was a slight increase of activity at the beginning of February. On March 6 a very violent explosion occurred in one of the side craters, followed by the formation of two small cones in its floor, and on the following days increased activity continued. During this year Prof. Matteucci stayed nine days on Stromboli, and made six ascents. The eruptions all took place from a little eccentric cone on the southern slope of a large crater of explosion, probably 4, 4 bis, or 5, and there were six other bocche, but they only emitted smoke. The mountain was again active in November, and about the 10th of that month a new bocca, No. 6, opened on the Sciara below and to the north-east of No. 5.

1900. Stromboli was unusually active from March to November, especially in October. Many of the explosions were sufficiently powerful to shake the whole island and cover it with dust. The chief explosions were from bocche 4, 4 bis, and 5, all situated towards the western part of the Sciara. The later observations are not yet published, but Signor Liberator Castalan, syndic of Filicudi, whose house commands a full view of Stromboli, informed me that there was a severe eruption of Stromboli in December, 1903, and January, 1904, also others five and ten years previously. Between those times nothing special occurred, but the mountain was never absolutely quiet.

Signor Guiseppa Renda, Postmaster of Stromboli, also spoke of an eruption in November and December, 1903, during which a stream of lava ran down the Sciara from about December 10 to 20, and a new bocca formed on the north-eastern part of the eruptive area near the Torrione (Torrella?).

There was an earthquake in February, 1904.

1904. I stayed four days on the island, and ascended the cone on April 20 and 22. The photographs were taken April 20.

On May 30, 1904, Signor D. Vasalo, Capo Posto del Semaphoro di Stromboli,* made an ascent of the mountain, and, the craters being quiet, was able to ascend the eastern Faraglioni (Torrella), from whence he had a near view of the "Apparato Eruttivo." He found in the part which I have called the fumarolic area a new bocca, which he calls No. 7. It is about 20 metres east-south-east from bocca 2, and about 6 metres by 4 metres in extent. It was in a state of the weakest activity, and emitted whitish smoke, apparently being in a similar condition to that on April 20, when I photographed the locality, as shown in Plate IV.

* See *Boll. della Soc. Sism. Ital.*, vol. 10.

He also found the large crater No. 1 filled up as described above, probably during the eruption of November, 1903. It is very satisfactory to find my observations in this respect independently confirmed.

He also climbed the western Faraglioni (Torrella) and noted the condition of the western bocche, which were still the most active.

The following information, though not strictly scientific, may be of interest or use to intending visitors.

The southern part of the island is precipitous, and for the most part uncultivated. The north-eastern part is gently sloping, and presents a large village (St. Vincenzo), or perhaps rather a large straggling group of houses, with two churches, situated among vineyards. From the cultivation of these and from fishing, the inhabitants, who number perhaps 4000, derive a precarious livelihood. To the west of the village, and on a promontory near the eastern side of the Sciara, is a signal station maintained by the Italian Government, where the passage of vessels is recorded and reported. One of the officials here is charged with keeping a diary of the state of activity of the volcano, and he reports to Prof. Riccò, of the observatory of Catania.

The only other person who seemed to know anything about or take any interest in the doings of the volcano was the postmaster, Signor Guiseppe Renda.

There is another small village, Ginostra, to the west of the island. There is no inn on the island, but tolerable lodgings are obtainable at the house of Don Antonio Renda, who did his best to make us comfortable. A small steamer calls twice a week. It goes daily from Milazzo to Lipari, and some one or other of the islands, and there is a steamer once a week to Messina. There is no harbour, but passengers are landed in small boats. If the wind is unfavourable, landing is sometimes impossible.

We took as guide Francesco Conti from Lipari, who has been in America and speaks some English.

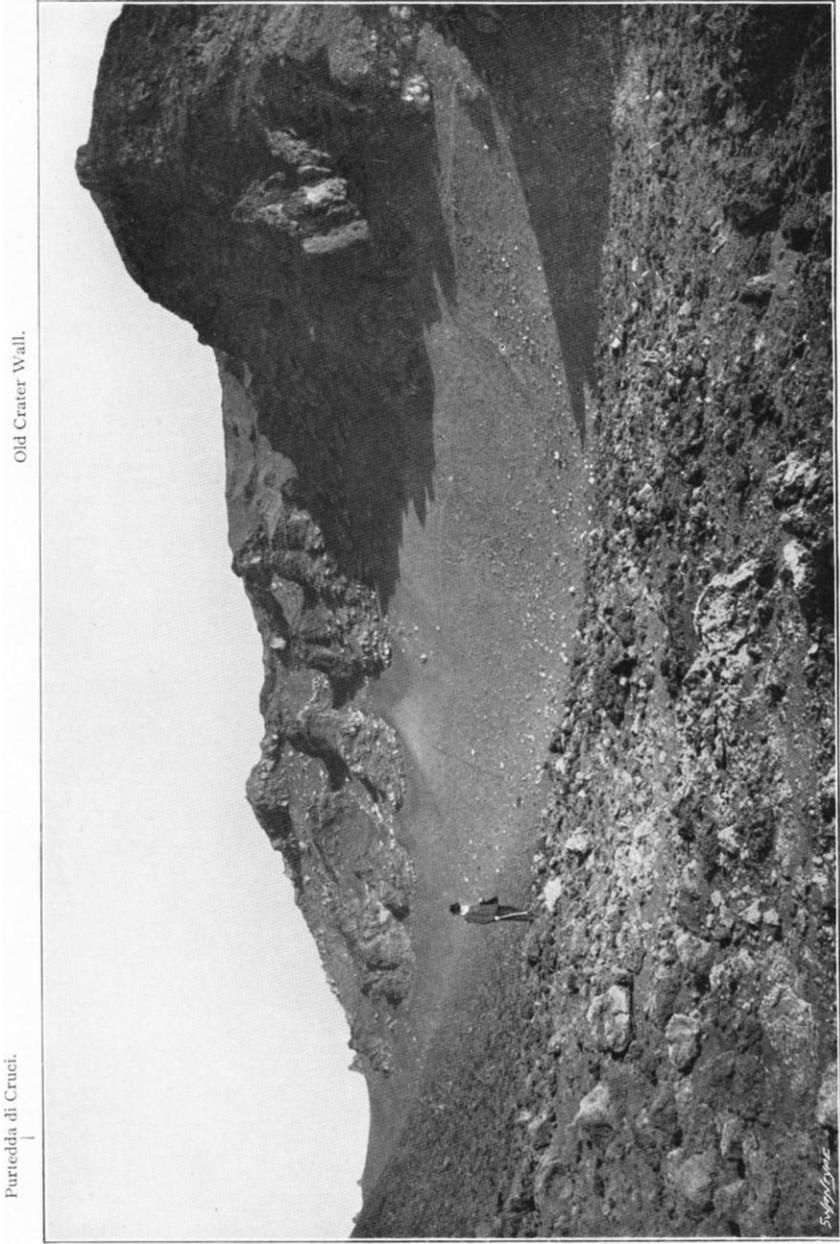
In conclusion, I wish to express my grateful thanks to H.I.H. the Archduke Ludwig Salvator of Tuscany, for allowing the reproduction of the map from his monumental work, 'Die Liparischen Inseln,' Siebendes Heft (Stromboli, 1896); to Prof. Riccò, of Catania, for much valuable assistance, and for permitting the reproduction of the inset plan of the crater and Sciara; to my valued friends Prof. Bonney, F.R.S., Prof. Judd, F.R.S., Prof. Milne, F.R.S., and George Yeld, my companion during the voyage, for much kind assistance and counsel; and to Mr. Geo. S. Eunson, of Northampton, for the use of the negative of Plate V.

PLATE I.

THE SERRA DI VANCORI, STROMBOLI.

(From a Photograph by the Author, 1904.)

In the distance to the right and in the centre is the crescentic range of cliffs forming the southern part of the old wall of the crater. It is composed chiefly of tuffs and agglomerates, with, I believe, a few small flows of compact lava. The slope in the foreground and to the left is part of the ridge overlooking the site of the crater existing in 1888, but now much filled up. It is composed of fragmentary ejecta, including many large masses of scoria and a few very perfect volcanic bombs. The depression in the distance to the left is the Purtedda di Cruci, over which the track from Ginostra leads down to San Vincenzo, the chief village of the island.



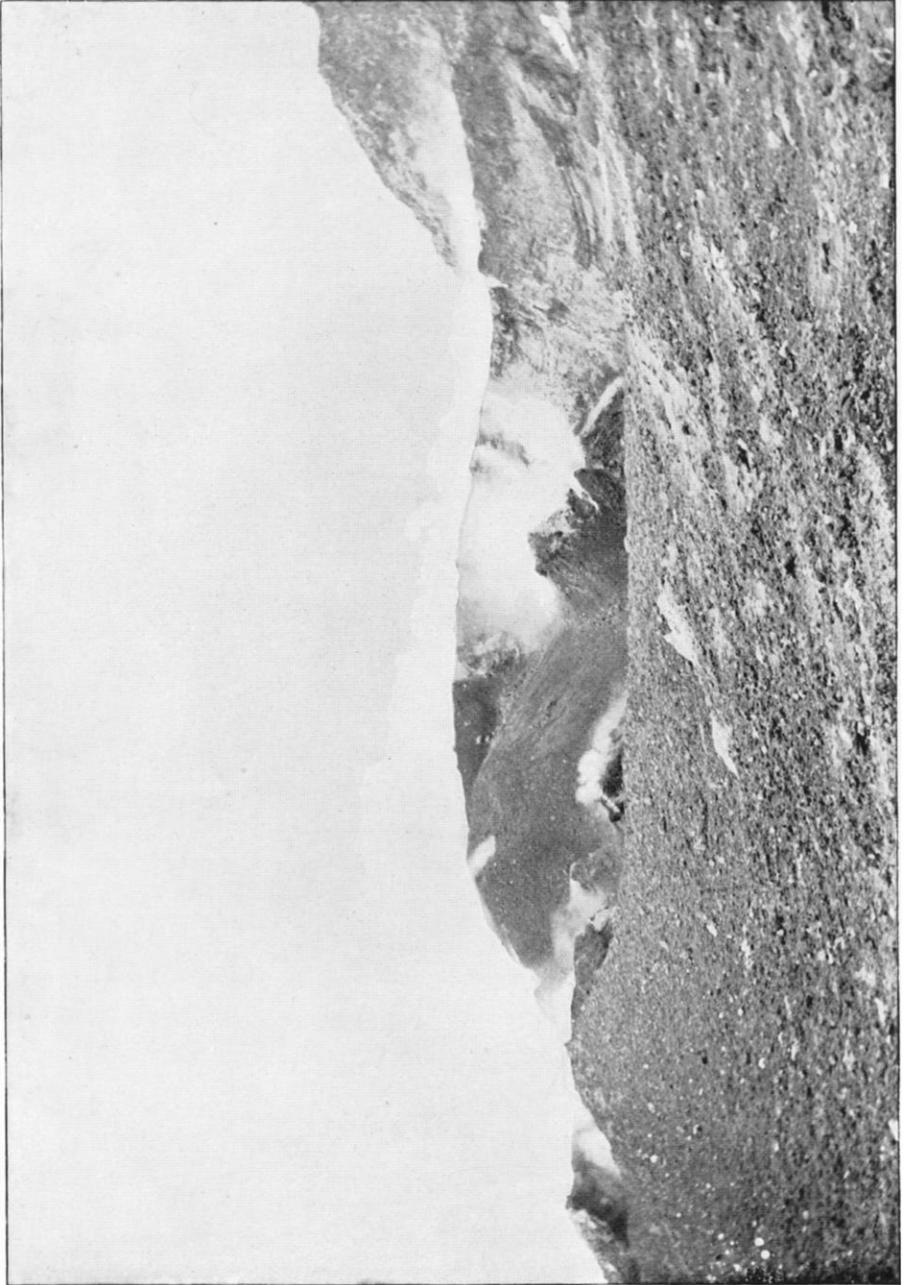
Partecchia di Cruci.

Old Crater Wall.

STROMBOLI. THE SERRA DI VANCORI

Bocche 2 and 3.

Bocca 4.



STROMBOLI : THE CRATER FROM ABOVE. 1888.

PLATE II.

STROMBOLI—THE CRATER FROM ABOVE.

(From 'Volcanic Studies,' Plate XXII., by Tempest Anderson.)

This photograph shows the condition of the crater in 1888. It was taken from the slope extending down from the north side of the ridge shown to the left of the last plate, towards the crater, and with the camera pointed in a northerly direction. Owing to the necessity of tilting the camera forward in order to obtain this view, the slope in the foreground is much foreshortened. It is in reality very steep—in fact, “at the angle of repose.” The crater was an elliptical hollow, probably at least 60 or 70 yards in its longer diameter, and contained two small secondary cones. A considerable amount of vapour escaped steadily from the cone to the right, which appears to be on the site of *bocche 2* and *3* (*Riccò* and *Mercali*), and also from several fumaroles. Explosions took place from the cone to the left, *bocca No. 4*, every few minutes. The further or north-west side of the crater was the upper edge of the *Sciara*, down which such of the ejecta as fell in that direction rolled into the sea.

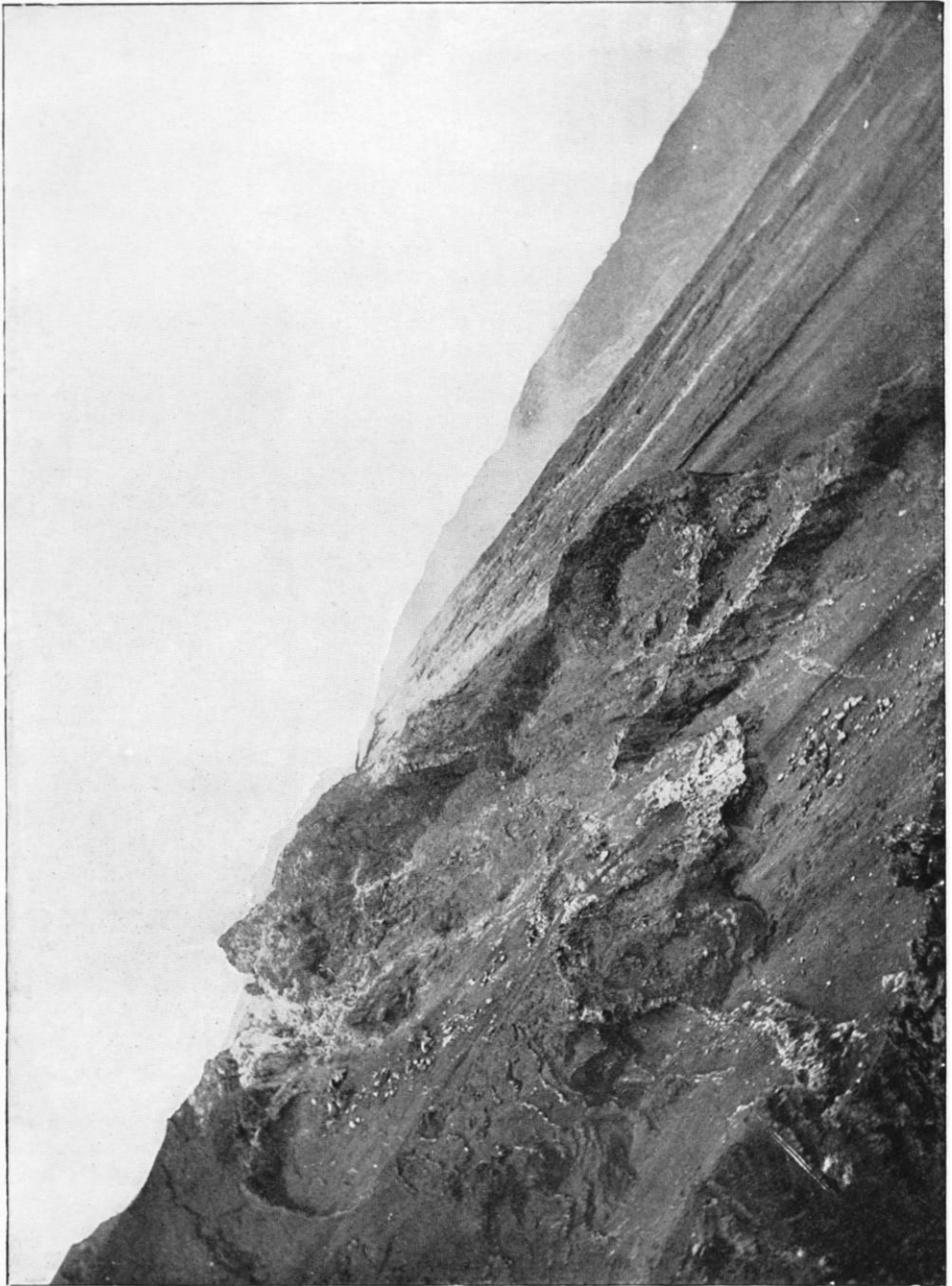
When I visited the same spot in 1904, intending to take a comparison photograph, I found the crater quite filled up, and the slope of the *Sciara* continued upwards over its site, so as to form a great ridge right across the foreground of this picture, which concealed the *bocca* from view. There was a hollow in front of the ridge, but further up the slope than the old crater, and it contained no fumaroles.

PLATE III.

STROMBOLI—THE SCIARA FROM THE NORTH-EAST.

(From ' Volcanic Studies,' Plate XXI., by Tempest Anderson.)

This photograph, taken by the author in 1888 from the ridge overlooking the north-east side of the Sciara, and consequently looking south-west, shows the crater partly concealed from view behind the eastern Torrella, the conspicuous pointed rock to the left, in the distance behind which the western Torrella is just visible. The lip of the crater is just above a large wedge-shaped dyke, which also appears in the next plate. The slope extending down to the right is the Sciara. It reaches from the edge of the crater down to the sea at a slope of about 30° , and its width at the water's edge is about 3000 feet. The edge of the crater has an elevation of about 2400 feet. To the left is a rugged slope, which leads from the left of the Torrella down to the Sciara and the sea, and down which ejecta are thrown during the larger eruptions.

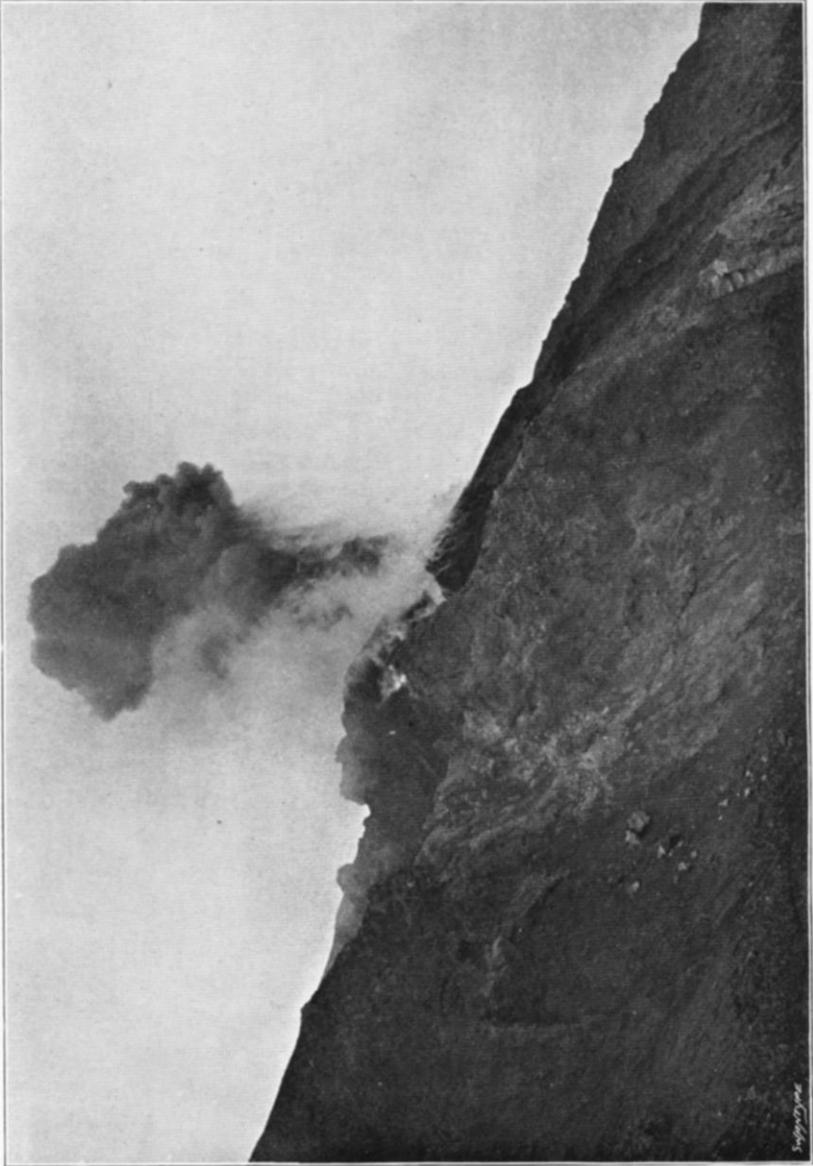


STROMBOLI: THE SCIARA FROM THE NORTH-EAST. 1888.

PLATE IV.

Fumarolic Area
Terrella.

Wedge-shaped Dyke.



STROMBOLI: THE SCIARA FROM THE NORTH-EAST. 1904

PLATE IV.

STROMBOLI—THE SCIARA FROM THE NORTH-EAST

(From a Photograph by the Author, 1904.)

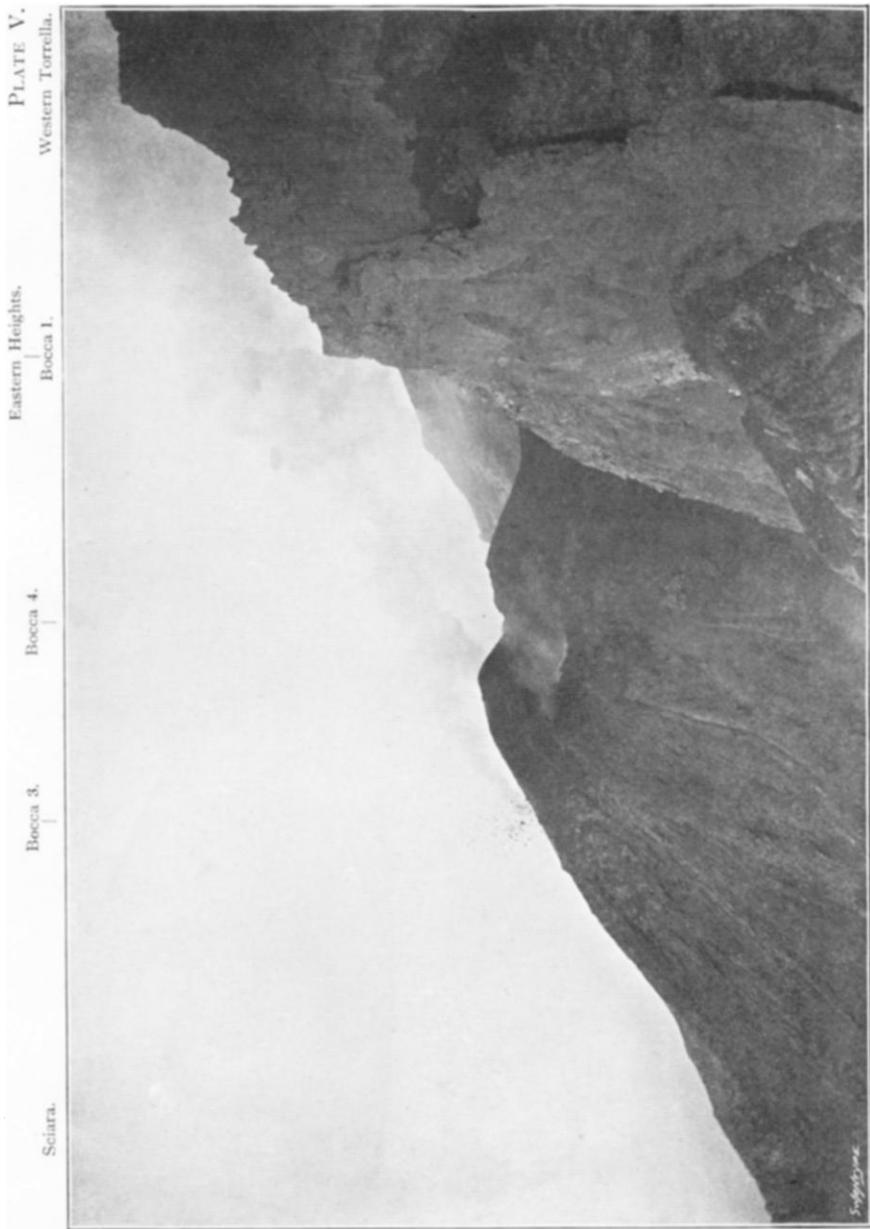
This photograph was taken on April 20, 1904, from the cliff overlooking the Sciara on the north-east, and thus from the same general direction as the last, but perhaps a little higher up the slope, and, being taken with a longer-focus lens, less of the subject is included. To the right is the slope of the Sciara leading down to the sea, with the cliff behind it corresponding to the one on which we are standing. In the centre is the Torrella, with the slope of the Sciara continued up behind it, and showing the large fumarolic area (bocche 2 and 3). This area was much covered with yellow incrustations, and vapours escaped from innumerable points and cracks. There was one small bocca, from which very feeble explosions took place. They were more frequent than, and quite independent in rhythm from, those taking place from the more western parts. In the background are seen the products of an explosion which has just taken place from a bocca beyond the limits of view, probably No. 4 or 5. In the foreground rather to the right is the same wedge-shaped dyke as in the last plate. Compare the position of the crater in relation to this dyke and the Torrella with that shown in the last plate.

PLATE V.

STROMBOLI—THE CRATER FROM THE WEST.

This photograph was taken by George S. Eunson, of Northampton, on September 19, 1889, during a visit to the Lipari islands along with the Geologists' Association.

It is taken from the end of a projecting ridge to the west of the crater and to the north of the Purtedda di Ginostra (see map and Plate VI., Fig. 1), and consequently in exactly the opposite direction to Plates III. and IV. To the right is the western Torrella, and in the distance behind is the eastern Torrella and the adjacent heights. Between the two is the Apparato Eruttivo, as it is appropriately called by the Italian observers. The bocca which emits smoke in the centre of the picture, and from which the chief explosions take place, appears to be the same as the cone shown at the left of Plate II., but its cone is already beginning to grow a little towards the larger crater which still exists behind and to the right of it. It is probably the same as bocca No. 4 or 5 of Profs. Riccò and Mercali. A small bocca (perhaps No. 3) on the skyline to the left throws out small masses of lava. The Sciarra on the left or north side stretches down to the sea, as shown in the previous plates.



STROMBOLI: THE CRATER FROM THE WEST. 1889.



FIG. 2. THE CRATER FROM THE WEST. 1891.



FIG. 1. STROMBOLI FROM THE SEA. 1904.

PLATE VI.—FIG. 1.

STROMBOLI FROM THE SEA, 1904.

This photograph, taken by the author from a small steamer, shows the Sciarra in the centre and towards the left of the picture extending from the craters down to the sea. Rather below the centre is a rough patch, the remains of a stream of lava, probably one of those of June 24–30, 1891.

The other points of interest can be best identified by the letters.

a. The Filo del Fuoco, otherwise Fila d'a Sciarà, the rocky precipice bounding the sciarra on the east. Plates III. and IV. were taken from near its upper end. The Semaforo, or signal station, is situated on this slope outside the lower part of the plate.

b. Eastern Torrella, shown more in detail in Plate III.

c. Fumarolic area on site of bocche 2 and 3 (see Plate IV.).

d. Bocche 4 and 5.

e. Western Torrella (see Plates V., VI. (Fig. 2), VII., VIII., IX., X., and XI.).

f. Filo di Baraona, otherwise Fila di Barcuna, the rocky precipice bounding the Sciarra on the west.

The plates mentioned in *e* were taken from a point at its summit.

PLATE VI.—FIG. 2.

THE CRATER OF STROMBOLI FROM THE WEST, 1891.

This photograph, kindly placed at my disposal by Prof. Ricco, and taken by Ing. S. Arcidiacono, his assistant, shows the crater of Stromboli from the west on September 3, 1891. It appears to have been taken from the same place as Plate V. To the right is the western Torrella; in the distance to the left the eastern Torrella, with the east cliff bounding the Sciarra just showing behind it at the edge of the picture. Between the two Torrelle are more than one eruptive bocca, apparently Nos. 3 and 4. The large inactive crater I is behind the western Torrella. It is noticeable that the whole of this "Apparato Eruptivo" is well below the level of the line joining the two Torrelle, though rising higher than in the earlier photographs.

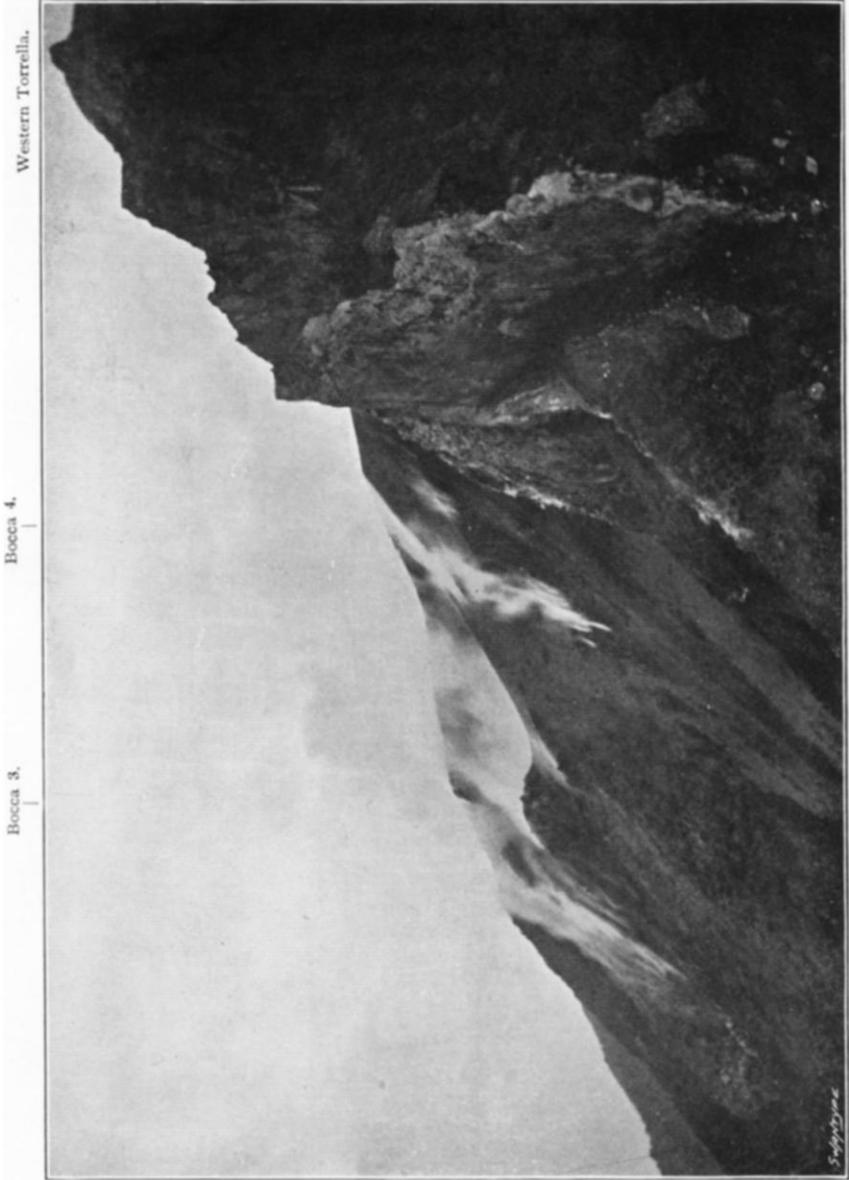
The slope of the Sciarra extends from the crater down to the left of the plate.

PLATE VII.

THE CRATER OF STROMBOLI FROM THE WEST, 1895.

This photograph, placed at my disposal by Prof. Riccò, of Catania, and taken by him on November 21, 1895, apparently from nearly the same point as the last two, shows the condition of the crater above four years later. The western and eastern Torrella occupy corresponding positions to the right and left of the picture respectively. The eruptive area between them shows several bocche, and the slope of the Sciara extends higher than before to the right of the main mouths. The numbers of the bocche are from a figure in a brochure, 'Stato presente dei fenomeni in 1898, Riccò.' The large crater No. 1 is behind the western Torrella.

PLATE VII.



STROMBOLI: THE CRATER FROM THE WEST. 1895.

PLATE VIII.

W. Torrella,

Bocca 3,
Bocca 4 or 5.



THE CRATER FROM THE WEST, 1904.

PLATE VIII.

STROMBOLI.—THE CRATER FROM THE WEST.

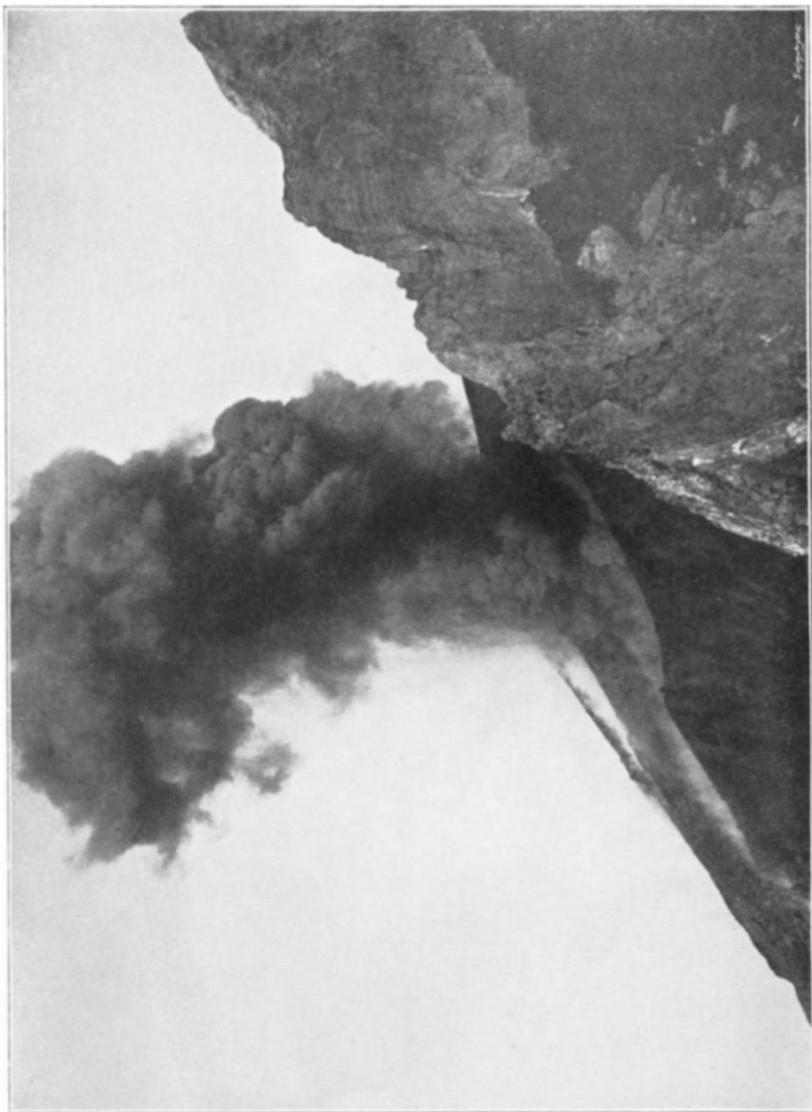
This photograph, taken by the author April 20, 1904, and from the same point as the last, shows the condition eight and a half years later. The western Torrella is conspicuous as before, but the slope of the Sciara now extends far up to the right beyond the active craters, and conceals the eastern Torrella almost entirely from view. It fills up the large old crater No. 1, which was behind the Torrella. The large bocca in the front of the middle distance was that from which all the explosions took place during my visit, and appears to be No. 4 or 5 of Prof. Riccò's numeration. Those beyond it gave issue to vapour only.

PLATES IX, X, AND XI.

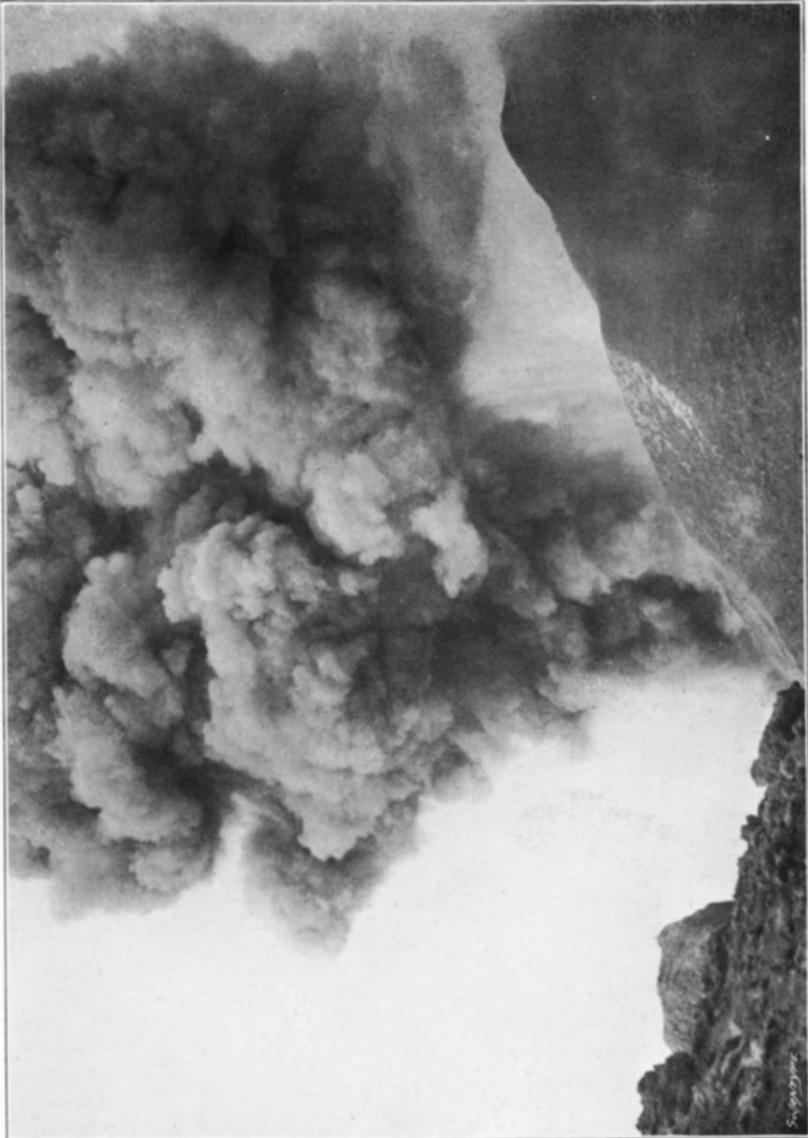
These three photographs were all taken by the author on April 20, 1904, from the same point as Plate VIII., but, not being all done with the same lens, differ in the amount of the subject included. They show different stages of several explosions, all from one bocca. The form assumed, like a cauliflower or a bunch of grapes, though usual in volcanic explosions, is not confined to them. It is often assumed by a mixture of heated gases holding fine powder in suspension, issuing from the chimney of a steamer as well as from that of a volcano. Plate XI. in particular shows the volcanic dust dropping out of the cloud of vapour.



STROMBOLI: AN EXPLOSION. EARLY STAGE.



STROMBOLI: AN EXPLOSION. LATER STAGE.



STROMBOLI : AN EXPLOSION. ADVANCED STAGE.