CHAPTER VII.

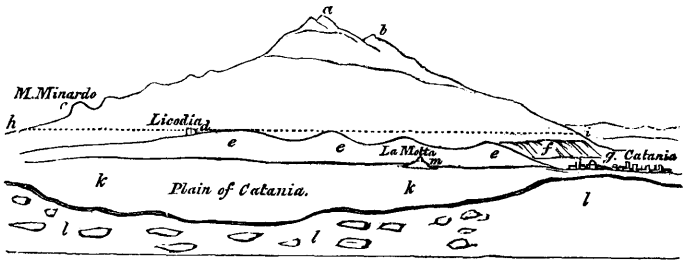
Marine and volcanic formations at the base of Etna—Their connexion with the strata of the Val di Noto—Bay of Trezza—Cyclopian isles—Fossil shells of recent species—Basalt and altered rocks in the Isle of Cyclops—Submarine lavas of the Bay of Trezza not currents from Etna—Internal structure of the cone of Etna—Val di Calanna—Val del Bove not an ancient crater—Its precipices intersected by countless dykes—Scenery of the Val del Bove—Form, composition, and origin of the dykes—Lavas and breccias intersected by them.

MARINE AND VOLCANIC FORMATIONS AT THE BASE OF ETNA.

THE phenomena considered in the last chapter suggest many theoretical views of the highest interest in Geology; but before we enter upon these topics we are desirous of describing some formations in Valdemone, which are analogous to those of the Val di Noto, and to point out the relation of such rocks to the modern lavas of Etna.

If the traveller passes along the table-land, formed by the great limestone of the Val di Noto, until it terminates suddenly near Primosole, he there sees the plain of Catania at his feet,

No. 11.



View of Etna from the summit of the limestone platform of Primosole.

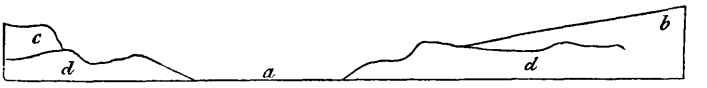
a, Highest cone. *b*, Montagnuola. *c*, Monte Minardo, with smaller lateral cones above. *d*, Town of Licodia dei Monaci. *e*, Marine formation called creta, argillaceous and sandy beds with a few shells, and associated volcanic rocks. *f*, Escarpment of stratified subaqueous volcanic tuff, &c., north-west of Catania. *g*, Town of Catania. *h*, *i*, Dotted line expressing the highest boundary along which the marine strata are occasionally seen. *k*, Plain of Catania. *l*, Limestone platform of Primosole of the newer Pliocene. *m*, La Motta di Catania.

and before him, to the north, the cone of Etna (see diagram No. 11). At the base of the cone he beholds a low line of hills *e*, *e* (No. 11), formed of clays and marls, associated with yellowish sand, similar to the formation provincially termed 'Creta,' in various parts of Sicily.

This marine formation, which is composed partly of volcanic and partly of sedimentary rocks, is seen to underlie the modern lavas of Etna. To what extent it forms the base of the mountain cannot be observed, for want of sections of the lower part of the cone, but the marine sub-Etnean beds are not observed to rise to a greater elevation than eight hundred, or, at the utmost, one thousand feet above the level of the sea. We should remind the reader, that the annexed drawing is not a section, but an outline view of Etna, as seen from Primosole, so that the proportional height of the volcanic cone, which is, in reality, ten times greater than that of the hills of 'Creta,' at its base, is not represented, the summit of the cone being ten or twelve miles more distant from the plain of Catania, than Licodia.

Connexion of the sub-Etnean strata with those of the Val di Noto.—These marine strata are found both on the southern and eastern foot of Etna, and it is impossible not to infer that they belong to the inferior argillaceous series of the Val di Noto, which they resemble both in mineral and organic characters. In one locality they appear on the opposite sides of the Valley of the Simeto, covered on the north by the lavas of Etna, and on the south by the Val di Noto limestone.

Val di Noto. No. 12. Etna.



Section from Paternò by Lago di Naftìa to Palagonìa.

a, Plain of the Simeto. *b*, Base of the cone of Etna, composed of modern lavas. *c*, Limestone of the Val di Noto. *d*, Clay, sand, and associated submarine volcanic rocks.

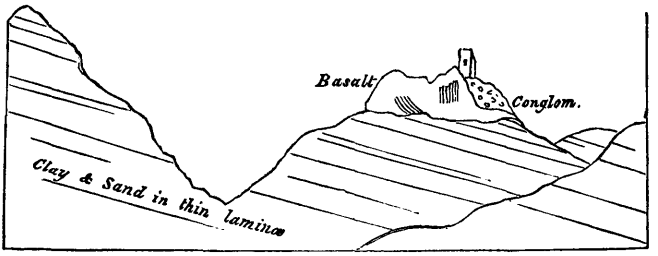
If in the country adjacent to the Lago di Naftìa, through

which the annexed section is drawn, and in several other districts where the 'creta' prevails, together with associated submarine lavas, and where there is no limestone capping, a volcano should now burst forth, and give rise to a great cone, the position of such a cone would exactly correspond to that of the modern Etna, with relation to the rocks on which it rests.

Southern base of Etna.—The marine strata of clay and sand already alluded to, alternate in thin layers at the southern base of Etna, sometimes attaining a thickness of three hundred feet, or more, without any intermixture of volcanic matter. Crystals of selenite are dispersed through the clay, accompanied by a few shells, almost entirely of recent Mediterranean species. This formation of blue marl and yellow sand greatly resembles in character that of the Italian Subapennine beds, and, like them, often presents a surface denuded of vegetation, in consequence of the action of the rains on soft incoherent materials.

In travelling by Paternò, Misterbianco, and La Motta, we pass through deep narrow valleys excavated through these beds, which are sometimes capped, as at La Motta, by columnar basalt, accompanied by strata of tuff and volcanic conglomerate. (Diagram No. 13.)

No. 13.



La Motta near Catania.

The latter rock is composed of rolled masses of basalt, which may either have originated when first the lava was produced in a volcanic archipelago, or subsequently when the whole country was rising from beneath the level of the sea. Its occurrence in this situation is striking, as not a single pebble

can be observed in the entire thickness of subjacent beds of sand and clay.

The dip of the marine strata, at the base of Etna, is by no means uniform; on the eastern side, for example, they are sometimes inclined towards the sea, and at others towards the mountain. Near the aqueduct at Aderno, on the southern side, I observed two sections, in quarries not far distant from each other, where beds of clay and yellow sand dipped, in one locality, at an angle of forty-five degrees to the east-south-east, and in the other at a much higher inclination in the opposite direction. These facts would be of small interest, if an attempt had not been made to represent these mixed marine and volcanic deposits which encircle part of the base of Etna, as the outer margin of a so-called 'elevation crater *.'

Near Catania the marine formation, consisting chiefly of volcanic tuff thinly laminated, terminates in a steep inland cliff, or escarpment, which is from six hundred to eight hundred feet in height. A low flat, composed of recent lava and volcanic sand, intervenes between the sea and the base of this escarpment, which may be well seen at Fasano. (*f*, diagram No. 11.)

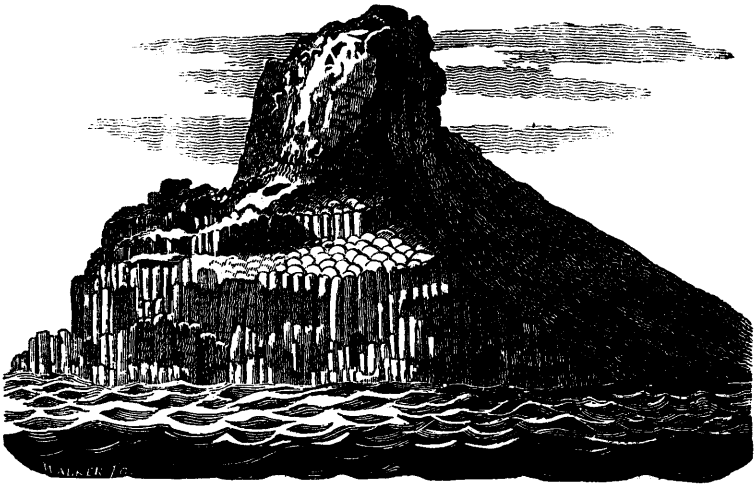
Eastern side of Etna—Bay of Trezza.—Proceeding northwards from Catania, we have opportunities of examining the same sub-Etnean formations laid open more distinctly in the modern sea-cliffs, especially in the Bay of Trezza and in the Cyclopian islands (Dei Faraglioni), which may be regarded as the extremity of a promontory severed from the main land. Numerous are the proofs of submarine eruptions of high antiquity in this spot, where the argillaceous and sandy beds have been invaded and intersected by lava, and where those peculiar tufaceous breccias occur which result from ejections of fragmentary matter, projected from a volcanic vent. I observed many angular and hardened fragments of laminated clay (creta), in different states of alteration, between La Trezza and Nizzitta, and in the hills above Aci Castello, a town on the main land contiguous to the Cyclopian isles, which could not be mistaken

* See vol. i. chap. xxii.

by one familiar with Somma and the minor cones of Ischia, for anything but masses thrown out by volcanic explosions. From the tuffs and marls of this district I collected a great variety of marine shells *, almost all of which have been identified with species now inhabiting the Mediterranean, and, for the most part, now frequent on the coast immediately adjacent. Some few of these fossil shells retain part of their colour, which is the same as in their living analogues.

The largest of the Cyclopian islets, or rather rocks, is distant two hundred yards from the land, and is only three hundred yards in circumference, and about two hundred feet in height. The summit and northern sides are formed of a mass of stratified marl (creta), the laminæ of which are occasionally subdivided by thin arenaceous layers. These strata rest on a mass of columnar lava (see wood-cut, No. 14) †, which appears to have forced itself into, and to have heaved up the stratified mass.

No. 14.



View of the Isle of Cyclops in the Bay of Trezza.

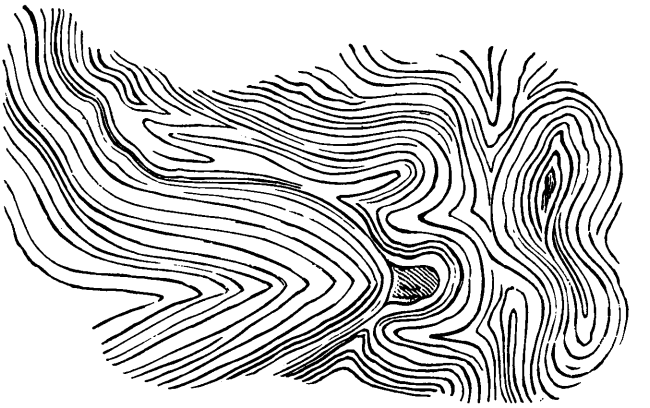
* See, in Appendix No. II., a list, by M. Deshayes, of sixty-five species, which I procured from the hills called Monte Cavalaccio, Rocca di Ferro, and Rocca di Bempolere (or Borgia).

† This cut is from an original drawing by my friend Capt. W. H. Smyth, R. N.

This theory of the intrusion of the basalt is confirmed by the fact, that in some places the clay has been greatly altered, and hardened by the action of heat, and occasionally contorted in the most extraordinary manner, the lamination not having been obliterated, but, on the contrary, rendered much more conspicuous by the indurating process.

The annexed wood-cut (No. 15) is a careful representation of a portion of the altered rock, a few feet square, where the alternate thin laminæ of sand and clay have put on the appearance which we often observe in some of the most contorted of the primary schists.

No. 15.



Contortions in the newer Pliocene strata, Isle of Cyclops.

A great fissure, running from east to west, nearly divides the island into two parts, and lays open its internal structure. In the section thus exhibited, a dike of lava is seen, first cutting through an older mass of lava, and then penetrating the superincumbent tertiary strata. In one locality, the lava ramifies and terminates in thin veins, from a few feet to a few inches in thickness (see diagram No. 16).

No. 16.

Newer Pliocene strata invaded by lava. Isle of Cyclops (horizontal section).

a, Lava. *b*, laminated clay and sand. *c*, the same altered.

The arenaceous laminæ are much hardened at the point of contact, and the clays are converted into siliceous schist. In this island the altered rocks assume a honeycombed structure on their weathered surface, singularly contrasted with the smooth and even outline which the same beds present in their usual soft and yielding state.

The pores of the lava are sometimes coated, or entirely filled, with carbonate of lime, and with a zeolite resembling analcime, which has been called cyclopite. The latter mineral has also been found in small fissures traversing the altered marl, showing that the same cause which introduced the minerals into the cavities of the lava, whether we suppose sublimation or aqueous infiltration, conveyed it also into the open rents of the contiguous sedimentary strata.

Lavas of the Cyclopian Isles not currents from Etna.—The phenomena of the Bay of Trezza are very important, for it is evident that the submarine lavas were produced by eruptions on the spot, an inference which follows not only from the presence of dikes and veins, but from those tuffs above Castello d'Aci, which contain angular fragments of hardened marl, evidently thrown up, together with the sand and scoriæ, by volcanic

explosions. We may, therefore, suppose this volcanic action to have been as independent of the modern vents of Etna, as that which gave rise to the analogous formations in the Val di Noto. It is quite evident that the lavas of the Cyclopian isles are not the lower extremities of currents which flowed down from the highest crater of Etna, or from the region where lateral eruptions are now frequent,—lavas which, after entering the sea, were afterwards upraised into their present position. It is more probable that the basalts of the Bay of Trezza, and those along the southern foot of Etna, at La Motta, Adernò, Paternò, Licodia, and other places, originated in the same sea in which the eruptions of the Val di Noto took place.

There are, however, as we have observed, no sections to prove that the central and oldest parts of Etna repose on similar submarine formations. The modern lavas of the volcano are continually extending their area, and covering, from time to time, a larger portion of the marine strata; but we know not where this operation commenced, so that we cannot demonstrate the posteriority of the whole cone to these newer Pliocene strata.

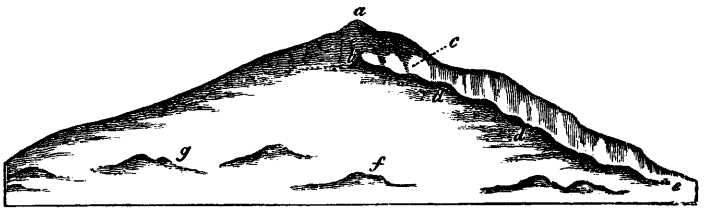
We might imagine that when the volcanos of the Val di Noto were in activity, and when the eruptions of the Bay of Trezza were taking place, Etna already existed as a volcano, the upper part only of the cone projecting above the level of the waters, as in the case of Stromboli at present. By such an hypothesis, we might refer the origin of the older part of Etna to the same period as that of the sedimentary strata and volcanic rocks of the Val di Noto.

But, for our own part, we see no grounds for inclining to such a theory, since we must admit that a sufficient series of ages has elapsed since the limestone of the Val di Noto was deposited, to allow the same to be elevated to the height of from two thousand to three thousand feet, in which case there may also have been sufficient time for the growth of a volcanic pile like Etna, since the newer Pliocene strata now seen at the base of the volcano originated.

INTERNAL STRUCTURE OF THE CONE OF ETNA.

In our first volume we merely described that part of Etna which has been formed during the historical era; an insignificant portion of the whole mass. Nearly all the remainder may be referred to the tertiary period immediately antecedent to the *recent* epoch. We before stated, that the great cone is, in general, of a very symmetrical form, but is broken, on its eastern side, by a deep valley, called the Val del Bove*, which,

No. 17.



Great valley on the east side of Etna.

a, highest cone. *b*, Montagnuola. *c*, Head of Val del Bove. *d*, *d*, Serre del Solfizio. *e*, Zaffarana. *f*, One of the lateral cones. *g*, Monti Rossi.

commencing near the summit of the mountain, descends into the woody region, and is then continued, on one side, by a second and narrower valley, called the Val di Calanna. Below the latter another, named the Val di St. Giacomo, begins,—a long narrow ravine, which is prolonged to the neighbourhood of Zaffarana (*e*, No. 17), on the confines of the fertile region. These natural incisions, into the side of the volcano, are of such

* In the provincial dialect of the peasants called 'Val del Buê,' for here the herdsman

——— 'in reductâ valle *mugientium*
Prospectat errantes greges.—'

Dr. Buckland was, I believe, the first English geologist who examined this valley with attention, and I am indebted to him for having described it to me, before my visit to Sicily, as more worthy of attention than any single spot in that island, or perhaps in Europe. I have already stated, that the view of this valley, which I have given in the frontispiece of the second volume, does not pretend to convey any idea of the grandeur of the scene.

depth, that they expose to view a great part of the structure of the entire mass, which, in the Val del Bove, is laid open to the depth of from four thousand to five thousand feet from the summit of Etna. The geologist thus enjoys an opportunity of ascertaining how far the internal conformation of the cone corresponds with what he might have anticipated as the result of that mode of increase which has been witnessed during the historical era.

It is clear, from what we before said of the gradual manner in which the principal cone increases, partly by streams of lava and showers of volcanic ashes ejected from the summit, partly by the throwing up of minor hills and the issuing of lava-currents on the flanks of the mountain, that the whole cone must consist of a series of cones enveloping others, the regularity of each being only interrupted by the interference of the lateral volcanos.

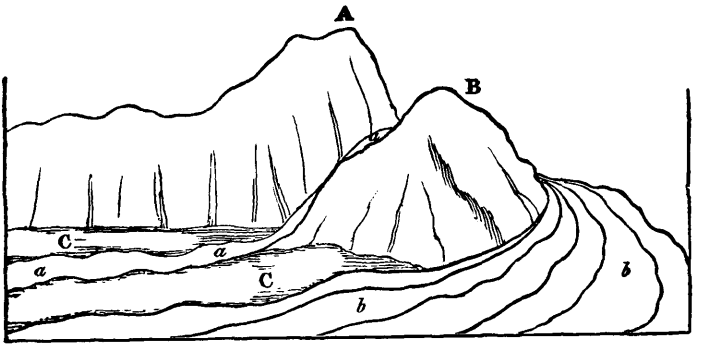
We might, therefore, have anticipated that a section of Etna, as exposed in a ravine which should begin near the summit and extend nearly to the sea, would correspond very closely to the section of the ancient Vesuvius, commencing with the escarpment of Somma, and ending with the Fossa Grande ; but with this difference, that where the ravine intersects the woody region of Etna, indications must appear of changes brought about by lateral eruptions. Now the section before alluded to, which can be traced from the head of the Val del Bove to the inferior borders of the woody region, fully answers such expectations. We find, almost everywhere, a series of layers of tuff and breccia interstratified with lavas, which slope gently to the sea, at an angle of from twenty to thirty degrees ; and as we rise to the parallel of the zone of lateral eruptions, and still more as we approach the summit, we discover indications of disturbances, occasioned by the passage of lava from below, and the successive inhumation of lateral cones.

Val di Calanna.—On leaving Zaffarana, on the borders of the fertile region, we enter the ravine-like valley of St. Giacomo, and see on the north side, or on our right as we ascend,

rising ground composed of the modern lavas of Etna. On our left, a lofty cliff, wherein a regular series of beds is exhibited, composed of tuffs and lavas, descending with a gentle inclination towards the sea. In this lower part of the section there are no intersecting dikes, nor any signs of minor cones interfering with the regular slope of the alternating volcanic products. If we then pass upwards through a defile, called the 'Portello di Calanna,' we enter a second valley, that of Calanna, resembling the ravine before mentioned, but wider and much deeper. Here again we find, on our right, many currents of modern lava, piled one upon the other, and on our left a continuation of our former section, in a perpendicular cliff from four hundred to five hundred feet high. As this lofty wall sweeps in a curve, it has very much the appearance of the escarpment which Somma presents towards Vesuvius, and this resemblance is increased by the occurrence of two or three vertical dikes which traverse the gently-inclined volcanic beds. When I first beheld this precipice, I fancied that I had entered a lateral crater, but was soon undeceived, by discovering that on all sides, both at the head of the valley, in the hill of Zocolaro, and at its side and lower extremity, the dip of the beds was always in the same direction, all slanting to the east, or towards the sea, instead of sloping to the north, east, and south, as would have been the case had they constituted three walls of an ancient crater.

It is not difficult to explain how the valleys of St. Giacomo and Calanna originated, when once the line of lofty precipices on the north side of them had been formed. Many lava-currents flowing down successively from the higher regions of Etna, along the foot of a great escarpment of volcanic rock, have at length been turned by a promontory at the head of the valley of Calanna, which runs out at right angles, to the great line of precipices. This promontory consists of the hills called Zocolaro and Calanna, and of a ridge of inferior height which connects them. (See diagram No. 18.)

No. 18.



A, Zocolaro. B, Monte di Calanna.
C, Plain at the head of the Valley of Calanna.
a, Lava of 1819 descending the precipice and flowing through the valley.
b, Lavas of 1811 and 1819 flowing round the hill of Calanna.

The flows of melted matter have been deflected from their course by this projecting mass, just as a tidal current, after setting against a line of sea-cliffs, is often thrown off into a new direction by some rocky headland.

Lava-streams, it is well known, become solid externally, even while yet in motion, and their sides may be compared to two rocky walls, which are sometimes inclined at an angle of forty-five degrees. When such streams descend a considerable slope at the base of a line of precipices, and are turned from their course by a projecting rock, they move right onwards in a new direction, so as to leave a considerable space (as in the Valley of Calanna) between them and the cliffs which may be continuous below the point of deflection.

It happened in 1811 and 1819, that the flows of lava overtopped the ridge intervening between the hills of Zocolaro and Calanna, so that they fell in a cascade over a lofty precipice, and began to fill up the valley. (See letter *a*, diagram No. 18.)

The narrow cavity of St. Giacomo will admit of an explanation precisely similar to that already offered for Calanna.

Val del Bove.—After passing up through the defile, called the 'Rocca di Calanna," we enter a third valley of truly magnificent dimensions—the Val del Bove—a vast amphitheatre four or five miles in diameter, surrounded by nearly vertical precipices, varying from one thousand to above three thousand feet in height, the loftiest being at the upper end, and the height gradually diminishing on both sides. The feature which first strikes the geologist as distinguishing this valley from those before mentioned, is the prodigious multitudes of vertical dikes, which are seen in all directions traversing the volcanic beds. The circular form of this great chasm, and the occurrence of these countless dikes, amounting perhaps to several thousands in number, so forcibly recalled to my mind the phenomena of the Atrio del Cavallo, on Vesuvius, that I imagined once more that I had entered a vast crater, on a scale as far exceeding that of Somma, as Etna surpasses Vesuvius in magnitude.

But having already been deceived in regard to the crescent-shaped precipice of the valley of Calanna, I began attentively to explore the different sides of the great amphitheatre, in order to satisfy myself whether the semicircular wall of the Val del Bove had ever formed the boundary of a crater, and whether the beds had the same quâquâ-versal dip which is so beautifully exhibited in the escarpment of Somma. If the supposed analogy between Somma and the Val del Bove should hold true, the tuffs and lavas, at the head of the valley, would dip to the west, those on the north side towards the north, and those on the southern side to the south. But such I did not find to be the inclination of the beds; they all dip towards the sea, or nearly east, as was before seen to be the case in the Valley of Calanna.

There are undoubtedly exceptions to this general rule, which might deceive a geologist who was strongly prepossessed with a belief that he had discovered the hollow of an ancient crater. It is evident that, wherever lateral cones are intersected in the precipices, a series of tuffs and lavas, very similar to those which

enter into the structure of the great cone, will be seen dipping at a much more rapid angle.

The lavas and tuffs, which have conformed to the sides of Etna, dip at angles of from fifteen to twenty-five degrees, while the slope of the lateral cones is from thirty-five to fifty degrees. Now, wherever we meet with sections of these buried cones in the precipices bordering the Val del Bove, (and they are frequent in the cliffs called the Serre del Solfizio, and in those near the head of the valley not far from the rock of Musara,) we find the beds dipping at high angles and inclined in various directions*.

Scenery of the Val del Bove.—Without entering at present into any further discussions respecting the origin of the Val del Bove, we shall proceed to describe some of its most remarkable features. Let the reader picture to himself a large amphitheatre, five miles in diameter, and surrounded on three sides by precipices from two thousand to three thousand feet in height. If he has beheld that most picturesque scene in the chain of the Pyrenees, the celebrated 'cirque of Gavarnie,' he may form some conception of the magnificent circle of precipitous rocks which inclose, on three sides, the great plain of the Val del Bove. This plain has been deluged by repeated streams of lava, and although it appears almost level when viewed from a distance, it is, in fact, more uneven than the surface of the most tempestuous sea. Besides the minor irregularities of the lava, the valley is in one part interrupted by a ridge of rocks, two of which, Musara and Capra, are very prominent. It can hardly be said that they

> ——— 'like giants stand
> To sentinel enchanted land;'

for although, like the Trosachs, they are of gigantic dimen-

* I perceive that Professor Hoffmann, who visited the Val del Bove after me (in January, 1831), has speculated on its structure as corresponding to that of the so-called elevation craters, which hypothesis would require that there should be a quâquâ-versal dip, such as I have above alluded to. I can only account for this difference of opinion, by supposing the Professor to have overlooked the phenomena of the buried cones.—Archiv. für Mineralogie, &c. Berlin, 1831.

sions, and appear almost isolated as seen from many points, yet the stern and severe grandeur of the scenery which they adorn is not such as would be selected by a poet for a vale of enchantment. The character of the scene would accord far better with Milton's picture of the infernal world; and if we imagine ourselves to behold in motion, in the darkness of the night, one of those fiery currents, which have so often traversed the great valley, we may well recall

> ——— 'yon dreary plain, forlorn and wild,
> The seat of desolation, void of light
> Save what the glimmering of these livid flames
> Cast pale and dreadful.'

The face of the precipices already mentioned is broken in the most picturesque manner by the vertical walls of lava which traverse them. These masses usually stand out in relief, are exceedingly diversified in form, and often of immense altitude. In the autumn, their black outline may often be seen relieved by clouds of fleecy vapour which settle behind them, and do not disperse until midday, continuing to fill the valley while the sun is shining on every other part of Sicily, and on the higher regions of Etna.

As soon as the vapours begin to rise, the changes of scene are varied in the highest degree, different rocks being unveiled and hidden by turns, and the summit of Etna often breaking through the clouds for a moment with its dazzling snows, and being then as suddenly withdrawn from the view.

An unusual silence prevails, for there are no torrents dashing from the rocks, nor any movement of running water in this valley, such as may almost invariably be heard in mountainous regions. Every drop of water that falls from the heavens, or flows from the melting ice and snow, is instantly absorbed by the porous lava; and such is the dearth of springs, that the herdsman is compelled to supply his flocks, during the hot season, from stores of snow laid up in hollows of the mountain during winter.

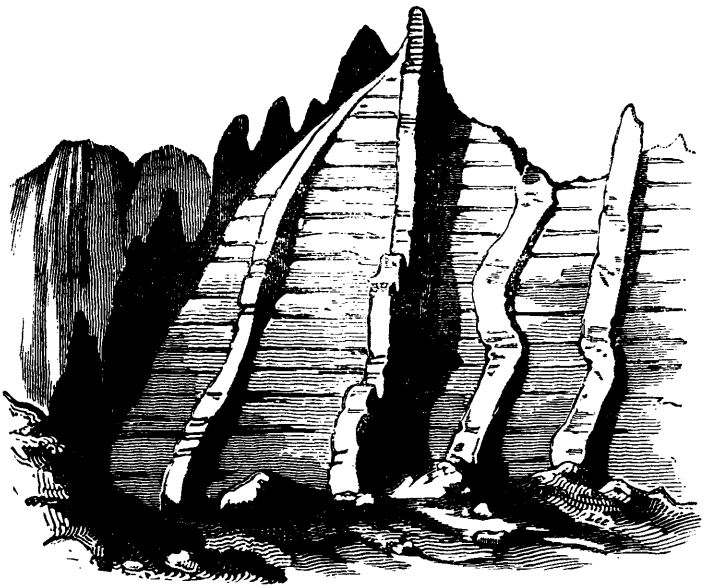
The strips of green herbage and forest-land, which have

here and there escaped the burning lavas, serve, by contrast, to heighten the desolation of the scene. When I visited the valley, nine years after the eruption of 1819, I saw hundreds of trees, or rather the white skeletons of trees, on the borders of the black lava, the trunks and branches being all leafless, and deprived of their bark by the scorching heat emitted from the melted rock; an image recalling those beautiful lines—

> ——— 'As when heaven's fire
> Hath scath'd the forest oaks, or mountain pines,
> With singed top their stately growth, though bare,
> Stands on the blasted heath.'

Form, composition, and origin of the Dikes.—But without indulging the imagination any longer in descriptions of scenery, we may observe, that the dikes before mentioned form unquestionably the most interesting geological phenomenon in the Val del Bove.

No. 19.

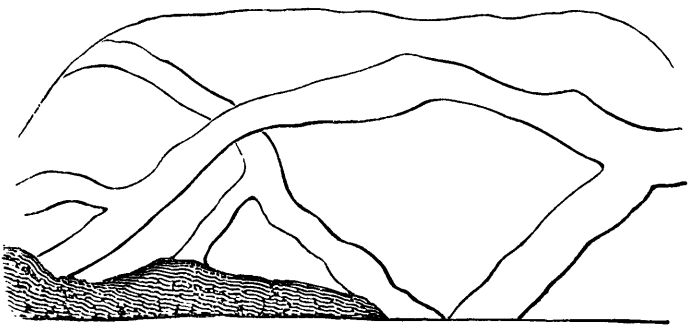


Dikes at the base of the Serre del Solfizio, Etna.

Some of these are composed of trachyte, others of compact

blue basalt with olivine. They vary in breadth from two to twenty feet and upwards, and usually project from the face of the cliffs, as represented in the annexed drawing (No. 19). They consist of harder materials than the strata which they traverse, and therefore waste away less rapidly under the influence of that repeated congelation and thawing to which the rocks in this zone of Etna are exposed. The dikes are, for the most part, vertical, but sometimes they run in a tortuous course through the tuffs and breccias, as represented in diagram, No. 20. In the escarpment of Somma where, as we be-

No. 20.



Veins of Lava. *Punto di Guimento.*

fore observed, similar walls of lava cut through alternating beds of sand and scoriæ, a coating of coal-black rock, approaching in its nature and appearance to pitch-stone, is seen at the contact of the dike with the intersected beds. I did not observe such parting layers at the junction of the Etnean dikes which I examined, but they may perhaps be discoverable.

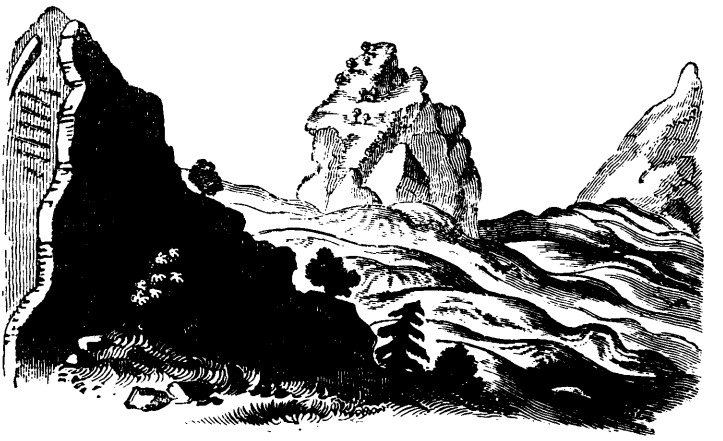
The geographical position of these dikes is most interesting, as they occur in that zone of the mountain where lateral eruptions are frequent; whereas, in the valley of Calanna, which is below that parallel, and in a region where lateral eruptions are extremely rare, scarcely any dikes are seen, and none whatever still lower in the valley of St. Giacomo. This is precisely what we should have expected, if we consider the vertical fissures now filled with rock to have been the feeders of lateral

cones, or, in other words, the channels which gave passage to the lava-currents and scoriæ that have issued from vents in the forest-zone.

Some fissures may have been filled from above, but I did not see any which, by terminating downwards, gave proof of such an origin. Almost all the isolated masses in the Val del Bove, such as Capra, Musara, and others, are traversed by dikes, and may, perhaps, have partly owed their preservation to that circumstance, if at least the action of occasional floods has been one of the destroying causes in the Val del Bove; for there is nothing which affords so much protection to a mass of strata against the undermining action of running water, as a perpendicular dike of hard rock.

In the accompanying drawing (No. 21) the flowing of the

No. 21.

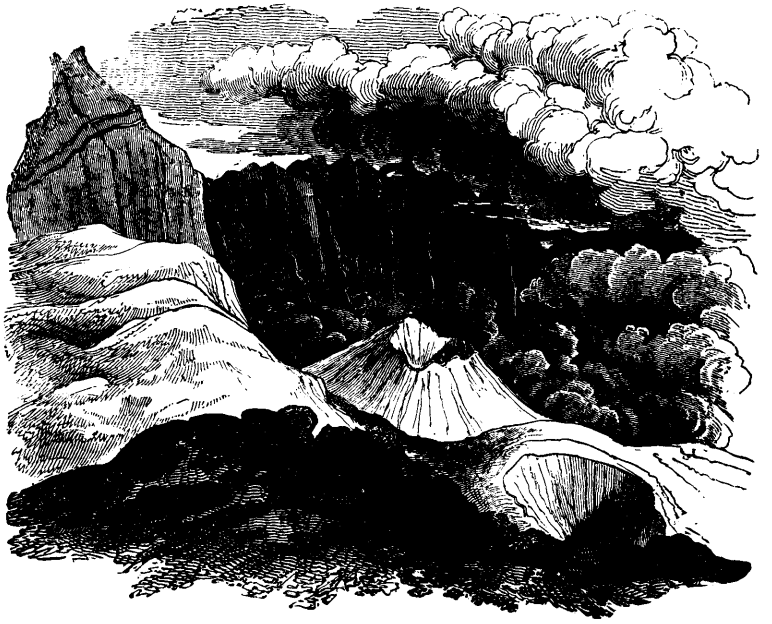


View of the rocks Finochio, Capra, and Musara, Val del Bove.

lavas of 1811 and 1819, between the rocks Finochio, Capra, and Musara, is represented. The height of the two last-mentioned isolated masses has been much diminished by the elevation of their base, caused by these currents. They may, perhaps, be the remnants of cones, which existed before the Val del Bove was formed, and may hereafter be once more buried by the lavas that are now accumulating in the valley.

From no point of view are the dikes more conspicuous than from the summit of the highest cone of Etna; a view of some of them is given in the annexed drawing *.

No. 22.



View from the summit of Etna into the Val del Bove.

The small cone and crater immediately below were among those formed during the eruptions of 1810 *and* 1811.

Lavas and breccias.—In regard to the volcanic masses which are intersected by dikes in the Val del Bove, they consist, in great part, of graystone lavas, of an intermediate character between basalt and trachyte, and partly of the trachytic varieties of lava. Beds of scoriæ and sand, also, are very numerous, alternating with breccias formed of angular blocks of igneous rock. It is possible that some of the breccias may be referred to aqueous causes, as we have before seen that great floods do

* This drawing is part of a panoramic sketch which I made from the summit of the cone, December 1st, 1828, when every part of Etna was free from clouds except the Val del Bove.

occasionally sweep down the flanks of Etna when eruptions take place in winter, and when the snows are melted by lava.

Many of the angular fragments may have been thrown out by volcanic explosions, which, falling on the hardened surface of moving lava-currents, may have been carried to a considerable distance. It may also happen, that when lava advances very slowly, in the manner of the flow of 1819, described in the first volume *, the angular masses resulting from the frequent breaking of the mass as it rolls over upon itself, may produce these breccias. It is at least certain, that the upper portion of the lava-currents of 1811 and 1819, now consist of angular masses, to the depth of many yards.

D'Aubuisson has compared the surface of one of the ancient lavas of Auvergne to that of a river suddenly frozen over by the stoppage of immense fragments of drift-ice, a description perfectly applicable to these modern Etnean flows.

* Chap. xxi.