The Recent Eruption of Etna.

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ETNA has always presented the most varied geodynamic and eruptive phenomena, separated by periods of repose so varied that it is futile to make any attempt to define them with precision. During the nineteenth century there were ten great classical eruptions accompanied by imposing emissions of lava. From 1892 to 1910, Etna did not present any outburst of importance; for the eruption of 1908 in the upper part of the Val del Bove stopped after a few days. Since then, we have had the eruptions of 1911, 1918 (of a few hours' duration), 1923, and the present year.

When Etna is in eruption the lavic magma accumulated in its interior does not as a rule issue from the central crater, but opens a passage in its lateral walls, either because the lava is unable to rise so high as the summit (3313 metres above sea-level) or because it exerts on the flanks of the volcano a pressure so great that it breaks them in places and flows through. Thus, at 16 h. 30 m. (3.30 P.M., G.M.T.) on Nov. 2, 1928, without any warning, an explosion occurred in the highest crater on the north-east side, while the central crater was quite still. At 18h. a new vent opened in the Val del Leone (2700 metres), with emission of lava over about 350 metres; at the same time the subterranean course of the lava was directed to the south of Monte Frumento, so far as the eastern flank of Monte Cubania, where a second vent was opened, the lava from which invaded the valley below and stopped on the plain of the Donne.

Towards the evening of Nov. 3, a more intense lavic effusion prolonged the subterranean course of the lava so far as the region 'La Naca' (1150 metres), where the third vent was opened (Fig. 2), the lava from which emerged and reached nearly to the village of Carabba, about 1500 metres from the sea. Along this subterranean course, small craters occur in the form of buttons and of different magnitudes.

The present eruption of Etna is one of the feeblest recorded in history, but the enormous

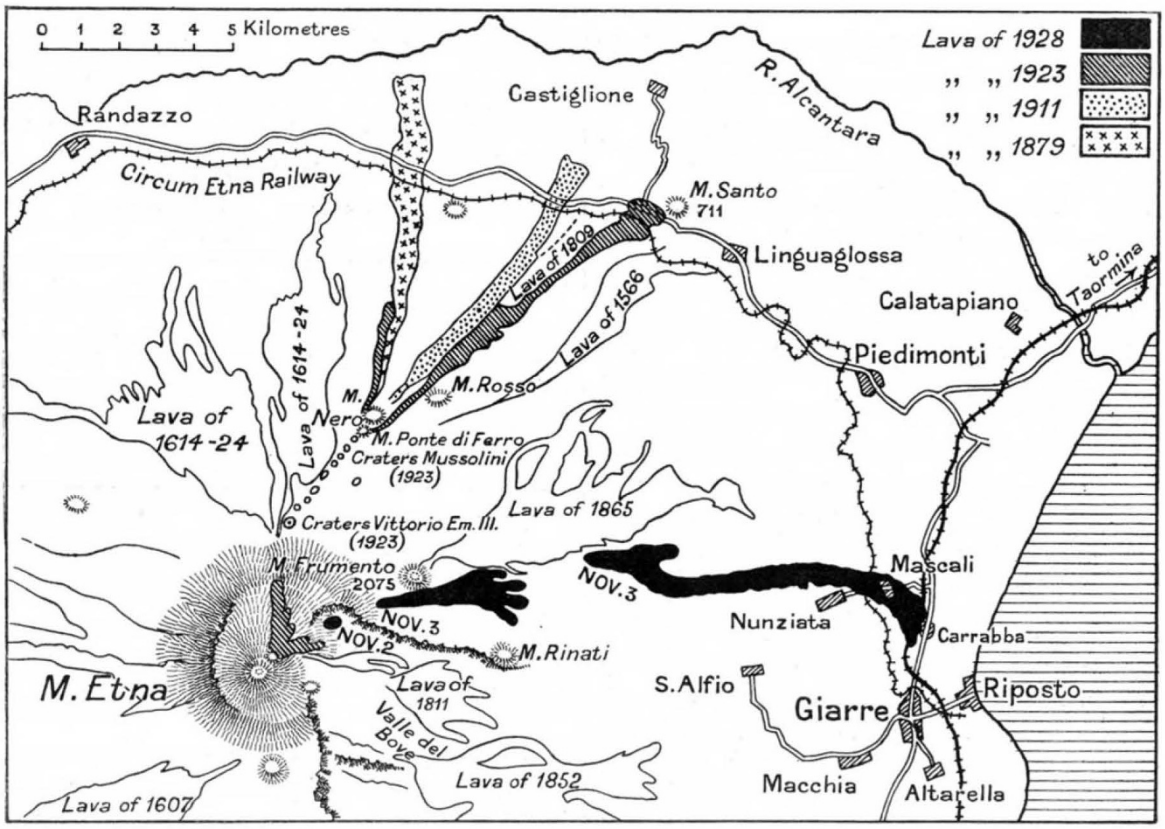

FIG. 1

damage done is greater than that in other eruptions of longer duration.

The district traversed by the lava is the most fertile on Etna, and what was once the smiling district of Mascali, a flourishing fruit-grove, a luxuriant garden, or a fine vineyard, is now buried beneath an enormous mass of hard and smoking lava. In the piazza of Mascali, after the lava had closed in on the village, the church and belfry still held out; but the lava surrounded it, and, on Nov. 7, the church collapsed, dragging the belfry with it in its ruins (Fig. 4).

Etna in eruption is a truly grand and impressive spectacle that defies description. The rumbling volcano mutters gloomily in its new mouths, and from it issues a fiery stream which at the origin runs like a river of viscous incandescent material; a couple of kilometres farther downwards the movement is shown by the slow sliding of the great masses which cover the interior incandescent pasty mass, whilst in front the movement is manifested by the continuous crumbling of lumps of various sizes, pushed forward by the pressure of the internally fluid lava, and detached from the sides of the mass of lava with a metallic noise, the incandescent mass inside appearing like the interior of a great heated oven.

The stream then exerts on the lateral moraines formed by the consolidated lava a constant pressure so as to make some point of the moraine give way, determining a rearrangement of the magma, and through this last extension of the stream, districts not invaded at first, and property so far spared, are continually threatened with invasion and consequent destruction.

Photo.] *Pirrone*

FIG. 2.—Principal vent with the liquid incandescent magma on the right; by night.

The temperature of the flowing lava is about 1050°, yet, before issuing, it was higher, because the passage of the gases adds a pressure of many atmospheres to the surrounding pressure, and occasions a loss of internal heat, known as the heat of expansion. A curious phenomenon, which indicates the low temperature of the surface layer of the lava-flow, is the presence of several tree trunks entangled in the crust of the lava that show no sign of the action of heat beyond an incipient charring. Sometimes the stream has dug into the ground so that trees are torn up with all the soil about their roots. Near the lava there is always noticed the smell of hydrochloric acid, and near the eruptive mouths that of sulphur dioxide.

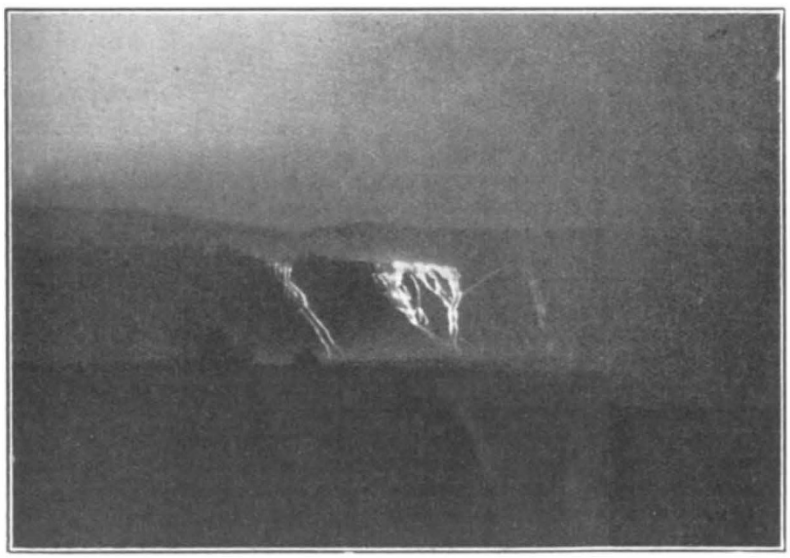

Photo. *[Pirrone.*

FIG. 3.—Cascade of lava near the Fossa Santoro; by night.

In the recent eruption are noticed blocks of old lava, torn from the deep strata of the ground which form part of the framework of Etna, like the rocks which are observed in the denuded strata and dykes of the Val del Bove. This lava, however, does not represent the true massive compact lava; is of a greyish-black colour, rather heavy, and similar to that of the latest Etnean eruptions. One notices a moderate abundance of enclosures of plagioclase, a little augite and still less olivine, magnetite, and vitreous material.

On Nov. 12 the eruption entered decisively on the decreasing phase, and on the date of writing (Nov. 18) the external manifestations of the

eruption may be said to have come to an end. There are already to be seen fumaroles with beautiful incrustations of sublimated substances, especially of ammonium chloride. On the whole, this eruption of Etna has been of brief duration, briefer than would be expected, seeing the very low position of the mouth from which the lava was emitted. An end so premature was principally due to the lack of fragmentary material. The mouths of the eruptive apparatus were not able to form those great cones which, like monuments, indicate to posterity the hundreds of eccentric eruptions of Etna.

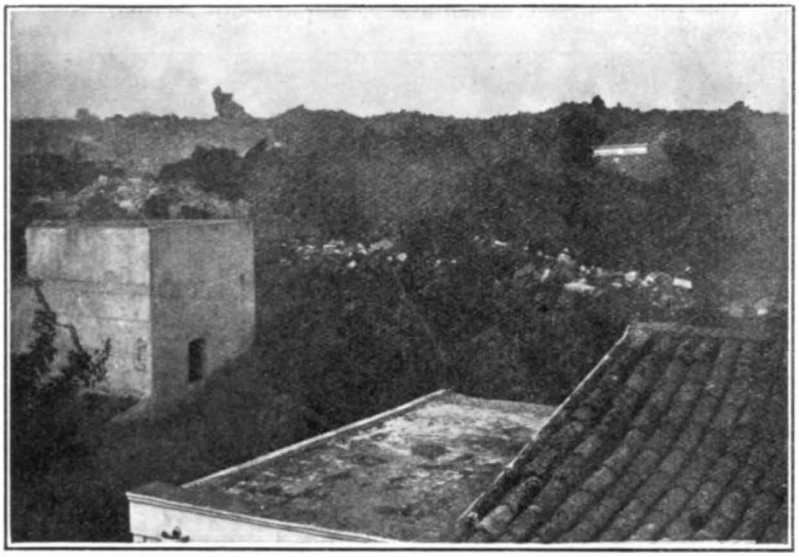

FIG. 4.—The last houses of Mascali burning.

Many threatened villages have been spared, but the district round Mascali remains buried for ever. After the tremendous eruption of 1669, which destroyed many villages and reached as far as Catania and the sea, passing rapidly over 18 km., this is the first instance of a district invaded by lava. At some future time, when the district now covered with lava once again enables plants to flourish and to provide men with means of living, the present eruption will be forgotten or will remain as an historical event, until another will come to revive its memory and pass through the same cycle of events.

A 'Growth Substance' and Phototropic Response in Plants.

THE remarkable development made in recent years in animal physiology in the study of the endocrinal secretions and their relation to growth has naturally encouraged the tendency to find growth-regulating substances in plants. Most such suggestions as yet are notable for their slender experimental basis, so that the more importance attaches to a recent dissertation by Dr. F. W. Went,[1] describing numerous experiments carried out in his father's laboratory at Utrecht, which are regarded by the author as establishing the existence of a growth substance (*Wuchsstoff*) in the organ of one plant, the coleoptile of the oat.

The coleoptile is a remarkable little structure—the first part of the shoot of the oat (or other grass) seedling to emerge from the grain into the air; it is a little hollow cylinder with a conical closed top which is burst through by the first leaf of the plant, when it is left as a collar around the base of the lamina. It has been the basis of innumerable studies in plant physiology, and it is no exaggeration to say that recently scores of papers have come each year from Continental laboratories dealing with this little structure. Indeed, one distinguished German botanist is reported as saying that there is at present a 'coleoptile fashion' in the German laboratories.

The reason for this intensive study is that the coleoptile is the classic object upon which was first demonstrated by Charles Darwin the reception of an external (light) stimulus at one point, the apex of the coleoptile, followed by a growth movement, curvature towards the light, near the base of the object. Thus the response of the plant to light apparently could not be the direct result of the action of light upon a complex growing tissue. Rather we had to deal with an external stimulus received in one region, from which influences then were transmitted which modified the mechanism of growth at work in another region of the plant. Thus the phototropic response of this little organ has profoundly influenced the development of botanical ideas as to growth and its response to light and gravity, etc.

The new outburst of experimental activity upon the coleoptile followed upon some interesting experiments by Boysen-Jensen, in which he showed that if the tip of the coleoptile were cut off and then replaced again upon the stump by the aid of a little gelatin, when the tip was afterwards illuminated laterally, the usual tropic curvature took place in the base of the organ. This immediately seemed to place the growth controlling machinery in the category of substances, in this case diffusible through gelatin, which were moving from the receptive tip towards the responsive base of the coleoptile. The one-sided illumination of the tip then modified either the formation or the subsequent distribution of these substances, or partially destroyed them, so that on their arrival in the basal region, unequal growth now took place.

Since Boysen-Jensen's papers an army of in-

[1] "Wuchsstoff und Wachstum," by F. W. Went. *Rec. des Trav. bot. Neerland.*, **25**, 1-116; 1928.