MAP OF THE FEROE ISLANDS

Reduced from the

KAART

OVER

FÆRÖERNE

TRIGONOMETRISK OPMAALET AF CAPITAINE BORN

adgivet fra

Det Kongelige Soe Kaarte Archiv

1806

Engraved for the Transactions of the Royal Society of Edinburgh by W. & D. Lizars 1813.

British Statute Miles

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

KALSÖE

WIDERÖE

FUGLÖE

SVINÖE

NAALSÖE

HESTÖE

SKUÖE

STORE DIMON

LILLE DIMON

THORSHAVN

KOLTER

Munken

Longitude West from Greenwich

VII. *An Account of the Mineralogy of the Faroe Islands.* *By* Thomas Allan, Esq. F. R. S. Edin.

[*Read* 1*st February* 1813.]

Sir George Mackenzie having already given a paper, entitled, "An Account of some Geological Facts observed "in the Faroe Islands," it may be necessary to explain why our communications were not combined in one. This was simply owing to our objects being in some measure dissimilar. He was anxious to compare the facts presented in a country decidedly volcanic, with those in a trap district, where no traces of a volcano were to be discovered; consequently, his observations were confined to particular facts: whereas my object is to describe, without relation to theory, whatever appeared to me interesting in a geological point of view.

I do not propose to embarrass myself with an attempt to reduce the various phenomena I remarked, to any existing theory, farther than what appears warranted by the new and additional light we derived from some of the appearances in Faroe. I shall content myself with aiding the labours of future travellers,

travellers, by enabling them to profit by our experience, and by removing the difficulty we encountered in procuring information, regarding the objects calculated to gratify curiosity, or assist us in our investigations, which neither of the accounts of Faroe published are capable of doing *.

In the following pages, I shall take notice of the objects most deserving of attention, and particularly note the localities where minerals are to be found; and conclude with a few observations on the geology of the islands.

To this I shall not attempt to add a description of the inhabitants, their mode of life, or their means of subsistence, although all are peculiar, and all interesting. It would be temerity to attempt it on an acquaintance of five weeks, although that time was sufficient to satisfy us, that they are a people in all respects honest, industrious, and hardworking, who earn their scanty livelihood with more labour than perhaps any other set of human beings, while nothing but patience and contentment appears to prevail among them.

In our voyage to Faroe, we were extremely fortunate; although the weather was boisterous, the wind was fair and steady, so that we cast anchor at Thorshavn exactly in sixty hours after passing the Isle of May,—a run of about five hundred miles. When we first made the land, the atmosphere was so thick, that it was some time before we discovered the island we were approaching to be the Lesser Dimon, situated between Suderoe and Sandoe. The form of this rock is similar to that of Ailsa; it gave us a glimpse of the trap country we were going to ransack, and as we approached our anchorage, other magnificent cliffs successively displayed themselves, affording some idea of the grand scenery we were about to visit.

Having

* The only publications on the Faroe Islands are those of Debes and Landt. The former appeared in 1670, the latter in 1800.

Having established our head quarters in the house of the Governor, Major LOEBNER, who entertained us with the greatest hospitality, we engaged a servant and a guide, who both of them occasionally acted as interpreters; and the weather being unfavourable for commencing our journey, we delayed a few days, in hopes of its improvement. We had selected June, as a season most likely to afford us comfortable weather; but during the whole month, we had not two days together that it did not either rain or snow. August and September, we found, were considered the most favourable periods. During this delay, we had time to inform ourselves of the best mode of travelling through the country.

In Faroe, the term *road* means little more than direction, as not even a path is to be discovered in some of the principal routes, which are merely the most passable cuts across the hills: occasionally a priest may save himself bodily labour, by traversing these wastes on horseback; but a stout man will generally accomplish the same distance in less time on foot.

Where a country is so entirely intersected by the sea, inland communication is but seldom resorted to, nor would it at all answer the purpose, where such constant intercourse is required; the inhabitants of the most distant parts being obliged to repair almost weekly to Thorshavn, to draw their little portions of grain from the Government store; where the stock is always so stinted, never more than a fortnight's allowance is delivered at one time. Besides, all the habitations are situated on the coast. Boats, therefore, afford the best mode of travelling, and the only means of conveying goods. Even to a stranger, there is no inducement to traverse the interior, which presents nothing but dreary desolation. All the striking scenery is on the coasts, and there only are minerals to be procured; for although LANDT mentions, that the best zeolites,

lites he got, were found among the debris upon the sides of the hills, those we picked up in such situations, were uniformly deprived of lustre, and otherwise much damaged.

The boats are principally used for fishing; they are all constructed in the country, of plank brought from Norway. They are built in the canoe shape, and though not very commodious, are so admirably fitted to the seas of Faroe, that I do not recollect, during the whole of our excursions, to have been in the least incommoded by the rising of the spray. The continual practice of the natives, and their constant habits of attending to the tide, not only for the purposes of their avocations, but also to mark time, when the sun is obscured in clouds, renders them extremely expert in the management of their craft; yet they never venture their boats to sea without having them well manned,—a precaution extremely necessary, where, by the rapidity of the currents, and the sudden gusts of wind, the waves are thrown into the most violent agitation almost instantaneously.

The Faroe Islands being so celebrated as the source of the finest zeolites and calcedonies, which decorate the cabinets of Europe, I there expected to find a perfect magazine of every thing magnificent of that nature; and never doubted that we should meet with people in plenty, who, if they had not objects of this description to dispose of, would at least be able to conduct us to the places where they were to be procured. I was therefore surprised, that not one person in Thorshavn could give us any satisfactory information on the subject. Such is the indifference those beautiful productions of nature, so justly prized abroad, meet with in their own country. Our guide, HANS, who had also attended Sir JOHN STANLEY in the same capacity, told us, that that gentleman had supplied himself with zeolites from a cave in Nalsoe, about twenty-three years before; but that he had not

not been in it since. Knowing what a hopeless measure it is to explore a country in quest of its mineral productions, without being previously directed to the particular spots that afford them, this information occasioned considerable chagrin; and as it appeared we had only our own exertions to depend upon, we commenced operations with all possible speed.

That part of Stromoe which surrounds Thorshavn is tamer than the generality of the country, and, so far as we could discover, presents nothing of interest to the mineralogist. We therefore immediately proceeded to explore Nalsoe, a long narrow island which lies within five miles; and here we found a constant source of amusement *.

Almost the very first object that attracted our attention on landing, was the very remarkable appearances of fusion, on the surface of a bed of amygdaloid, mentioned by Sir GEORGE MACKENZIE. These occurred on a point as nearly due east as possible from Thorshavn. Two miles south of this is the cave in which Sir JOHN STANLEY had found so many brilliant specimens of zeolite. It is described by LANDT as a very remarkable cavern, not, however, for its productions, of which he takes no notice, but as leading to a perforation said to pass so nearly through the island, that the noise of the waves on the opposite side may be heard at the extremity of it. This aperture I could not find; it may, however, be covered with debris, the place being so much altered since HANS our guide was there before, that he scarcely knew it to be the same.

It is situated considerably above the level of the sea, in a soft amygdaloid, and presents an opening of about two hundred feet in length, while its inmost recess does not exceed

* In the annexed map of the Faroe Islands, reduced from that of Captain BORN, I have traced our different routes.

eighty; in front it is nearly closed up with debris, which slope gradually into it, so that it is in many places quite low. Here, both in the solid rock, and among the fallen fragments, we found specimens of zeolite in abundance, of the species Stilbite, Apophyllite, and Chabasie.

The first of these was the most abundant, and occurred very beautifully crystallized, in irregular crevices, disposed in groupes, on globular mesotype, mixed with minute crystals of chabasie, and of the following forms:

1. Flat rectangular prism; the broad surfaces of which have a lamellated and pearly aspect, while the narrow ones are longitudinally streaked, with smooth shining terminations, set at right angles to the rest, forming a parallelopiped.
2. The same; having each of the solid angles replaced by two planes, set obliquely on the narrow sides of the prism, presenting the form *dodecaèdre*, fig. 178. of Hauy.
3. When the replacement of the solid angles is not complete, part of the terminal plane of the first variety remains. Form *epointé*, fig. 179. of Hauy.

Besides these, we found it in radiated and lamellar masses, and in aggregations assuming the sheaf shape.

The Apophyllite is a rarer mineral; we found it only among some of the fallen masses of rock, disposed on a ground similar to the last, and mixed with crystals of stilbite. The forms it assumes are very simple, and as follows:

1. Equilateral rectangular prisms; terminated at each end by a plane set at right angles. Here the sides of the prism

prism are all streaked, and the terminations pearly; these crystals appear to have but one cleavage, which is at right angles to the axis, and extremely distinct.

2. The same; slightly truncated on all the solid angles.
3. The same; with the truncation on the angles somewhat deeper; a small four-sided facet remaining on the summit, forming a truncated pyramid.

In other specimens I have found the apex complete, producing a very distinct sharp-pointed pyramid *.

We here likewise found radiated and amorphous mesotype; also in most delicate minute acicular fibres.

Chabasie occurred here only in very small crystals; but towards the southern extremity of Nalsoe, we found it in very large crystals, some of them at least an inch in diameter; they were imbedded in a very tough rock, and, being naturally brittle, we were unable to detach them.

From the southern point of Nalsoe, a portion of the rock was removed some years ago to Kongsberg in Norway, for the purpose of extracting the native copper dispersed through it; this, however was not found to answer, from the small quantity it produced. Another spot was also pointed out to us as affording copper, on the east side of the island, a little north of a small detached rock called *Kabelen*, and not very distant from where we first saw it.

* This variety has been referred by Haüy to the species Mesotype. From the great respect I entertain for the opinions of that distinguished mineralogist, it is with reluctance I venture to place it under a different name. It is not, however, without due consideration that I have done so: my reasons I shall detail more fully, when speaking of the Crystallised Mesotype.

I here had the good fortune to procure some very good specimens of the metal, in rather larger bulk than usual, very beautifully crystallized, with some of the sprays forming the nuclei of radiated mesotype; which, when considered in a geological point of view, is a circumstance highly deserving attention. Here the native copper is found in amygdaloid, at no great distance from the spot where we saw a bed of the same material covered with the most decided marks of fusion. It does not traverse it in veins, but is disseminated in minute particles, and sometimes presents crystallizations, equal in beauty to any from the veins of Cornwall, although imbedded in the solid substance of the rock, through which it branches with the utmost elegance and freedom.

The places I have mentioned as the localities of these minerals, with one or two others, rather of less note, were the only spots we landed at. There were many others, which appeared sufficiently inviting; but from the roughness of the waves, and the quantity of sunken rocks, we could not with safety approach them.

Having delayed some time, vainly waiting for good weather, we at last proceeded to the western coast of Stromoe, and took up our lodgings at Quivig, in the house of the priest, Mr Holm. During our voyage to this place, the mist lay so thick upon the islands, that we seldom could see the summit of the cliffs, near which we were obliged to steer, in order to keep our course.

Our host at Quivig, was the only person whom we met with in Faroe, in the habit of collecting its mineral productions; and although he did not appear to have made a very good selection for himself, yet he conducted us to different cavities on the shore, from which we obtained some of the finest zeolites that ever were brought from these islands. Some of the cavities

cavities were three feet in diameter, and entirely lined with large crystals of stilbite; but the most interesting, were between Quivig and Westmanhavn. In one, we observed the mesotype, in long acicular crystals, but so extremely slender, that it was quite impossible to detach them entire from the rock. In another, we found the same substance, but in a more tangible form. This cavity was about two feet wide, eighteen inches deep, and nine high, in a perpendicular rock, about ten feet from the base, which was washed by the tide. By means of a ladder, we succeeded in reaching this repository, and found the whole interior coated with aggregated groups of stilbite, having only the crystallised acuminations visible, of an opake yellowish-white colour, and varying from an inch to an inch and a half in thickness. Upon this ground were disposed numerous groups of mesotype, radiating from a centre, and shooting from the surface, an inch to an inch and a half in length, in clear, transparent, well-defined prisms, of a rectangular form, terminated with a flat four-sided pyramid, the variety *pyramidée* of HAUY, and varying in size from a hair to a line in thickness. It was a mortifying circumstance to be obliged to destroy any part of this very magnificent specimen, in detaching it from the rock; a circumstance, however, totally unavoidable. I succeeded in obtaining several very good specimens, and by gluing them carefully to the bottom of a box, was very fortunate in preserving them in all their natural beauty.

This is the Mesotype of HAUY, and the Nadelstein of WERNER; it varies entirely from the Apophyllite formerly noticed; in place of a distinct foliated cleavage, cutting the axis at right angles, with a pearly lustre on its terminations; it presents a vitreous fracture, without the appearance of any regular cleavage, and an uniform lustre in all directions. Fragments of Mesotype dissolve in nitric acid, and form a clear transparent

rent jelly; while the Apophyllite separates into minute particles, of a semitransparent white *. It besides varies in refraction, and is in all respects similar to the Mesotype from Puy de Dome, a magnificent specimen of which I had lately the honour to receive from the hands of Monsieur HAUY.

On the east side of the Bay of Westmanhavn, we found other cavities containing Mesotype. We there also discovered a vein of calcareous spar, about two feet in width, from which we detached several specimens; it was entirely composed of a congeries of crystals, among which were imbedded, rounded masses of amygdaloid. The forms here presented by the carbonate of lime are quite new to the mineralogist, and are particularly described in the late work of the Count de BOURNON, who has added to his already numerous collection of the crystallizations of that substance, no less than eleven varieties. To his interesting work I beg leave to refer for their detailed description †.

Having been compelled to abandon our intention of ascending Skeelingfeld, from the state of the weather, we were likewise advised not to attempt the open sea, by which we proposed to proceed on our journey to Osteroe. We therefore passed over to Wagoe, and paid a visit to the island of Tintholm.

The peculiarities of Tintholm are not mentioned in the translation of LANDT, although fully described in the original.

* The Apophyllite of Utö in Sweden, as well as of Disco in Greenland, after separating in the acid, swell out in a very remarkable manner, occupying a space very much larger than the original; but do not combine into a gelatinous mass.

† *Catalogue de la Collection Mineralogique du Comte de* BOURNON, London, 1813.

nal. This little island forms a continuation with the west side of the Bay of Sorvaag, but is not seen from the village of that name. We there obtained a boat, to proceed towards it, and in going down the bay, which is very narrow, we came suddenly in view of it, with all the singular and grotesque rocks by which it is surrounded. One of these is perforated by the sea, forming a very fine natural arch; while another, like an enormous column, placed crooked on its base, stands as if prepared to fall into the abyss beneath.

The summit of Tintholm may be from five to six hundred feet above the level of the sea; it is divided into a number of pinnacles, so extremely slender to appearance, that it becomes a matter of surprise how they resist the fury of the storm. This peak presents on the south side a bare perpendicular cliff, and appears to be principally composed of amygdaloid. The only observation we made here, was with regard to the extreme similarity of the trap-tuff to that which Sir GEORGE MACKENZIE met with at Akkerfeld, and in other parts of Iceland. It contained no minerals of any note.

Here, for once, the weather favoured us; and although the cliffs of Wagoe were not more elevated than others we had previously seen, they were disincumbered of clouds, and when viewed from the farther extremity of Tintholm, formed a most sublime prospect. At the time, we could not sufficiently estimate their altitude; but the diversity of form into which their summits were broken, and the fine contrast afforded by the intervening rocks, with the beautiful effects of light, altogether rendered our visit to this place extremely gratifying, particularly, as we were not at all prepared tomeet with any thing of the kind; and we left it with a feeling, that overlooking Tintholm, would have been the omission of an important object of curiosity, in a tour to Faroe.

Next

Next morning Wagoe was obscured in heavy clouds of thick mist. When the tide served, we left Midvaag, on our return to Thorshavn; but had no sooner fairly quitted the shores of this island, when, emerging as it were from darkness, we had a view of Skeeling, and the other mountains of Stromoe, with the islands of Hestoe, Kolter, Sandoe and Suderoe, none of which had been visible as we passed them before.

It very frequently happens, that one island is enveloped in fog, while the next is quite clear of it. The clouds take their partial stations with inconceivable tenacity; and, according to the direction of the wind, it was usually known what sort of atmosphere was enjoyed in the remote quarters of the group.

From Thorshavn we proceeded on a second tour, to Eide, a small village situated at the farther extremity of Osteroe. The channel which divides the two principal islands is very narrow in some places, and cannot be passed at all times of tide, even in the small craft of the country, being traversed by a reef of rocks near the middle. The hills are generally tame on both sides of this passage, excepting at Zellatrae, where there is a magnificent bed of columnar greenstone.

At Eide we remained some time; but our proceedings were still sadly impeded by the weather; we, however, had an opportunity of ascending Slattertint, a neighbouring mountain, apparently not much lower than Skeeling.

According to Captain Born, the last-mentioned is only 2400 feet high. From the very excellent chart constructed by that gentleman, after an accurate survey of the islands, in which even the shading of the mountains is executed with great correctness, we ought to state with diffidence, that our measurement of Slattertint, by means of a barometer, indicated an elevation of 2825 feet; from its summit we could discern, that

that Skeelingfeld was considerably higher, and, according to our estimation, not less than 3000 feet above the level of the sea. We had no opportunity of repeating our observation; but as we took all possible pains to guard against error, we have room to suspect that Captain Born must have fallen into some mistake; although, from the opportunities of observing, which his long residence in the country must have afforded him, we cannot, without much hesitation, come to such a conclusion.

In this excursion we had reason to congratulate ourselves on our good fortune. The atmosphere was clear of clouds, consequently almost every island in the group was within sight, which, from the wonderful variety in the form of the hills and islands, affords a very grand and striking prospect.

The peculiar delight one feels in the enjoyment of a boundless view from an elevated situation, was, on this occasion, considerably enhanced by the unobscured horizon, and peculiar brightness of the day; since our arrival in the country, we had not till now enjoyed a single hour, that would have permitted us to see half the extent. Though bleak and barren, and in many places covered with eternal snow, the novelty of shape, which varied in every hill,—the deep indentations of the sea,—the contrast of the irregular outline with the even and unvarying direction of the rocky beds, and the placid stillness of the surrounding ocean, all contributed to repay us most amply for the trouble of our ascent.

Like many of the Faroe hills, the summit of Slattertint is flat, and presents an irregularly oval plane, of sixty yards by thirty-six in its greatest dimensions. This surface is covered with thick moss, under which the soil was completely frozen. We observed nothing remarkable in the composition of the beds, and no minerals of any consequence.

The village of Eide is situated on the acclivity of one of the headlands which presents a perpendicular front to the ocean. Some of these we had previously been much struck with; that of Nypennæs puzzled us extremely. LANDT represents it to be 1200 feet high, which, from the magnitude of every thing around, the little distance we thought we were from it, and without any object by which we could form an estimation, we could not bring ourselves to believe. I was therefore determined to ascertain, by the simple mechanical means of a line and plummet, the height of the Kodlen, as the headland near Eide is called, and succeeded, by letting down a fishing-line, with a stone at the end of it, from the top of this formidable precipice, from which I ascertained its height to be 1134 feet *. This, I believe, is a very near approximation to the truth: the elasticity of the cord was the only material source of error; but I endeavoured to counteract this defect, by stretching the cord sufficiently when it was measured off.

We were thus furnished with the means of forming a proper estimation of these tremendous cliffs, and without it we should in all probability have left the islands under a very different impression regarding them than we did. The Kodlen

* It was not till after the third attempt that I was satisfied with this experiment. In the two first I met with unlooked for difficulty, by the hitching and entanglement of my cord, upon the projecting points of the rock, and also by the severity of the blast, which, striking on so large a surface, blew upwards with tremendous fury, even when there was otherwise apparently but little wind. I consequently bethought myself of coiling a given quantity of cord, upon a round stone, and forming a compact mass, of sufficient weight to overcome the violence of the wind opposed to it at the summit, which decreased proportionably to the opposition it met with in descending; while the shape, and unfolding of the rope, rendered it less liable to attach itself to the points of the rock. By means of this device, I succeeded to my satisfaction..

len is by no means remarkable for its elevation; the Myling, in Stromoe, is at least a third higher. presenting an unbroken mural front, with scarcely a point for a bird to perch upon from the summit to the base.

On the west side of the promontory, opposite Thiornivig, and also on the east side, upon the shore, we observed numerous indications of fusion upon different surfaces of the rocks; and it was from this vicinity that we procured the principal part of the specimens, bearing testimony of this fact, that we brought home with us. It was among some large fragments, also on the east side, that we discovered specimens of apophyllite altogether rare for the magnitude and beauty of crystallization.

They here occur in rectangular prisms, often in perfect cubes, sometimes longer, sometimes shorter; occasionally, the cubes are truncated upon the solid angles, either slightly, or so deeply as to meet, forming the regular *cubo-octohedron.* The crystals, like those formerly mentioned, which we found in Nalsoe, are streaked on the sides longitudinally, and have a pearly aspect on the terminations; they are disposed on a ground of mamillated mesotype, and in some instances grouped like fluor-spar; the cubes being irregularly implanted on each other. They are perfectly transparent and colourless, except when affected by the weather, which renders them dull and opake. The largest I met with measures seven-tenths of an inch, by five-tenths. I was assured by M. Varina, a Spanish mineralogist, and a distinguished pupil of Werner, that it is to this variety he gives the name of Cubizite, although it is under that appellation the Analcime and Chabasie of Hauy are described by Brochant and others. It may be, therefore, that the Cubizite of Werner, is in fact the Apophyllite of

HAUY, and that WERNER's Nadelstein should be confined to HAUY's Mesotype.

The only other circumstance of interest which I met with near Eide, was a remarkable instance of the abrasion of the surface, where the rock appears to have been worn down by the friction of heavy bodies. Of this I shall take notice in the sequel.

Again, we were obliged to abandon our station, without completing our intentions, in consequence of the badness of the weather; and being deterred from venturing to the northern islands in this direction, we returned to Thorshavn, resolving to attempt it by the south side; and after some delay for a favourable day, we reached Waaij in Bordoe, with tolerable prospects of success. Here we had just landed, and prepared ourselves for our afternoon's excursion among the neighbouring hills, when it began to rain heavily, and continued pouring for fifty hours, accompanied with sleet; on the third evening a shower of snow commenced, and next morning the mountains were clothed in white almost to the water's edge. It was now the 23d day of June, and yet this inclemency created no surprise among the natives, who assured us, that at Christmas the weather was generally better. The recent snow did not lie long, and, anxious to do something before we left the place, we ascended a hill which lies on the west side of the village, while it yet snowed, and were repaid for our trouble, by observing marks of fusion, similar to those of Eide, but at a height of at least 1200 feet. We had hitherto found them only close upon the shore.

Despairing of being able to proceed farther, and as our provisions were not calculated for so long a delay, we were compelled to return to Thorshavn, and busied ourselves in directing preparations for our final departure. At this time the weather

suddenly

suddenly assumed a more settled appearance than it had hitherto done; and having still a few days at our disposal, we resolved to make a last effort, to visit the objects we had hitherto been prevented from seeing. We had now to retrace a great part of our former track; but the difference of weather rendered it entirely new to us. Formerly, as one cloud followed another, we caught an occasional glimpse of the coasts along which we were steering; now we had a delightful view of all the islands and groups of mountains, perfectly unimpeded; and their rough surfaces afforded as magnificent effects of light as can well be imagined. One of the most extraordinary of these, is in the island of Wagoe. On the north side of the entrance to the Bay of Midvaag, there is a fragment of a rock standing out from the rest, to which, from its acute pyramidal form, they have given the name of the *Trolkende Fingeren*, or Witch's Finger. As we approached it from the extremity of Stromoe, the light struck upon it, and the rocks in its vicinity, exactly so as to produce the appearance of a Gothic cathedral; an appearance not requiring fancy to help it out, but actually demanding attention to overcome the illusion. We had passed close under this rock twice before, but had not till now seen it.

We again passed our former residence at Quivig, and reached Westmanhavn soon after noon. Next morning we were ready to start on our long meditated expedition at an early hour. The weather was fine, and the water in the bay as smooth as any lake; still the people wished to dissuade us from venturing upon the open sea, asserting that we should find it very rough without. We now began to be less moved by their representations than formerly, having observed their extreme caution, or rather timidity, on all occasions. We determined to proceed, and although the sea was certainly more agitated than

than we expected, all inconvenience it occasioned soon absorbed in the stupendous grandeur of the scenery that opened upon us. From the northern coast of Wagoe, all the way to Eide, we had a continued series of magnificent cliffs, towering in many places, like minerets, to the height of 2000 feet. Here also we saw a series of rocks, which, from the accounts contained in LANDT, had excited a great degree of curiosity: although they do not by any means accord with his description, yet they present some of the wildest and most magnificent appearances possible. Here a part of the coast is separated from the rest, and appears to have formed a barrier or wall in front, the ruins of which now only remain. In one place, where the largest portion stands highly elevated from the water, an immense perforation, like a grand portal, presents itself, through which boats of any size may row in safety. The rest of this reef, as it may very properly be considered, presents a string of fantastically shaped rocks, many of them acute pyramids, denominated *Drengs* in the language of the country, in a line at unequal distances. In a little narrow bay near this, of about three or four hundred yards in depth, there is another wall, somewhat similar, dividing the bay in two; the extremity of which ranges with the entrance of it. The end towards the sea is highest; and from this it declines to the other, being ornamented all along with the same kind of pinnacles we formerly admired at Tintholm. In it we also found a natural arch, through which we passed in the boat. These walls, I first suspected, might have been the remains of enormous dykes, similar to some which exist on the coast of Antrim; but on examination, I found no traces to support that conjecture, nor could I discover any probable cause for their separation from the adjoining country.

We

We arrived at Eide in the afternoon; and from thence proceeded, early next morning, towards the northern islands, directing our course to Wideroe. From the general appearance of the country, and the perfect sameness we every where met with, in its geological characters, we found there was little inducement to prolong our stay in this quarter, and therefore resolved, if circumstances permitted, to return the same day to Thorshaven.

The morning was beautiful; and as we skirted along, we had a delightful view of the coast, which presented many of the singularly shaped rocks, of which we had seen so many the day before. Being obliged to keep out to sea, to get into the current, we had an opportunity of comparing the relative heights of the Myling and Kodlen, and to form a very accurate judgment of the former, by knowing the altitude of the latter. We now passed along the islands of Kalsoe and Kunoe, which are little more than lengthened ridges of barren rocks, presenting the most frightful aspect of sterility. We arrived at Wideroe a little before mid-day; it is situated on a peninsula, the isthmus of which is of considerable extent: on the left, the rocks rise, in wild and rugged peaks, to a very great height; and having viewed the bold and rocky shores of Fugloe and Swinoe, from the opposite side of the island, we again embarked.

It was our intention, at this place, to have changed our boats; but the people being all engaged abroad, plucking their sheep *, our crew from Eide offered to take us forward, apparently delighted with the opportunity it gave them of obliging us. We had already come twenty-three miles, and were distant

* The savage custom of tearing the wool from the backs of their sheep, still prevails in these islands.

tant thirty-three from Thorshavn, where our people were still twenty-three miles from Eide; and as they never remain from home over night, they had to complete a journey of seventy-nine miles without rest, and almost in the constant exercise of the oar. From their knowledge of the tides, they are enabled to take every advantage of the current; but in a voyage of this extent, it was impossible to have it always favourable; we were therefore more than once stationary for upwards of half an hour; the utmost exertion of the crew being barely sufficient to prevent the boat being carried back with the stream, in turning some of the headlands we had to pass. About eight in the evening we reached Thorshavn, where, after resting an hour, our crew left us to return home, and arrived there at two in the morning, having performed their voyage in nineteen hours, including stoppages, an exertion which may appear incredible but to those who saw it.

By this rapid and successful voyage, we retraced in three days nearly all our former excursions, and, besides, accomplished our visit to the northern islands. We were now fully satisfied, we had nothing new to expect by extending the period of our stay, and nothing now remained worth examination, except the island of Suderoe, which, lying in the course of our return, we expected to stop at after our final departure from Thorshavn; but in this we were unfortunately disappointed.

We were likewise satisfied with the supply of minerals we had obtained. We had made a splendid collection of zeolites, of every variety, except analcime, of which I was rather surprised not to have seen a single specimen in the country, except one solitary crystal, which was found among the debris at Waaij. Since our return, however, I have procured a very magnificent specimen of this substance from Kollefiord in Stromoe,

Stromoe, not above ten or twelve miles distant from Thorshavn; a discovery somewhat mortifying, considering we could have visited it with great facility.

Of Calcedony we had likewise procured several very capital specimens, all brought by the people to barter against tobacco; nor could we learn where they were to be found *in situ*, being constantly told, that they were got loose upon the summits of the mountains, and by the priest at Quivig, that the place he found them in, was at that time covered with snow. Two days before our departure, an accidental circumstance led to the accomplishment of what I so much desired: a country man offered us some masses, having the appearance of being recently detached, from some small barnacles which adhered to them being still alive. This led us to inquire where they were got; and being informed at Lambevig, within twelve or fifteen miles distant, we determined to explore it. The nearest approach to this place is by Skaalefiord, on the west side of Osteroe. Here we landed at Glibre, and walked over to Lambe, not three quarters of a mile distant, and having there procured a boat, were set on shore among the rocks, a little to the right of the harbour, where we soon found some immense masses of calcedony.

Our apparatus was now considerably impaired; besides, the rock was so situated, that nothing but mining tools could effectually act upon it. These we had now neither time nor opportunity to apply, although we would certainly have done so, had we come here earlier; as it was, we procured some excellent and interesting pieces of calcedony, as well as some capital specimens of chabasie. But the circumstance which afforded me most satisfaction on this expedition, was to find the cavernous calcedony *in situ*. I here saw plates of it of extraordinary dimensions, one being four feet long by two in breadth,

which appeared to be parallel, with several others which I saw in the same place, and all of them horizontal.

On the shore of Skaalefiord, we also found several masses of calcedony, of the same description, likewise cavernous; and I have no doubt, that by a little attention, abundance may be found in the same vicinity.

This excursion was particularly gratifying to me, as it afforded an opportunity of observing some peculiarities in the relations of a fossil, very much referred to by the supporters of the two great geological questions, each as affording decisive proofs in their own favour. Viewing it as belonging to that subject, I shall connect my observations on calcedony, with those I have to make on the geology of the country.

The difficulty we met with, in discovering the localities of minerals, fully confirmed the fears I anticipated on our first arrival. Excepting Mr Holm the clergyman of Quivig, we did not find a person in the country, in the practice of collecting minerals. But notwithstanding the apparent indifference, with which these beautiful productions are treated by the natives, yet they soon found out the objects we were in pursuit of, and frequently afforded considerable assistance in finding them; as all, however, depends on the care with which minerals are taken from the soil, and as these poor people are destitute of implements for this purpose, it is impossible they can obtain them in their most interesting state, even if they were inclined to bestow their time and labour in collecting them, which the difficulty they experience in obtaining the more necessary articles of food and raiment most peremptorily forbids.

This excursion to Lambe was the last. The day following we embarked, expecting the vessel would come to anchor off Suderoe, as was originally intended. But as we approached

that

that island, the wind blew so fair, and at the same time so strong, that we thought it more advisable to bear away, and had the singular good luck to reach Leith Roads in less time than we took going out, having performed our expedition exactly in six weeks.

GEOLOGY.

In the preceding part of this paper, I have purposely refrained from touching on geology, in order that I might bring together the few remarks that occurred on that subject. No country perhaps presents such perfect sameness in its geological relations; from end to end the islands are composed of trap rocks; consequently, it is only to the peculiarities this interesting series here affords, that my observations can extend.

Sir George Mackenzie has already described part of the curious phenomena I now allude to, which he thinks corroborate the doctrines suggested by some of the facts he met with in Iceland, and has, in a great measure, exhausted a subject so singularly meagre. A few observations, however, still remain to be made, without entering into any theoretical discussions, which, though amusing, in the present state of knowledge, are not capable of leading us to any satisfactory conclusions, with respect to the general formation of the globe. All I hope to accomplish is, to give a faithful description of what I have seen; and to mark the impression made upon my mind, by

certain features which distinguish the Faroe Islands from all other countries I am acquainted with.

The Faroe islands occupy a geographical extent of about sixty miles by forty; their greatest stretch being north and south. Throughout the whole, there is not one atom of stratified rock to be met with, if I may be allowed to judge from the islands we visited, together with what we learned of those we did not touch at. I do not consider, that even the coal of Suderoe presents an exception to this general conclusion. We have much reason to regret, that circumstances prevented us from exploring this island; as, from some remarks, both of DEBES and LANDT, as well as from some observations of Captain BORN, which occur in a periodical publication of Copenhagen, devoted to natural history, Suderoe contains peculiarities in the arrangement of some of the trap rocks, with which we found nothing analogous in any of the other islands. According to LANDT, the coal was particularly examined by a Mr HENCKEL in 1777, in obedience to the orders of the directory of mines; and by his report, the veins extend in length 12,000 feet, and, at an average, 4000 in breadth. He then goes on to calculate the quantity of fuel that an area of such dimensions would produce. From this it must be supposed, that he has estimated in the above sum, the whole of the coal to be met with in Suderoe; consequently, as there are several places at which it is found, none of the seams can be of large extent. With respect to the quality of the coal, he asserts, that it was found to be superior to that of Airshire; but this cannot be the case, if it be all like the specimens we procured, which are entirely similar to that occurring imbedded in the basalt, in the vicinity of Ballintoy, on the coast of Antrim. It presents the same ligneous texture; it burns with difficulty;

it

it emits the same intolerable smell; and produces a very large proportion of ash. At Ballintoy it occurs only in small beds, sometimes in very minute patches, and is used only in burning lime.

I think it is fair, therefore, to conclude, that this coal presents none of the characters of regular stratification; and it besides, appears to be totally unaccompanied with sandstone, as I find it immediately connected with trap in some of the specimens I have got. So far as we saw, sandstone does not occur in the country. LANDT mentions generally, that it is to be found in the dales of Nordstromoe. We nowhere, however, saw any vestiges of it; and from the very low ebb of his geological acquirements, nothing on that subject, unless corroborated by other testimony, can be attended to, as we may judge by the following passages, quoted from Captain BORN, as authority. "If (says he) a bluish-grey fine-grained sort of stone, "which contains grains of quartz and calcedony, be not *gra-* "*nite or limestone*, neither the one or other is to be found in "the islands." Page 140.

The varieties of trap we met with, were Greenstone, Porphyritic Greenstone, Amygdaloid, Trap-tuff, and Porphyry-slate. Basalt we found only in a few dykes; we nowhere saw it in beds, or presenting the beautiful articulated columns of Staffa and the Giant's Causeway. The beds composed of these different kinds of trap, have one uniform dip and direction; stretching from S. S. E. to N. N. W., and so very slightly inclined, that it required a considerable portion of the rock to be seen at once, to render the inclination perceptible. When surveyed from the north or south, the beds consequently appear horizontal; while on the east and west sides an inclination is observed, dipping almost imperceptibly towards the south.

This

This arrangement of the mass of beds, prevails with great uniformity throughout; we observed them to deviate only in one instance from it, at the western extremity of Myggenaes, where they rise abruptly to an angle exceeding 45°. There was no particular uniformity that we perceived, in the succession of the different kinds of trap, although such might perhaps be discovered on more minute investigation. The trap-tuff was more abundant than any of the other varieties, and was often the only material we could distinguish, in cliffs of tremendous elevation, in which we sometimes found it difficult to trace the separation of the different beds. When greenstone or amygdaloid are interposed, the separations are better defined, and are often divided, by a layer of brick-coloured fine-grained tuff, which passes into the substance of the adjoining bed, and is analogous to the red material which forms so striking a feature in the basaltic promontories of the Giant's Causeway. The grandest display of greenstone which we met with was at Zellatrae in Osteroe, where the bed, like that of Fairhead, is three hundred feet thick, and split in a similar manner, into prismatic concretions, which, at a distance, give it a regular columnar appearance. On the top of the hill, at Leynum, I found the greenstone in the rude columnar form, which it assumes on the south-west side of Arthur's Seat; and in Nalsoe, as well as in some other of the islands, we noticed beds of a description quite new to me. Being considerably elevated in the cliff, we could not ascertain the dimensions with accuracy. I think, however, that, in Nalsoe, may be from forty to fifty feet thick; it is composed of vertical columns, enormously thick. In some the diameters were little short of their length; and although they stand straight upon the base, they are all bent at the sides, so as to present an irregularly waved line between each. The most singular circumstance

cumstance respecting them is, that they are all coated with an arrangement of small prisms, set at right angles to their axis; so that when some of these rude masses are broken in their longitudinal direction, a circumstance which occurred not unfrequently, a double set of small prisms appeared, to separate the columns, not unlike little dykes; and when an horizontal direction chanced to be displayed, a radiating arrangement of prisms was observed around the edge. The substance which generally occurs, of a brick-red colour, and forms partial separations between some of the varieties of trap, seldom extends to any great length; in thickness it is very irregular; the greatest depth we met of it, was in the vicinity of Kirkeboe in Stromoe, where it may be from eight to ten feet. It is not invariably of a red colour: under the greenstone at Leynum, it occurs of a dark-green. This material, which in some cases may very readily be mistaken for sandstone, particularly as it frequently presents a slaty texture, after being acted on by the weather, appears to me to form a portion of the overlying trap, although it no doubt presents a very different character. In other beds of greenstone, nearer home, alterations equally remarkable may be pointed out; and as we frequently observed in it cavities lined with zeolite, similar to those which were dispersed through the other parts of the same bed, it cannot possibly be considered of a separate formation.

Notwithstanding the uniformity that prevails in the general disposition of the trap in Faroe, there are some beds which depart entirely from it. The most remarkable of these, we met with in the vicinity of Norderdahl in Stromoe. A little north of this place, there is a conical hill, presenting a projecting rounded front towards the shore; and being denuded from top to bottom, the structure is distinctly seen, and the horizontal beds traced with the utmost precision. Resting on these, and covering

covering the summits and sides of this cone, excepting on the south, a bed of greenstone stretches, which is rendered particularly conspicuous by the vertical rents of its prismatic concretions. On the west side, after descending more than half-way from the top of the cone mentioned, it continues towards, and again rises to the top of Dalsnypen; from whence passing under other beds, it may be traced in an undulated line, almost without interruption, to Skellingfeld, where it terminates in a wedge, about half-way from the base of that hill. A little north of this, and nearly in a line, the same kind of greenstone recommences, and extends to beyond Leynum. Skeeling presents on the west side a bare section, like the conical hill of Norderdahl, whence the beds may be counted in one continuous slope, from the base to the summit, rising to a height of about three thousand feet; and here, although the powerful mass of greenstone I have just noticed, loses itself in a wedge, there is not the slightest derangement created among the other beds of trap of which Skeelingfeld is composed.

The position of this enormous mass of greenstone is worthy of attention, and is difficult to reconcile with any of the doctrines I know of. Its occurrence in Skeeling, &c. as an adventitious bed, like that of Salisbury Craig, is nothing uncommon; but when it extends from under the incumbent trap, stretching itself over a most irregular surface, and finally covering, as like a cap, a very acutely conical hill, it assumes a new and totally different character.

It is in the beds of amygdaloid that the beautiful zeolites and calcedonies are found. I have already noted the different places where they occur, and have also given sufficient details respecting the varieties of zeolite. But as the peculiarities of Calcedony have often been urged in support of doctrines very opposite

opposite in geology, a description of them belongs more properly to this part of my subject.

From the proofs we met with in Faroe, of the igneous origin of trap rocks, I think it almost unnecessary to enter into any discussion respecting the formation of Calcedony, as no doubt can very reasonably be entertained of its co-existing with the matrix in which it is inclosed. The laws by which it has been regulated, in assuming the various appearances it now presents, are, however, beyond our reach; nothing I met with tended in any degree to elucidate the subject.

Calcedony occurs in the rock in the most irregular masses, generally rounded, and sometimes shooting into forms like bunches of grapes. It is either solid, or in hollow cavities, and varies in size from the head of a pin to a foot or upwards in diameter. When solid, the masses are marked with parallel lines, straight or concentric, sometimes with both; the latter forming a border or coating round the straight lines. The solid pieces are frequently penetrated by minute stalactites of the same substance, branching through the mass, in a form perfectly vegetable; and as these always contain a portion of green earth, it occasions an appearance extremely similar to moss; which no doubt has given rise to the assertion of LANDT, that moss and straw actually occur in them. I have sometimes found, on breaking the solid masses, which contained these slender fibres, the latter would separate from their bed, and leave an impression of their form,—a tolerable proof that they must have been in a solid state previous to their being enveloped in the larger mass. I have obtained very few stalactites, whose centres are not occupied by this green substance; it seldom exceeds in thickness the twentieth part of an inch, and varies in colour, from a very

dark green, with a tinge of blue, to a pale green, and even a light straw-yellow. It is always opake. It is not easy to conceive, that this substance could have existed without something to support its very delicate fibres; but yet this appears to be quite evident, from the examination of specimens, and consequently adds one more difficulty to the solution of the formation of Calcedony.

When calcedony occurs in hollow cavities, they are simply mamillated, ornamented with stalactites, or lined with crystals. Externally, they are of a very fantastic shape; but within, the arrangement is more symmetrical. The upper part forms a kind of dome, with a smooth mamillated surface, or appended all over with stalactites, which generally hang perpendicularly, but sometimes ramify in every direction; while the lower part of the cavity is filled up, so as to present an horizontal surface or platform, affording a pleasing contrast with the irregularity opposed to it.

This platform is evidently the result of circumstances subsequent to the formation of the stalactites, as they not only occasionally penetrate it, but sometimes the horizontal part seems to have risen to the top, so as to have filled the cavity, and envelope the stalactites entirely. This part of the mass also varies from the rest, by presenting different shades of colour, forming the onyx, or *Band Calcedony* of the lapidaries; it is often accompanied with semi-opal, white, yellow, and green in colour, and also with the opake white substance, known by the name of *Cacholong*. It likewise often happens, that the upper and stalactitic part of the cavity is covered over with a second deposition, forming a distinct coat, which sometimes differs in colour. Besides the circular arrangement which this produces in the section of the stalactites, when they are cut across

and

and polished, a radiation of fibres may be observed diverging from the slender green thread which occupies the centre.

It does not appear as if the form of the stalactites were owing to the pendulous position in which they are found, as they sometimes occur attached by the side, and terminated both above and below. With respect to size, they vary, from the thickness of a hair to two inches in diameter; but I have not found any above four inches in length.

The cavities are often entirely lined with crystallized quartz, which always forms a distinct coat, and is sometimes interposed between the two coats of calcedony. To illustrate these combinations, I selected a series of specimens, all of them portions of hollow masses. In the first, the quartz is transparent and crystallized, in the usual form. In the second, the crystals are coated with calcedony, but so slightly, that the shape of the quartz is preserved entire. In the third, the edges of the crystals are rounded off. In the fourth, the apices are partly converted into mamillons. And, in the fifth, the crystallization is entirely replaced by a mamillated surface; the quartz being visible only in the section of the mass. Nearly the whole of these changes may be traced in one specimen belonging to Sir George Mackenzie. At one part, the crystallization is nearly complete, while, at the other extremity, it is perfectly mamillated. I never observed quartz crystals among stalactites, or stalactites among crystals. The quartz and calcedony always occur in distinct coats, one or other occupying the whole surface, and, except very rarely, with perfect uniformity.

Quartz and calcedony is a combination well known to mineralogists; but before visiting Faroe, I was not aware, that the latter substance occurred, also intimately connected with zeolite. Some Danish mineralogists have considered this substance as the connecting link between calcedony and opal; a

conclusion I did not find to be justified by the observations which occurred to us; opal and the mixture of zeolite and calcedony having uniformly very different aspects.

The first specimen of this description which I procured, is a very interesting one. The outer surface, or that which lay next the matrix, is formed of radiated zeolite, which has also been projected into the cavity, in the form of stalactites. The whole of this is covered over with calcedony, which is so intimately blended with the acicular fibres of the zeolite, that it is nearly impossible to trace the demarcation between the substances. And, again, upon this calcedony, is imposed a coating of most slender stalactitic fibres of the same material. In the centre of the zeolitic stalactites, there is a point, like that occupied by green earth, in those of calcedony, from which the zeolite diverges. Here the zeolite is infinitely harder than is usual with the varieties of that substance,—an effect no doubt produced by its intimate connection with the calcedony.

In cavities of this description, we sometimes found quartz and sometimes zeolite; but the latter does not, like the former, uniformly occupy the entire surface, being occasionally dispersed in solitary crystals, among the stalactites of calcedony, and sometimes, though rarely, accompanied with carbonate of lime.

The only variety of crystallized zeolite which occurred in these cavities, was Apophyllite, presenting two or three very beautiful varieties of crystallization:

1. In rectangular prisms, terminated at each end by faces set at right angles to the axis, and deeply truncated on all the solid angles, so as to form a truncated pyramid, the

the sides of which would measure about 67°. This is the *Mesotype epointée*, fig. 175. of HAUY.

2. The same crystal, with the apices of the pyramids perfect; may be termed the Pyramidal Apophyllite.
3. When the same crystal is so short in the prism, that the truncating faces touch, and so broad on the terminal faces, as to reach the sides of the prism, a cube truncated on all the solid angles is produced.
4. In rectangular prisms, hollow, and diverging at the termination. This variety, I suspect, owes its present appearance to decomposition.

In one specimen, I found some of the crystals of zeolite covered with a *sheath* of calcedony, open at the top, and partly hollow, owing to the decomposition of the apophyllite. It would be almost endless to proceed, with a detail of all the peculiarities which occur, in the combinations of these different substances. I have said enough to mark several curious circumstances relating to them; many of which will perhaps have an effect quite the reverse of affording any clew towards those hidden arts by which the hand of nature has accomplished their formation. We have proofs, most unequivocal, of the igneous origin of the rock in which they are imbedded, and *consequently* of their own. But granting this, as also the construction of the cavities, and the production of the stalactites of calcedony, whence came the second coating, which so frequently occurs, lining them entirely and uniformly throughout? whence the different alternations of quartz and calcedony? and whence the substance of those beautiful crystallizations of zeolite I have just mentioned?

Like

Like all other trap countries, the Faroe islands are intersected by innumerable dykes. Those we examined were principally of fine-grained greenstone, and more or less formed of prismatic distinct concretions. They frequently occur in the hollows, between hills, and in gulleys which intersect the precipices, being, from their proneness to decompose, themselves the cause of these indentations. They do not appear to have any peculiar direction, although they be generally very nearly perpendicular. Many we perceived cutting the hills from top to bottom. Some we could trace from one island to another; and even where covered with soil, we often observed their track, by the superiority of the verdure on the surface; the dyke, from its looseness of texture, having acted as a drain, and rendered the bottom more nourishing to the vegetable root. This circumstance proves how permeable these dykes are to moisture, and helps to account for the singular fissures that often present themselves on the shore. They are considered by LANDT as marks of some violent convulsion in nature; and to a common observer, they have very much that appearance. The effects of the weather, however, without any such assistance, are quite sufficient to accomplish this end; nor will its operations be tardy; the constant action of the surface-water on the summit, and the continued lashing of the waves at the base, are agents of sufficient power; and we have thus dykes washed from their *sockets*, for an extent of several hundred feet, leaving a frightful chasm in rocks of enormous height.

Two of the most singular dykes we met with, are between Thiornivig and Westmanhavn, on the north-west coast of Stromoe. The first intersects a mural precipice, a little beyond Stakken. This is a double dyke: immediately under the edge of the cliff, it divides, and shortly after joins again;

it

it then separates a second time; and the left branch continues its course downwards to the sea; while that on the right diverges, and breaks off in a point; a little beyond, but somewhat above the level of this, it recommences, and continues downwards to the edge of the water, in a line parallel, but at a distance from the other. Both terminate in caves, which often occur at the base of dykes.

The other which attracted our attention, is a little south of the entrance to the bay in which Saxen is situated. At the top, it cuts the edge of the cliff, in the usual manner. After descending for some length perpendicularly, it makes a curve to the left, in the form of a hook, and becomes evanescent. Within this curve another takes its rise, and after describing a figure similar to the letter S, it again vanishes. To this another succeeds, somewhat similar in form, but not quite so regular, commencing and vanishing in the same way; and from within the lower curve of the last, another sets off; and from this the dyke continues perpendicularly till it reaches the water. The cliffs in which these two dykes are, being principally composed of trap-tuff; the colour of which is dark-brown, while the dykes themselves are almost black, and of the prismatic structure; the contrast renders them conspicuous and well defined.

I have seen many veins of basalt, but never found one presenting features at all analogous to those of the last mentioned. From the appearance of the tuff in its immediate vicinity, one would almost imagine, that the whole mass, from top to bottom, not less, I think, than about 1000 feet, had been in a soft state when invaded by the dyke. In many of these rocks there is a parallel disposition of the materials observable; and in some, myriads of minute particles of zeolite were arranged in such regular lines, as to give them a decided stratified appearance.

ance. Some such lines existed in this cliff; which, near the dyke, were drawn as it were into the curves it has described, which could not easily have been the case, had the rock been in a solid state when it was traversed by this dyke.

The soil produced by the degradation of trap-rocks is usually found to be fertile, and favourable to vegetation. These islands, however, where no other rocks exist, have no such happiness to boast of. In Faroe, there is no flat land, on which the reduced materials can rest; and where not occupied by impracticable cliffs, they present a solid smooth surface, always highly inclined, on which vegetation, by degrees, arrests the crumbling particles, and in time forms a sward upon the arid rock. Here, however, from the impenetrable nature of the mass, no support can be obtained by the vegetable fibres; accumulation, therefore, becomes fatal, and, sinking under its own weight, the soil slips from the surface, and leaves the rock in its original naked state.

The hills being placed so near to each other, there are no valleys to enrich; consequently, whatever falls from above, is swept away by the mountain torrents, and affords no farther benefit. So slight is this vegetable covering, that it often gave way under our feet, leaving the smooth rock exposed. This was likewise the case among the more recent debris, on which, when expecting safe footing at least, we often found an inclined and slippery surface, covered with wet clay, which rendered a considerable degree of caution necessary. It is between the sward thus formed and the rock, that the rain-water must find its way. Hence the cold damp bottom on which the verdure rests, renders it totally unfit for cultivation or improvement.

Where the torrents poured down the side of a hill, we had an opportunity of observing the smooth and solid nature of the

the rock, on which the action of the water had produced no other effect, than displacing the soil, the course being simply marked by it on each side; and LANDT informs us, that there is no soil in any part of the country above three feet thick. It would be curious to investigate, whether this smoothness on the sides of the mountains could be traced to any external cause, such as that which has been observed by Sir JAMES HALL, on Corstorphine Hill, and other parts of this country, indicating the passage of heavy bodies along the surface. Near Eide, I observed a very remarkable example of this description. There the rock was scooped and scratched in a very wonderful degree, not only on the horizontal surface, but also on a vertical one, of thirty to forty feet high, which had been opposed to the current, and presented the same scooped and polished appearance with the rest of the rock, both above and below.

Had any doubt respecting the igneous formation of trap rocks remained upon my mind, previous to my visit to Faroe, it would have been completely removed, by the facts we there met with, which have been so ably described by my fellow traveller. These we first observed in the Island of Nalsoe, and afterwards at Eide, and at Waaij. The specimens bearing marks of this phenomenon, which we brought home, in order to present to the Society, will sufficiently convey the same impression to all who examine them. No production of a furnace can tell its tale in plainer language, nor any slag bear more distinct marks of the effects of heat.

In Nalsoe, it was only on the surface of one bed of amygdaloid that we observed these marks of fusion. They were the first I had seen, and of course created no small degree of surprise. This was distinctly the upper surface of the bed, be-

ing immediately overlaid by the brick-coloured trap-tuff, passing into the superincumbent bed. At Eide and Waaij, the appearances differed from those of Nalsoe. They did not occupy the surface, but were dispersed through the bed, at different elevations, yet all parallel, as if it had been formed of a multitude of partial flowings, each moulding on the consolidated surface of its predecessor, and extending, as the supply of fluid matter permitted; and, so far as we observed, this was always in the direction of the declivity of the hill or cliff on which we perceived them.

By the regularity of the folds and wrinkles which characterize their surfaces, and their usual horizontal position, they seem to have flowed undisturbed; and although we never met with any very extensive surface exposed at one place, in consequence of finding them always on the declivity of a hill, yet we had the most perfect evidence of their passing under the incumbent rocks, but to an extent of which we could of course form no estimation. There was enough, however, seen, to mark it as a fact of a general nature, and one which, more than any other I have ever met with, denotes the origin of trap rocks.

There is a wide difference between ascertaining the agency by which a rock has been formed, and the manner in which that agent has been applied. It is an inquiry perhaps of no great utility, but, in prosecuting the one, the other naturally presents itself, and the inquisitive mind cannot be expected to stop short, particularly at a point, where, for the first time, it has met with data quite unequivocal. Here, however, the multiplicity of proof in favour of the former, throws a difficulty of great magnitude in the way of the latter. Had each bed been the operation of a volcanic eruption, the appearances of fusion would

would have been confined to the surface, as was the case in Nalsoe; but when these occur throughout the whole mass, all in parallel lines, it is difficult to comprehend how the minute portions constituting a series of distinct and separate flowings, could have been produced. From the smallness of their bulk, it appears evident, that they never were exposed to the action of a superincumbent ocean, as they could not possibly contain heat enough to counteract its effects; and if the whole bed had been in fusion at once, the internal marks, if not obliterated, would, at all events, have been deranged. In order to conceive a bed of lava flowing under an ocean, I should imagine one necessary postulate is, that the bulk of heated matter must, in all cases, be equal to sustain the whole in a state of fusion, until it has flowed into the situation it was destined to fill; and from thence, again, other operations are requisite to raise it to the station it now occupies, above the level of the sea.

The extent of the country, the uniform inclination of the beds, their regularity and symmetry, all present difficulties to this mode of formation; and while the igneous appearances in the rocks of trap, bespeak a source in some near neighbourhood, throughout the islands, there is not one spot that can be fixed upon, more readily than another, as the site of a volcano; the highest hills in the country, Slattertint and Skeelingfeld, being surmounted by beds of trap, nearly horizontal.

To my mind, the subject remains loaded with difficulty. It is something to have obtained such unquestionable corroboration of the igneous origin of trap. But the circumstances under which that powerful agent has performed its office, are to me, I confess, as inexplicable as ever.