TRANSACTIONS

OF THE

GEOLOGICAL SOCIETY.

I. Account of Guernsey, and the other Channel Islands, by
J. MAC CULLOCH, M.D. F.L.S. Member of the Geological Society.

The few following notes may help to explain the maps on which I have sketched the leading features of the mineralogy of the Channel Islands. The specimens which I collected having been mislaid, I am unable to give a more particular description of the stones which I have noticed.

These islands are situated in St. Michael's Bay, and from the general direction of the land, the form of the bottom, and the numerous rocks which are scattered around, may possibly have once been more intimately connected with the Coast of Normandy. Of this however, any further evidence, arising from continuity or similarity of strata, is, for the present at least, inacessible.
Dr. Mac Culloch's Account of Guernsey.

It will be seen that they are chiefly formed of granitic rocks. The Islands of Chozè, which lie deeper in the Bay, are of similar formation, and I am informed that Mont St. Michel is also a mass of granite. Excepting this, I have not been able to obtain any information with regard to the Coasts of Normandy or Brittany, from the Islands of Brehat to La Hogue. But from the Seven Islands to l'Isle de Siecle, including Morlaix and Treguier, I have had opportunities of ascertaining that granite is the predominant rock; and more extensive observation may possibly prove, that a chain of granitic rock extends from Cape La Hogue to Ushant, a line parallel to that granitic chain, which runs in a WSW direction, from Dartmoor to the Scilly Islands. This is rendered further probable, from the rockiness of the bottom of the sea, and the quartzose gravel and sand which are brought up by the sounding line.

The average depth of water in the neighbourhood of the islands is thirty-five fathoms; it is scarcely any where more than forty, and with the exception of a few shoals, the bottom is tolerably uniform.

Numerous rocks beset these coasts, some of which form large chains lying in an east and west position. A variety of currents is the consequence of the particular position of these islands in the Channel stream, and the intricacy and rapidity of them, tend to form a very difficult navigation, and a strong natural defence, to the islands.

The tides on these shores rise to a considerable height, though not nearly equal to their elevation in the bottom of the bay, where the check to the Atlantic wave is greatest. The height which they attain is from thirty to forty feet: at Guernsey it is thirty-two feet: At St. Maloes it is said to exceed sixty.

The great wave which enters from the Atlantic, striking directly against the projecting Coast of Normandy, first fills the bay, and then continues its course along the islands, and round La Hogue, up
and the English Channel. Where its passage is narrowed, and diverted by the land, it forms those currents of which the variety and intricacy is so great, and of which the rapidity is such, as in some places to amount (it is said) to six miles in an hour.

Neither from my own observations, nor from the traditions of the inhabitants, nor from ancient records, have I been able to trace much alteration in the level of the sea, or any considerable change in the positions of the harbours, or the depths of the soundings. Indeed, the shores in general being high, small changes of level are more likely to escape notice; and the rocks being of a firm constitution, and belonging to a country without rivers, and almost without ice, escape some of the ordinary causes of decay.

ALDERNEY.

The approach to this island is somewhat dangerous, from the rapidity and perplexity of the tides, and the number of the rocks which surround it.

Its eastern end is only seven miles distant from Cape La Hogue, and the passage between them, Raz Blanchard, is known to English navigators by the name of the Race. Here the tide wave undergoes its first violent contraction, and here the rapidity of the current is greatest. Its course is on the NNW rhumbline.

The high rocky shores which are subjected to the constant action of this current, do not appear to have suffered materially from it; apparently, because they are formed of a rock so inclined, as to avert the effects of its action.

This part of the island is also beset with rocks, but there is deep water in mid channel. About six miles to the southward of it lies
Dr. Macculloch’s Account of Guernsey,

the Banc de la Chole, extending in a WSW direction about the same length, and having only two fathoms water on it at low tides.

On the other side of Alderney to the north-west, is the passage of the Singe, which, although narrow, contains water for ships of great burthen. It is formed by the shores of Alderney and the little island Burhou, and like the other passage, is subject to a short and turbulent sea.

The Island of Alderney shelves to the NE, but it is also intersected by deep valleys. Its length is about three miles and a half, and its greatest breadth one and a half.

The whole of the southern and western part, from La Pendante to La Clanque, is bounded by cliffs from one hundred to two hundred feet in height, presenting various picturesque and striking scenes. The northern and eastern sides consist of low cliffs, alternating with small bays and flat shores.

This part of the island is formed of a reddish grit, and the western side of porphyry; in which respects Alderney differs from the others of the group; which do not contain either of those rocks, at least, in large masses.

The boundary of this grit to the south-west, may be determined by a line drawn from l’État to Braie, or nearly. It is an aggregate formed from a detritus of granite, regularly varying in its texture and colour. At the NE part of the island it is a red coarse-grained grit; but it becomes gradually whiter, and of a finer texture, towards the west, till it ceases; resembling there, the finest sandstone. It is stratified through its whole extent, in parallel and equal strata, of about a foot in thickness. These strata are straight and continuous wherever I have observed them, and are almost every where inclined in an angle of 45°, dipping towards the east. Here and there, are some strata of a more horizontal tendency. Their equality and the
regularity of their position gives them in some places, where their edges are exposed, a form so apparently columnar, that they might at a distance be mistaken for basalt; and when a succession of these ribs appears cropping through the grass, the appearance as of the skeleton of a mountain is exhibited. The cliffs give no opportunity of observing on what bottom this sandstone rests, as the tide flows high round them. I have remarked that it becomes finer and whiter as it approaches the south-west, that is to say, the strata which in their original horizontal position were undermost, are the whitest and finest. They, here also, approach nearer in their nature to a sandstone flag; acquiring a schistose fracture, though incapable of being raised in large masses. The stone is however easily quarried, and breaks naturally into masses having their sides slightly inclined, or absolutely rectangular. It is therefore well calculated for architectural purposes; and abundance might be procured at a small expense, very nearly adapted for squared building without the assistance of the chisel. The few inclosures which are used in the island are built of this stone without mortar.

The principal varieties of the stone that I have been describing are the following.

1. White—very coarse—the quartz cemented by a clay the produce of the felspar.
2. The same—red—and with distinct grains besides, of felspar imbedded in it.
3. Dark red—and containing mica.
4. The felspar so distinct as to reapproach to a fine-grained granite.
5. A variety consisting of very minute grains, and to the magnifying glass exactly resembling a granite.
6. **Dr. Mac Culloch's Account of Guernsey**, 

6. A granitel, consisting of quartz and felspar in equal proportions.

7. A similar stone with a much less proportion of felspar.

8. No felspar at all—a fine white sandstone.

All these varieties are evidently the produce of the disintegration and reunion of more ancient granites.

At a point on the southern shore, is a rock called La Pendante, resembling a square tower of masonry, and inclined at a considerable angle. It consists of portions of the strata I have been describing, and appears about twenty feet high.

Where the strata of grit cease, a vein, or an inclined stratum, of black granitel, composed of hornblende and quartz, is found; which appears to run straight, and in contact with them, in a N and S direction across the whole island, from l'Etat to Braie. This is a thick mass, but I could neither discover its dimensions, nor its points of contact with the grit. It is in some places accompanied by a fine-grained sienite of a compact nature; and by another, much disintegrated and shot with iron. Here and there also, are fissures filled with red and purple hornstone, and more rarely, fissures, or what appear such, filled with sandstone-schist and mica, and often assuming the appearance of micaceous schist. The grit, which is cut off by this mass of granite, does not here absolutely disappear; but various strata of it and the granitel, succeed each other, till the whole ceases, and is replaced by a mass of porphyry.

Of the mass of porphyry, the remainder of the island is formed. And it is the broad and perpendicular fracture of this rock, which causes the picturesque appearance of the western extremity of the island.

It appears to have a great tendency to wear before the effects of time. At the western point in particular, where it is exposed to the
and the other Channel Islands.

undiminished force of the wind and the sea, it has undergone consider­able changes, and many detached rocks of rude forms are the conse­quence. And on this side it is in many places so thoroughly decomposed, as to have formed a white, powdery, siliceous soil, much resembling tripoli.

The whole of this porphyry has a hornstone basis, and is either red, grey, or white. Together with the felspar, it frequently contains imbedded grains of quartz. On the beach I picked up flints, and pebbles of different coloured hornstone. It is a necessary conse­quence of such an arrangement of rocks, that a great part of the soil of Alderney should be sandy. It is nevertheless well supplied with water, and produces good crops of grain and vegetables. Its valuable breed of cows is well known.

The precipitous rock Ortac lies a mile and a half to the westward of Alderney. It is about an hundred feet high, and connected with a chain of rocks that stretches from Burhou. And at the distance of seven miles in the same direction are the Casquets, remarkable for their well-known lighthouse, and consisting of many high and sunken rocks. I had no opportunity of visiting any of these, but was informed that they consisted of the same grit as the eastern end of Alderney. The figure of Ortac would however lead me to think that it was formed of porphyry, as its precipitous appearance is not so consistent with the tendency of the grit I have described. No organic remains have, as far as I know, been found in Alderney.

GUERNSEY.

The approach to Guernsey is also full of danger, from the number of the rocks, and the rapidity of the tides which surround it.
This island is of a triangular shape, its extreme length being seven and a half miles, and its greatest breadth about four. Its gross circuit is twenty-one miles.

The inclination of the land bears some resemblance to that of Alderney, as it is elevated to the south; and shelves towards the north. The southern coast is bounded by high cliffs, which also extend along part of the eastern coast. The remainder of the eastern and the northern sides, consists of a series of flat bays, divided by interposed ridges of high rocks.

The whole island is readily divided by a line drawn from the Town to Pezeries. To the north of this imaginary boundary is a level tract, interrupted only by cairns and rocky hillocks. And in this tract is an inundation of about sixty years standing, which covers three hundred acres; but whether this has arisen from any change in the level of the sea, or the failure of some natural barrier does not appear. It is quite dry long before the time of low water.*

To the south of the line I have supposed, the country forms a higher stratum, or stair, but everywhere intersected by narrow vallies and deep glens, of which the direction is exceedingly various. The high cliffs which bound this southern tract are continuous, with the exception of two or three narrow coves, the mouths of small vallies intersecting the high land.

On this part of the coast there are but few detached rocks; the northern shore is beset with them.

The Island of Guernsey is almost entirely of granitic formation, the southern division consisting entirely of gneiss, and the rocks which form the northern part exhibiting various kinds of granite or granitel.

To descend to a more particular description, the rock on which

* Since this paper was written, the tract in question has been drained and embanked.
Castle Cornet is built of a gneiss, often approaching so near to granite as to render its place in a nomenclature doubtful. It is everywhere crossed and intersected by veins of quartz, of trap, and of felspar, curved and mixed in various ways, but tending, upon the whole, to the north or north-east. More rarely there are found in its veins of brick red and bright green felspar, and pebbles of the same substance, or with hornblende imbedded, are found on the beach, as well as coarse agates passing into quartz and hornstone.

Proceeding from the Castle southwards, gneiss is found to constitute the cliffs on the eastern side, often in a state of decomposition, and covered with a great depth of debris. These strata, which extend all along the south coast to Rocquaine Bay, seem to tend from NE to SW, and have various inclinations, but most generally 10° or 15°, dipping to the south. On the southern side of the island they are intersected by veins of white, flesh-coloured, and red felspar, of various breadths. In some places the felspar veins pass into granite. Veins of quartz, and veins of a granitel consisting of quartz and felspar, also traverse it. A few veins of trap are also found intersecting it at Rocquaine, which are occasionally superseded by trap porphyry, or by the same substance containing minute grains of quartz. In this tract there are wrought two or three quarries of a black granitel, consisting of hornblende and quartz, and very hard.

The constitution of this stone varies much through the extent which it traverses. In some places it is a true granite, in others the mica disappears, in others again this latter ingredient becomes so abundant, that the stone passes into micaceous schistus. Occasionally also hornblende enters into its composition, as has been noticed by others: when this is the case it sometimes loses the foliated structure and passes into sienite. Sometimes all the other ingredients are excluded, and felspar alone remains. There may
also be traced gradations into mere quartz; and I further observed some varieties consisting of wavy mixtures of quartz and hornblende only.

This stone has a considerable tendency to decomposition, the felspar and mica being both very ferruginous. It is consequently found in all states, from that of a friable rock, to a gravelly clay, and finally to a perfect soil; constituting the gravelly or sandy loam which predominates through the Island.

No where is it more easy to remark the process by which in nature rocks are converted into earth; and as in this case by the action of an oxide of iron. Nests of yellow mica which seem to have arisen from the decomposed rock, are found in many places.

This stone is used for rough masonry.

A ledge of rocks called the Hanois extends from the westernmost point of the island, and from its apparent geographical continuity is probably of the same structure. Against this point the whole strength of the western ocean is first directed. And it is from hence I doubt not, that a large ridge of rounded masses of stone has been rolled, so as to form a natural barrier near Rocquaine.

In quitting the elevated part of the island, and with it the southern shore, the gneiss disappears; and its place is supplied by other granitic formations. Besides the trap and trap porphyry which I remarked at Rocquaine, there are masses of micaceous schist, having the appearance of veins; and a stratum of argillaceous schist may also be observed at the lower parts of the bay, incumbent on the granitic foundation.

At l'Erée and Lihou the rocks are composed of quartz and felspar, the foliated texture having disappeared. A granitel is thus formed, which in some places receiving an addition of hornblende, passes into sienite. This is traversed here and there by veins of the same
and the other Channel Islands.

red and green felspar, which are found at Castle Cornet. The same highly coloured felspars are also occasionally intermixed so as to form a constituent part of the granite, which thus becomes exceedingly beautiful.

Among the various pebbles which I picked up on the beach, I observed a black siliceous schistus and hornblende slate, but from whence they had been detached I could not discover: the latter however is known to be common in gneiss as well as in granite rocks.

At Grande Rocque are large masses of sienite, which are quarried to form building stones. It is the only rock of this nature on the island, and its produce is fully equal in beauty to that of the celebrated quarries of Mont Mado in Jersey, although it cannot be raised in such large masses. The felspar is the predominant ingredient, and it is either white or flesh-coloured. It is traversed by veins of a similarly constituted stone, but more minutely compacted and of a brick red colour. In some places indeed the veins seem to consist of a felspar basis, with grains of quartz and hornblende imbedded, approaching in its nature to a petunse porphyry. It is here an universal rule that where the granites are traversed by veins of a similar nature, the vein is the most compact of the two. As the hornblende is sometimes wanting in these stones, and as mica is sometimes present, we meet with many other granitic varieties. I observed in one place lumps of argillaceous porphyry stuck in granite, as has been noticed by Baron Born.

The predominant rock towards the bay of St. Sampson's, is a grey or black granitel, consisting of quartz and hornblende mixed in various proportions. Detached masses of this rock are also found in the higher grounds, as well as among the gneiss of the southern coast.
The hornblende in some places predominates so as to give a sort of hornblende porphyry, and in others, every other ingredient is excluded, and a hornblende rock alone remains. I observed some specimens, traversed by a derivative rock of the same composition, interspersed with minute grains of pyrites; the only trace of the kind I perceived in this island.

This stone is very hard and sonorous, and admirably adapted for building, as it easily breaks into squared masses before the hammer. It is more particularly fitted for paving, from its extreme hardness and toughness; and for that purpose it is exported in large quantities to London and to Portsmouth, by the name of Guernsey stone, or St. Sampson's stone.

A similar succession of rocks occupies the remainder of the coast to the town.

Such, as far I had opportunities of remarking, is the mineralogical structure of this island. The discovery of lime was much desired by the inhabitants, but there is no appearance of limestone.

Although the principal rocks are of a metalliferous nature, no metallic traces have at any time been observed.

It has been a common belief in England that emery was a product of this island, but of this I could neither obtain physical nor historical evidence.

The soil which is the produce of the decomposed gneiss is abundantly fertile, the ground being well watered, in a climate exposed to the first arrival of the Atlantic clouds. Springs and rivulets are therefore plentiful, and as is usually the case in siliceous countries, the waters are remarkably pure and free from saline impregnations.

Of Herm and Jedhout which are detached prolongations of the same rocks, nothing can be said which would not be a repetition of what I have remarked concerning Guernsey. The inaccessible ridge
and the other Channel Islands.

of the Anfroques is probably of a similar structure, and this is some­what pointed out by their granitiform outline.

SERCQ.

The little Island of Sercq lies six miles to the east of Guernsey, and is rather more than three miles in length. Its extreme breadth is not more than a mile and a half, and its average breadth not quite a mile. In one part, it is not many yards wide, being nearly divided into two portions, connected only by a high and narrow ridge. A small island, l’Isle des Marchands, lies on the west side of it, and sundry detached rocks surround it on other sides. Though of such small dimensions, it is more interesting to a mineralogist than the other islands, not only from the greater variety of its rocks, but from the more perfect exposure of its formation that is afforded by the abrupt cliffs which bound it on all parts. Unlike Guernsey or Alderney, it is a table land, having no declivity to the sea at any part, except a small descent at its northern extremity. The cliffs by which it is bounded are from one hundred to two hundred feet high. Except the Isle des Marchands which I men­tioned, the western shore is so abrupt that large ships may range it very near without hazard. The eastern shore is less clean, and is beset with ridges of rocks running far out into the sea. The bottom is rocky. The eastern side of the land is also pretty uni­formly about one third lower than the western, or it has a tendency to rise towards the west. In a general view the western side is of a trap and schistose formation, and the eastern of a granitic. It is intersected by veins of greater magnitude, and a more decided character than Guernsey, Alderney, or Jersey. The surface of the island though high, is every where intersected by deep vallies;
conducing much to its picturesque appearance, and contributing to its fertility: in which, on a comparison with Alderney, it very much excels. It is well watered, and produces trees of tolerable growth and vigour; a circumstance denied to the former.

Although there are five landing places about the island, there is no harbour where ships can lie, and but one beach where small boats can be wintered. Such is the nature of the cliffs, that except at the Creux, where a tunnel is cut through the rock, there is hardly any entrance to the land, but by climbing. It is a very strong natural fortification, and might at a small expense be rendered impregnable.

The rocks which compose the shores, being of various and generally fine forms, afford a variety of singularly grand and picturesque scenery.

Havre Gosselin, which is formed between the land and l'Isle des Marchands, is the nearest landing place to Guernsey. This is bounded by cliffs of trap formation, near two hundred feet in height, in many places very hard and compact, as is particularly the case where it is in contact with granite. The rock of which they are formed seems to have a N and S direction, consisting of indistinct strata, and dipping to the east under an angle of about 40°. These cliffs are divided by many large and deep fissures, out of which the materials have been washed, thus leaving large caverns. Some of these veins which I was able to examine, are filled with granitic stones, ironshot, and in a state of decomposition. In some parts I observed dark siliceous iron stone; and in some, were mixtures of black mica and quartz, resembling micaceous schistus. Smaller intersections are formed of green, and red jaspers, and many coarse agates are found among them, consisting of similar materials, and mixed with hornstones and quartz of different colours. Many veins are inaccessible, but the substances found on the beach which seem to
have been washed out of them, are, coarse yellow, brown, red, and green jaspers, sometimes containing veins of iron ochre, or crystals of hornblende, or passing on the one hand to quartz, and on the other to hornstone. Sometimes they are veined with quartz, and striped and waved of various colours, with mixtures of quartz and calcedony, resembling agates.

The Peninsula of Little Sercq is connected with the main island by the high narrow ridge before mentioned. This is about three hundred yards in length, and has a precipitous face to the sea on the eastern side; to the west it is also partly rocky and precipitous, and the remainder is a steep declivity of broken rocks and rubbish. It is called the Coupee, and on the top of it is a rugged path of frightful appearance, being in many places not above a yard or two in breadth, and in most without boundary on either hand. By this, the communication between the two parts of the island is kept up.

This narrow neck is traversed by a vein of porcelain clay at its widest part, ten or twelve feet in thickness, and lying E and W across it.

In most places this vein is much contaminated by purple, red, and yellow oxides of iron, and intersected by reticulations of quartz, which are probably the remains of veins running through the granite, from the decomposition of which the porcelain clay appears to have originated. Grains of quartz are also found dispersed through it, and indeed in many places it seems to be little altered from its original granite. Towards the bottom of the vein various substances are found, among which are coarse approaches to calcedony and agates; but the greater and apparently the most interesting part of the vein was inaccessible to me, in consequence of huge masses of fallen rocks.

In some places are veins of quartz having a slaty fracture, and becoming earthy, or much discoloured with iron, or containing
nODULES RUDELY APPROACHING TO OCULAR AGATES. These are accompanied by veins of mica and felspar in various states of decomposition, apparently from the failure of the mica, and by veins of chlorite containing here and there pyrites, together with talc and quartz, and talcaceous schistus, and a mixture of greenish steatite, felspar, and quartz. The rocks here also are of trap formation, and the beach is covered with jaspidaceous pebbles as at Havre Gosselin.

Such is Grande Havre, and the number of the soft veins here existing may serve to account for the great waste the land has undergone. The Coupée is becoming daily lower to the eye.

The southern point of the island is formed of a sienite, but there is no opportunity of tracing its connexion with the trap of the western shore; for, from the Coupée to l'Etat there is no access, unless under circumstances of weather which rarely occur.

The Etat very much resembles in shape the Mewstone of Plymouth, and from its appearance and inclination is probably of the same formation as that I have been describing. The felspar of the sienite is invariably white, and not nearly so beautiful as that of Guernsey before mentioned. It is intersected by various trap veins, one of the most remarkable of which near Paregorois runs N and S, inclining about 3° to the W, and is about six feet in thickness. This vein consists of trap porphyry and amorphous trap; and besides these, regular hexangular blocks, the sides alternately large and small, are quarried out of it. I was unable to find in what position they lie, as the vein was only accessible at low water, but from what I observed in a similar vein at Experquerie, I am inclined to think that the columns lie across it. Their joints are flat. Some veins of a brick red felspar are also here to be observed, and in some places the sienite passes into greenstone; but as this part of the coast is almost inaccessible, it is difficult to say what varieties may exist in it. The
sienite which I have been describing seems to be continued as far round the eastern coast as les Burons, where trap is again found. Of this part of the coast I can say nothing more particular. Those shores which are not impracticable are very difficult of access; and that which was accessible was sufficiently various to occupy more time than I was able to appropriate to its examination.

Further to the north, and on the eastern side, is the port of the Creux. This is a dry beach, in a cove formed by high cliffs of argillaceous rock, of which the faces are absolutely perpendicular in most parts, and as smooth as a wall. Being inaccessible from the land, and at the same time the only secure beach on the island, a communication was formed in 1588 by De Carterets, who excavated a tunnel through the rock; taking advantage of a loose vein which traverses it. This passage is occupied by a gate, and thus the chief landing place is rendered defensible by a very small force. The whole is strikingly picturesque and singular.

Ridges of detached rocks stretch out to sea from this point, which from the peculiar form of their outline appear to be granite.

There is a small funnel on the coast resembling the Buller of Buchan or Tol Pedn Penwith: it is called Creux terrible. I did not see it.

From hence to la Noire is an inaccessible promontory, but on the other side of it, is a steatitical vein containing asbestus, and which is probably the continuation of a vein I shall have occasion to notice on the western side of the island at Port des Moulins.

I also observed a large vein of black porphyry, of a beautiful texture, and capable of a high polish, containing distinct and large concretions of white and pale green felspar. An inaccessible vein is also here visible, of which the lower part has been washed out so as to form a cavern. The upper part which remains, shows blocks of
stone lying transversely and resembling masonry. I supposed it to be a vein of columnar trap similar to that I noticed at Paregorois. From Experquerie to Port des Moulins I could not examine the coast.

The descent into Port des Moulins is through a narrow pass of wild rocks, and the scenery of it is of the most picturesque class. Detached masses of rock surrounded by the sea, and relieved by the broad cliffs which bound it, constitute its peculiar feature. The whole of these rocks are of grauwacké schist and grauwacké. The strata are nearly horizontal, and are occasionally intersected by veins of quartz, as is common elsewhere. It is nowhere of a foliated fracture producing roofing slate, but in many places breaks into pieces well adapted for square masonry. In some places where it lies near to granite it seems to undergo an alteration of texture, and to become more siliceous. It is intersected in one or two places by wide and perpendicular veins of the magnesian class of stones; and where it is in contact with those veins, it appears to pass into schistose talc, and indurated steatite.

The veins I have mentioned contain various kinds of steatite, often so contaminated with iron and clay, and so indurated, as to be difficultly distinguished from the argillaceous tribe.

Talc, talcaceous schist, and asbestos, are found in the same veins; and with the asbestos are slender veins of argentine spar.

Lapis ollaris is also found there, as well as in the land lying above the cliffs, from which I guess that this vein extends across the island. It is applied by the natives to economical uses.

A very large wall of a redish granite, the end of a vein from which the schistose strata have been washed, stands far out on the shore, forming a natural arch. Where the arch is formed, a softer cross fissure seems to have existed from which the looser materials
and the other Channel Islands.

have been washed away. This vein intersects the grauwacké, and is nearly perpendicular, running in an east and west direction. Parallel and near to it, is a similar vein, but not standing out from the cliff, and between these two granite veins is contained a vein of argillaceous stone about fifteen feet thick, the whole forming a singular kind of stratified vein lying in the grauwacké.

I have to regret that the flowing of the tide prevented me from making a more accurate examination of this interesting spot. This is particularly desirable as it is said that De Carteret about one hundred years ago wrought a copper mine here. The researches however of Mr. Le Pelley, the lord, have not confirmed this report, nor could I distinguish any metallic traces. Their existence however is not improbable, as it is well known that the rocks I have been describing are very productive of metals, and that copper ore among others is frequently found in similar situations.

From this place to l’Isle des Marchands, the coast appears to consist of the same materials. I had no time to examine it, and I believe it is everywhere inaccessible.

The small island itself is precisely of the same nature as the opposite coasts.

JERSEY.

The island of Jersey is in the form of a parallelogram, being about ten miles long and on an average about five broad. Its inclination is precisely the reverse of that of Guernsey, it being much elevated to the north and shelving away to the south. It is everywhere intersected by narrow vallies, of which the most common direction is across the island, or north and south. The soil is not unlike that
of Guernsey: it is equally well watered, but being better sheltered and of more extent eastward, is far more productive of trees.

The cliffs which form its northern shore are in general about an hundred feet in height, though in many places they attain twice that elevation. The whole of this side is indented by small coves and bays. The western, southern, and part of the eastern sides, are formed of shelving shores, and wide sandy bays, separated by high rocks. Sundry rocks are dispersed round these coasts. On the northern side of the island lies a large and long ridge stretching east and west, consisting of the Paternostres, the Dirouilles, and the Ecreho. The depth of the sea is more variable round Jersey than round any of the other islands, there being many banks and shoals about it.

In a general view the whole of the high and northern tract may be said to consist of granitic rock, and the southern and flatter part of the island of a mass of schistus incumbent on it. The high rocks which stretch away to sea all round Jersey seem to be of granitic formation.

The Bay of St. Ouen is a large flat sandy tract occupying the whole western side of the island, and bounded by a ridge of sienitic rock, of which species all the granite of Jersey appears to be. A few rocks of grauwacké schist are seen emerging from the sand. This coast is subject to a sandy inundation, but it does not appear to spread rapidly: no precautions are taken to prevent it.

The ridge I have been describing terminates at the Corbiere, in an assemblage of rocks which stem the current of the Atlantic tide, forming a rapid and boisterous sea about this point, well known to seamen. From here to St. Aubyn's we find a succession of points formed of the same rock, their sides being everywhere covered with schistus. The castles of St. Aubyn and Elizabeth are built on similar rocks.
and the other Channel Islands.

The history of this shore is the history of the whole coast as far as Mont Orgueil, where the granitic rock becomes more continuous. The castle itself is situated on a high promontory of it.

From Mont Orgueil to Rosel harbour, with the exception of a flat shore in St. Catharine's bay, is a continuous cliff, affording no variety of structure, and not intersected by any remarkable veins.

But at Rosel a very singular rock commences, which appears to occupy the whole of Bouley Bay from Rosel to Belle-Hougue. At a distance it so much resembles the forms of the granites in Cornwall, that I should have set it down as such had I not examined it at hand.

It is an argillaceous breccia consisting of large and small scraps of schistus cemented by a basis of the same nature, but having entirely lost its tendency to a schistose fracture. I found some veins of a white hornstone porphyry which run in it. How it is connected with the granitic rock I could not find, but I traced it two miles into the country towards the church of St. Martin.

The whole remainder of the northern coast consists of rocks of sienite of various elevation, exhibiting generally broad and perpendicular faces to the sea. They are everywhere intersected by perpendicular veins running N and S, forming many remarkable caverns where they have been exposed to the action of the waves.

These veins wherever I saw them seemed to consist of granite, of which the felspar was commonly of a brick red colour. The sienite itself is in general white, consisting of variable mixtures of quartz, felspar, and hornblende, and varying therefore in colour. Most commonly the felspar is predominant.

In the rocks of Mont Mado the felspar is particularly abundant, and is of a flesh colour, constituting a very beautiful variety, which is also susceptible of a fine polish.
There are quarries established on this spot from whence stone is raised for the use of the island: it is also exported to Guernsey and to England. In times of peace it has been carried to France.

The quarries are inexhaustible; the cliffs for a long space and an elevation of an hundred feet or more, consisting entirely of this stone, in large masses apparently undisturbed by a single fissure. Shafts for columns of considerable length have been taken from the quarries, and were the demand sufficient to call for new openings, I have no doubt that columns of twenty feet and upwards might be raised.

No metallic traces, except of iron, have ever been observed in Jersey.*

There is no trace of lime, a substance so much wanted.

The schistus, though spread wide over the island, has not hitherto afforded any slate.

I wish that my knowledge and my time had enabled me to make these notes somewhat more than a mere sketch of mineralogical topography.

* I have just been informed by Mr. Lowry that manganese has been lately found; but I have not learnt the particulars.
Plate I. View of the CREUX in the ISLE of SERQU.
No. II. View of the COUPEE in the ISLE of SERCQ.

Published for the Society, by Cadell and Davies, London, 1811.
No. III. A Granite Vein in Port des Moulins in the Isle of Sercq.

Published for the Society by Cadell and Davies, London, 1812.
N°IV. General View of PORT DES MOULINS in the ISLE of SERCQ.
IV. View of FOURCHI POINT in the ISLE of ALDERNEY.

Published for the Society by Cadell and Davies, London, 1814.
No. 71. View in the GREVE DE LECQ in the ISLE of JERSEY.